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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.

To safely perform service on this product, see the *Service safety summary* that follows the *General safety summary*.

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.

While using this product, you may need to access other parts of a larger system. Read the safety sections of the other component manuals for warnings and cautions related to operating the system.

When incorporating this equipment into a system, the safety of that system is the responsibility of the assembler of the system.

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.

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.

Use proper AC adapter

Use only the AC adapter specified for this product.

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.

Connect the probe output to the measurement instrument before connecting the probe to the circuit under test. Connect the probe reference lead to the circuit under test before connecting the probe input. Disconnect the probe input and the probe reference lead from the circuit under test before disconnecting the probe from the measurement instrument.

De-energize the circuit under test before connecting or disconnecting the probe.

Observe all terminal ratings

To avoid fire or shock hazard, observe all ratings 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 float the common terminal above the rated voltage for that terminal.

The measuring terminals on this product are not rated for connection to mains or Category II, III, or IV circuits.

The measurement terminals on this product are not rated for connection to Category III or IV circuits.

Do not connect a current probe to any wire that carries voltages above the current probe voltage rating.

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.

Wear eye protection

Wear eye protection if exposure to high-intensity rays or laser radiation exists.

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.

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.

Beware of high voltages

Understand the voltage ratings for the probe you are using and do not exceed those ratings. Two ratings are important to know and understand:

- The maximum measurement voltage from the probe tip to the probe reference lead.
- The maximum floating voltage from the probe reference lead to earth ground.

These two voltage ratings depend on the probe and your application. Refer to the Specifications section of the manual for more information.

WARNING: To prevent electrical shock, do not exceed the maximum measurement or maximum floating voltage for the oscilloscope input BNC connector, probe tip, or probe reference lead.

Connect and disconnect properly.

Connect the probe output to the measurement product before connecting the probe to the circuit under test. Connect the probe reference lead to the circuit under test before connecting the probe input. Disconnect the probe input and the probe reference lead from the circuit under test before disconnecting the probe from the measurement product.

De-energize the circuit under test before connecting or disconnecting the current probe.

Connect the probe reference lead to earth ground only.

Do not connect a current probe to any wire that carries voltages or frequencies above the current probe voltage rating.

Inspect the probe and accessories

Before each use, inspect probe and accessories for damage (cuts, tears, or defects in the probe body, accessories, or cable jacket). Do not use if damaged.

Ground-referenced oscilloscope use

Do not float the reference lead of the probe when using with ground-referenced oscilloscopes. The reference lead must be connected to earth potential (0 V).

Floating measurement use

Do not float the reference lead of the probe above the rated float voltage.

Service safety summary

The *Service safety summary* section contains additional information required to safely perform service on the product. Only qualified personnel should perform service procedures. Read this *Service safety summary* and the *General safety summary* before performing any service procedures.

To avoid electric shock

Do not touch exposed connections.

Do not service alone

Do not perform internal service or adjustments of this product unless another person capable of rendering first aid and resuscitation is present.

Disconnect power

To avoid electric shock, switch off the product power and disconnect the power cord from the mains power before removing any covers or panels, or opening the case for servicing.

Use care when servicing with power on

Dangerous voltages or currents may exist in this product. Disconnect power, remove battery (if applicable), and disconnect test leads before removing protective panels, soldering, or replacing components.

Verify safety after repair

Always recheck ground continuity and mains dielectric strength after performing a repair.

Terms in this manual and on the product

These terms may appear in this manual:

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

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

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.

 CAUTION: Refer to Manual	 Protective Ground (Earth) Terminal	 Earth Terminal	 Chassis Ground	 Do not connect to or remove from an uninsulated conductor that is HAZARDOUS LIVE.	
 WARNING: High Voltage	 Standby	 Functional Earth Terminal	 Use only on an insulated wire.		

Specifications

This chapter contains specifications for the instrument. All specifications are typical unless noted as guaranteed. Typical specifications are provided for your convenience but are not guaranteed. Specifications that are marked with the ✔ symbol are guaranteed and checked in Performance Verification.

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.
- The instrument must be operating within the environmental limits described in this manual.
- The instrument must be powered from a source that meets the specifications.
- 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 instructions that describe how to perform signal path compensation. If the ambient temperature changes more than 5 °C, repeat the procedure.

Vertical system – analog channels

Number of analog input channels

DPO714AX: 4

DPO718AX: 8

DC Input Resistance ✓

Vertical scale < 100 mV/div:

50 Ω ± 1.5 Ω from 18 °C to 28 °C

50 Ω ± 2 Ω from 5 °C to 40 °C

Vertical scale ≥ 100 mV/div:

50 Ω ± 1.65 Ω from 18 °C to 28 °C

50 Ω ± 2.2 Ω from 5 °C to 40 °C

Input sensitivity range

Coarse: 1 mV/div to 500 mV/div in a 1-2-5 sequence

Fine: Allows continuous adjustment from 1 mV/div to 500 mV/div

Magnification is used below 4 mV/div.

Maximum input voltage

Overvoltage trip is intended to protect against overloads that may damage termination resistors. A sufficiently large impulse may cause damage regardless of the overvoltage protection circuitry because of the finite time required to detect and respond.

Standard analog channels:

2.3 V_{RMS}, at <100 mV/div, -20 V ≤ peak ≤ +20 V (Pulse Width ≤1 µs)

5.5 V_{RMS}, at ≥100 mV/div, -20 V ≤ peak ≤ +20 V (Pulse Width ≤100 µs)

Aux In:

-5 V ≤ peak ≤ +5 V

Input termination voltage range

±4.0 V with P7600 and P7700 probes

ADC resolution

12 bits

DC gain accuracy ✓

±2%[1] at ≥ 2 mV/div and < 5 mV/div, typical

±2%[1] at ≥ 5 mV/div

±1.5%[2] of full scale[3] at ≥ 2 mV/div to < 5 mV/div, typical

±1.5%[2] of full scale[3] at ≥ 5 mV/div

[1] Immediately following SPC, add 1% for every 5 °C change in ambient temperature beyond ±5 °C from when SPC was run.

[2] Immediately following SPC, add 0.5% for every 5 °C change in ambient temperature beyond ±5 °C from when SPC was run.

[3] Input signal is placed at 7 divisions.

Effective bits (ENOB)

Specification applies to 50 mV/div, 50 kS record length, Quiet Channel is OFF.

Vertical scale = 50 mV/div; Sample rate = 125 GS/s; Signal amplitude = 90% full scale										
Frequency (GHz)	**Effective Number of Bits (bit) Greater Than**									
	Channel bandwidth (GHz), BW Filter Optimized for Flatness									
	25	**20**	**16**	**13**	**10**	**8**	**6**	**4**	**2**	**1**
0.02125	6.6	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.5	7.6
1.00125	6.7	7.0	7.2	7.3	7.4	7.5	7.6	7.6	7.6	7.6
2.00125	6.7	7.0	7.2	7.3	7.5	7.6	7.6	7.6		
3.00125	6.7	7.0	7.2	7.3	7.5	7.5	7.6	7.6		
4.00125	6.7	7.0	7.2	7.3	7.4	7.5	7.5	7.5		
5.00125	6.7	7.0	7.2	7.2	7.4	7.5	7.5			
6.00125	6.6	6.9	7.1	7.2	7.4	7.5	7.5			
7.00125	6.7	7.0	7.2	7.3	7.5	7.6				
8.00125	6.5	7.0	7.0	7.1	7.3	7.4				
9.00125	6.4	6.7	6.9	7.0	7.2					
10.00125	6.5	6.8	7.0	7.1	7.3					
11.00125	6.2	6.5	6.7	6.8						
12.00125	6.4	6.9	6.9	7.0						
13.00125	6.5	6.9	7.0	7.1						
14.00125	6.6	6.9	7.1							
15.00125	6.5	6.9	7.1							
16.00125	6.5	6.8	7.0							
17.00125	6.4	6.7								
18.00125	6.5	6.8								
19.00125	6.5	6.8								
20.00125	6.4	6.7								
21.00125	6.4									

Vertical scale = 50 mV/div; Sample rate = 125 GS/s; Signal amplitude = 90% full scale										
Frequency (GHz)	**Effective Number of Bits (bit) Greater Than**									
	Channel bandwidth (GHz), BW Filter Optimized for Flatness									
	25	**20**	**16**	**13**	**10**	**8**	**6**	**4**	**2**	**1**
22.00125	6.4									
23.00125	6.4									
24.00125	6.4									
25.00125	6.4									
Average:	6.5	6.9	7.1	7.2	7.4	7.5	7.5	7.6	7.6	7.6

Vertical scale = 50 mV/div; Sample rate = 62.5 GS/s; Signal amplitude = 90% full scale										
Frequency (GHz)	**Effective Number of Bits (bit) Greater Than**									
	Channel bandwidth (GHz), BW Filter Optimized for Flatness									
	25	**20**	**16**	**13**	**10**	**8**	**6**	**4**	**2**	**1**
0.05	6.3	6.6	6.8	7.0	7.1	7.2	7.3	7.4	7.5	7.5
1.00125	6.3	6.7	6.9	7.1	7.2	7.3	7.4	7.5	7.5	7.5
2.00125	6.4	6.7	6.9	7.0	7.2	7.3	7.4	7.4		
3.00125	6.3	6.7	6.9	7.0	7.2	7.2	7.4	7.4		
4.00125	6.4	6.7	6.9	7.0	7.2	7.3	7.3	7.3		
5.00125	6.3	6.6	6.8	7.0	7.2	7.3	7.3			
6.00125	6.2	6.5	6.8	6.9	7.1	7.2	7.2			
7.00125	6.3	6.7	6.8	6.9	7.1	7.2				
8.00125	6.1	6.5	6.6	6.7	6.9	7.0				
9.00125	6.1	6.7	6.6	6.7	6.9					
10.00125	6.2	6.5	6.7	6.8	7.0					
11.00125	6.1	6.4	6.6	6.7						
12.00125	6.2	6.7	6.7	6.8						
13.00125	6.1	6.6	6.6	6.7						

Vertical scale = 50 mV/div; Sample rate = 62.5 GS/s; Signal amplitude = 90% full scale										
Frequency (GHz)	**Effective Number of Bits (bit) Greater Than**									
	Channel bandwidth (GHz), BW Filter Optimized for Flatness									
	25	**20**	**16**	**13**	**10**	**8**	**6**	**4**	**2**	**1**
14.00125	6.1	6.5	6.7							
15.00125	6.1	6.5	6.7							
16.00125	6.0	6.5	6.5							
17.00125	6.0	6.5								
18.00125	6.2	6.6								
19.00125	6.2	6.7								
20.00125	6.1	6.5								
21.00125	6.1									
22.00125	6.1									
23.00125	6.1									
24.00125	6.1									
25.00125	6.1									
Average:	6.2	6.6	6.7	6.9	7.1	7.2	7.3	7.4	7.5	7.5

Bandwidth selections

1 GHz starting bandwidth to the instrument bandwidth in 1 GHz increments

Bandwidth filtering optimization

Optimized for Flatness or Step response

Random noise, RMS

125 GS/s, QuietChannel Setting = Off [2, 3, 4]						
Vertical scale (full scale)	**Channel bandwidth (GHz), BW Filter Optimized for Flatness**					
	8	**10**	**13**	**16**	**20**	**25**
10 mV	155 µV	174 µV	195 µV	222 µV	261 µV	309 µV
20 mV	155 µV	174 µV	195 µV	222 µV	261 µV	309 µV
50 mV	157 µV	174 µV	200 µV	232 µV	267 µV	329 µV
100 mV	171 µV	191 µV	220 µV	244 µV	279 µV	365 µV
200 mV	254 µV	279 µV	320 µV	377 µV	418 µV	550 µV
500 mV	523 µV	595 µV	680 µV	743 µV	864 µV	1.13 mV
999.9 mV	1.04 mV	1.14 mV	1.29 mV	1.43 mV	1.6 mV	1.96 mV
1 V	1.32 mV	1.45 mV	1.67 mV	1.97 mV	2.29 mV	2.97 mV
5 V	5.01 mV	5.5 mV	6.48 mV	7.55 mV	8.53 mV	10.3 mV

125 GS/s, QuietChannel Setting = QC7 [2, 3, 4]						
Vertical scale (full scale)	**Channel bandwidth (GHz), BW Filter Optimized for Flatness**					
	8	**10**	**13**	**16**	**20**	**25**
10 mV	153 µV	172 µV	193 µV	218 µV	257 µV	321 µV
20 mV	153 µV	172 µV	193 µV	218 µV	257 µV	321 µV
50 mV	154 µV	170 µV	195 µV	218 µV	262 µV	321 µV
100 mV	155 µV	171 µV	197 µV	231 µV	270 µV	324 µV
200 mV	213 µV	231 µV	277 µV	309 µV	361 µV	445 µV
500 mV	396 µV	438 µV	488 µV	534 µV	615 µV	767 µV
1 V	1.13 mV	1.23 mV	1.41 mV	1.63 mV	1.89 mV	2.35 mV
5 V	3.75 mV	4 mV	4.58 mV	5.25 mV	5.78 mV	6.54 mV

125 GS/s, Quiet Channel = QC4 [1, 2, 3, 4]						
Vertical scale (full scale)	**Channel bandwidth (GHz), BW Filter Optimized for Flatness**					
	8	**10**	**13**	**16**	**20**	**25**
10 mV	158 µV	177 µV	199 µV	225 µV	267 µV	-
20 mV	158 µV	177 µV	199 µV	225 µV	267 µV	-
50 mV	159 µV	175 µV	201 µV	225 µV	262 µV	-
100 mV	164 µV	181 µV	207 µV	232 µV	282 µV	-
200 mV	229 µV	246 µV	291 µV	333 µV	411 µV	-
500 mV	438 µV	480 µV	536 µV	631 µV	808 µV	-
1 V	1.21 mV	1.3 mV	1.48 mV	1.76 mV	2.18 mV	-
5 V	4.14 mV	4.38 mV	5.02 mV	5.92 mV	7.33 mV	-

[1] Bandwidth is automatically limited to 20 GHz for QC settings 1-4.

[2] Full scale vertical settings from 10 mV to 999.9 mV use 1x input path (0 dB attenuation).

[3] Full scale vertical settings from 1 V to 5 V use 5x input path (14 dB attenuation).

[4] Full scale is defined as 10 divisions.

62.5 GS/s, QuietChannel Setting = Off [2, 3, 4]						
Vertical scale (full scale)	**Channel bandwidth (GHz), BW Filter Optimized for Flatness**					
	8	**10**	**13**	**16**	**20**	**25**
10 mV	158 µV	177 µV	199 µV	225 µV	265 µV	327 µV
20 mV	158 µV	177 µV	199 µV	225 µV	265 µV	327 µV
50 mV	163 µV	180 µV	206 µV	238 µV	275 µV	339 µV
100 mV	189 µV	210 µV	240 µV	267 µV	305 µV	394 µV
200 mV	296 µV	324 µV	369 µV	423 µV	494 µV	640 µV
500 mV	645 µV	730 µV	830 µV	904 µV	1.08 mV	1.38 mV
999.9 mV	1.27 mV	1.4 mV	1.58 mV	1.75 mV	1.98 mV	2.47 mV

62.5 GS/s, QuietChannel Setting = Off [2, 3, 4]						
1 V	1.51 mV	1.66 mV	1.96 mV	2.23 mV	2.6 mV	3.39 mV
5 V	6.19 mV	6.78 mV	7.95 mV	9.24 mV	10.5 mV	12.6 mV

62.5 GS/s, QuietChannel Setting = QC7 [2, 3, 4]						
Vertical scale (full scale)	**Channel bandwidth (GHz), BW Filter Optimized for Flatness**					
	8	**10**	**13**	**16**	**20**	**25**
10 mV	155 µV	174 µV	194 µV	220 µV	259 µV	324 µV
20 mV	155 µV	174 µV	194 µV	220 µV	259 µV	324 µV
50 mV	157 µV	174 µV	198 µV	221 µV	265 µV	327 µV
100 mV	163 µV	180 µV	204 µV	239 µV	278 µV	337 µV
200 mV	235 µV	260 µV	291 µV	329 µV	380 µV	479 µV
500 mV	467 µV	510 µV	560 µV	589 µV	684 µV	867 µV
1 V	1.23 mV	1.33 mV	1.49 mV	1.72 mV	1.95 mV	2.54 mV
5 V	4.46 mV	4.7 mV	5.3 mV	5.99 mV	6.5 mV	7.39 mV

62.5 GS/s, Quiet Channel = QC4 [1, 2, 3, 4]						
Vertical scale (full scale)	**Channel bandwidth (GHz), BW Filter Optimized for Flatness**					
	8	**10**	**13**	**16**	**20**	**25**
10 mV	160 µV	179 µV	200 µV	227 µV	270 µV	-
20 mV	160 µV	179 µV	200 µV	227 µV	270 µV	-
50 mV	162 µV	178 µV	203 µV	228 µV	267 µV	-
100 mV	175 µV	191 µV	217 µV	243 µV	291 µV	-
200 mV	256 µV	272 µV	310 µV	359 µV	437 µV	-
500 mV	523 µV	567 µV	625 µV	692 µV	966 µV	-
1 V	1.33 mV	1.42 mV	1.6 mV	1.89 mV	2.44 mV	-

5 V	4.99 mV	5.22 mV	5.91 mV	6.96 mV	9.17 mV	-

[1] Bandwidth is automatically limited to 20 GHz for QC settings 1-4.

[2] Full scale vertical settings from 10 mV to 999.9 mV use 1x input path (0 dB attenuation).

[3] Full scale vertical settings from 1 V to 5 V use 5x input path (14 dB attenuation).

[4] Full scale is defined as 10 divisions.

Channel-to-channel isolation

Assumes two channels with the same bandwidth setting and set to 20 mV/div. The limits apply up to the bandwidth of the particular instrument. Channel-to-channel isolation is measured with QuietChannel in the off state.

DPO714AX:

>60 dB up to 25 GHz for all channel combinations

>70 dB up to 15 GHz for all channel combinations

DPO718AX:

>60 dB up to 25 GHz for CH1/5 to all other channels, CH2/6 to all other channels, CH3/7 to all other channels, and CH4/8 to all other channels

>70 dB up to 15 GHz for CH1/5 to all other channels, CH2/6 to all other channels, CH3/7 to all other channels, and CH4/8 to all other channels

>50 dB up to 15 GHz for all channel combinations

>40 dB up to 25 GHz for all channel combinations

Analog DC

Offset range

Input signal cannot exceed maximum input voltage.

Vertical scale (mV/div)	Offset range (V)
1 to <100	±1
100 to 500	±5

Position range

±5 divisions

Offset accuracy ✓

Vertical scale	Offset accuracy
<4 mV/div	± (0.003 × |offset – position| + 0.7 mV + 0.13 div × vertical scale)
4 mV/div to <100 mV/div	± (0.003 × |offset – position| + 0.7 mV + 0.087 div × vertical scale)
≥100 mV/div	± (0.005 × |offset – position| + 3.5 mV + 0.087 div × vertical scale)

DC voltage measurement accuracy ✓

Average acquisition mode.

Measurement type	DC accuracy
Average of ≥16 waveforms	±((DC Gain Accuracy) × |reading - (offset - position)| + Offset Accuracy + digitizer nonlinearity + CVR nonlinearity)
Delta volts between any two averages of ≥16 waveforms acquired with the same oscilloscope setup and ambient conditions	±(DC Gain Accuracy × |reading| + 2 × (digitizer nonlinearity + CVR nonlinearity))

Calibrated Voltage Reference (CVR) nonlinearity is assumed to be negligeable (zero) since it is factory calibrated across the full CVR range. CVR nonlinearity term is left in the equation for completeness but it has negligeable effect on this specification.

Offset, position, and the constant offset term must be converted to volts by multiplying by the appropriate vertical setting.

Digitizer nonlinearity

Integral nonlinearity (INL) at ≥15 mV/div: ±3 DLs (10-bit reference)

Integral nonlinearity (INL) at <15 mV/div: ±4 DLs (10-bit reference)

Differential nonlinearity (DNL): ±1.0 DLs (10-bit digitizing scale)

Derate all specifications above by 0.1 DL/°C.

Analog AC

Analog bandwidth ✓

Bandwidth option	Maximum analog bandwidth
BW-25000	25 GHz
BW-20000	20 GHz
BW-16000	16 GHz
BW-13000	13 GHz
BW-10000	10 GHz
BW-8000	8 GHz

Frequency response tolerance (flatness)

±0.6 dB from DC to ≤ 65% of rated bandwidth for all acquisition modes except peak detect

±1.0 dB from 65% to 90% of rated bandwidth for all acquisition modes except peak detect

Valid for all QuietChannel settings. If the QuietChannel setting is QC1, QC2, QC3 or QC4, the bandwidth will be limited to ≤ 20 GHz.

Gain tolerance temperature is derated from factory adjust temperature.

Frequency (GHz)	Gain tolerance derating (dB/°C)
25	±0.08
20	±0.06
16	±0.04
13	±0.03
10	±0.02
8	±0.02

Frequency response tolerance (flatness) with P7625 Probe

±0.9 dB from DC to 80% of rated bandwidth when used with P76CA-292 (2.92 mm TriMode tip)

Not valid while using peak detect or envelope mode. Valid for probe modes A, B, and D.

Frequency response tolerance (flatness) with P7720 Probe

±0.9 dB from DC to 80% of rated bandwidth when used with P77C292MM (SMA probe tip)

Not valid while using peak detect or envelope mode. Valid for probe modes A, B, and D.

Phase flatness

<3° within any 10 GHz span up to 70% of bandwidth setting.

<5° from DC to 70% of bandwidth setting.

QuietChannel settings

Each setting from QC1 to QC7 provides specific frequency response.

Off: QuietChannel disabled

QC1, QC2, QC3, QC4 boosting peaks in the 9 GHz to 12 GHz range. However, these settings create additional loss above 20 GHz. If the oscilloscope bandwidth is set to a value > 20 GHz and QC1 to QC4 are selected, the oscilloscope bandwidth will automatically be limited to a maximum of 20 GHz.

QC5, QC6, QC7 boosting peaks in the 16 GHz to 20 GHz range.

Calculated transition time

10% to 90% transition time = 0.4/(rated bandwidth)

20% to 80% transition time = 0.3/(rated bandwidth)

Bandwidth option	Calculated transition time 10% to 90% (ps)	Calculated transition time 20% to 80% (ps)
BW-25000	16.0	12.0
BW-20000	20.0	15.0
BW-16000	25.0	18.8
BW-13000	30.8	23.1

Bandwidth option	Calculated transition time 10% to 90% (ps)	Calculated transition time 20% to 80% (ps)
BW-10000	40.0	30.0
BW-8000	50.0	37.5

Step response settling errors

This specification does not apply to QuietChannel™ settings. Percentages are relative to step amplitude.

Vertical scale (mV/div)	Step amplitude	Settling error after 150 ps	Settling error after 400 ps	Settling error after 3 ns	Settling error after 1 µs	Settling error after 1 ms
5	≤5 div	<3.5%	<2.5%	<1.5%	<0.75%	<0.25%
20						
50						
100						
200						

RF characteristics

Sensitivity (noise density)

-164 dBm/Hz at or below 20 GHz

-161 dBm/Hz above 20 GHz

Displayed Average Noise Level (DANL)

Sample rate 125 GS/s

Frequency range	Vertical scale (mV/div)	DANL (dBm/Hz)
10 MHz to <3 GHz	4	< -164
3 GHz to <8 GHz		< -165
8 GHz to <12 GHz		< -165
12 GHz to <18 GHz		< -163
18 GHz to 25 GHz		< -161

Sample rate 62.5 GS/s

Frequency range	Vertical scale (mV/div)	DANL (dBm/Hz)
10 MHz to <3 GHz	4	< -163
3 GHz to <8 GHz		< -165
8 GHz to <12 GHz		< -164
12 GHz to <18 GHz		< -163
18 GHz to 25 GHz		< -161

Noise figure

Sample rate 125 GS/s

Frequency range	Vertical scale (mV/div)	Noise figure (dB)
10 MHz to <3 GHz	4	≤10
3 GHz to <8 GHz		≤9
8 GHz to <12 GHz		≤9
12 GHz to <18 GHz		≤11
18 GHz to 25 GHz		≤13

Sample rate 62.5 GS/s

Frequency range	Vertical scale (mV/div)	Noise figure (dB)
10 MHz to <3 GHz	4	≤10.25
3 GHz to <8 GHz		≤9
8 GHz to <12 GHz		≤9.5
12 GHz to <18 GHz		≤11
18 GHz to 25 GHz		≤13

Signal-to-noise ratio (SNR) (dynamic range)

Center frequency (GHz)	SNR (dB)	Details
1	≥111	0 dBm instrument input range, 100 MHz span, 1 kHz RBW, measured ±20 MHz from center
10	≥106	

Phase noise

Frequency offset	Phase noise at 1 GHz (dBc/Hz)	Phase noise at 10 GHz (dBc/Hz)

10 kHz	≤-118	≤-102
100 kHz	≤-124	≤-109
1 MHz	≤-134	≤-119
10 MHz	≤-142	≤-131

Error Vector Magnitude (EVM)

Conditions	EVM (relative to reference vector power)	
	RMS normalization	Peak normalization
10 GHz, 256 QAM, 100 MHz BW	≤1.06%	≤0.66%
7 GHz, 256 QAM, 7 GHz BW	≤1.20%	≤0.73%

Spurious Free Dynamic Range (SFDR)

Sample rate 125 GS/s

Conditions	SFDR (dBc)
2.35 GHz sine, -4 dBm, 2.35 GHz CF, 1.5 GHz span, ≤100 kHz RBW	≤-80
3 GHz sine, -4 dBm, 3 GHz CF, 5 GHz span, ≤100 kHz RBW	≤-62

Sample rate 62.5 GS/s

Conditions	SFDR (dBc)
2.35 GHz sine, -4 dBm, 2.35 GHz CF, 1.5 GHz span, ≤100 kHz RBW	≤-78
3 GHz sine, -4 dBm, 3 GHz CF, 5 GHz span, ≤100 kHz RBW	≤-60

S_{11} Return Loss and Voltage Standing Wave Ratio (VSWR)

Vertical scale (mV/div)	Frequency range	$\lvert S_{11} \rvert$ (dB)	VSWR
<100	≤9 GHz	≤14	1.50
	>9 GHz to ≤15 GHz	≤11	1.79
	>15 GHz to ≤25 GHz	≤9	2.10
≥100	≤9 GHz	≤14	1.50
	>9 GHz to ≤25 GHz	≤10	1.93

2^{nd} and 3^{rd} harmonic distortion

Fundamental frequency (GHz)	2^{nd} harmonic (dBc)	3^{rd} harmonic (dBc)

1	≤-60	≤-60
10	≤-60	-
For 2nd and 3rd harmonic distortion tests:50 mV full scale (5 mV/div), -28 dBm input signal (~50% of full scale) at 100 kHz RBW		

2nd and 3rd order intermodulation distortion

Frequency (tone 1) (GHz)	2nd order intermodulation (IM2) (dBc)	3rd order intermodulation (IM3) (dBc)
3.5	≤-50	≤-60
10	≤-50	≤-62
18	≤-50 (single sided)	≤-45
23	≤-50 (single sided)	≤-45
For 2nd and 3rd order intermodulation tests: Two sine waves, 10 MHz spacing, 5 mV/div, -29 dBm/tone		

Horizontal system

Record length range

- **Minimum**: 50 points
- **Maximum**: 500 Mpoints (1 Gpoints, 2 Gpoints optional)
- **Increment**: 1 point

Horizontal scale range

400 fs/div to 1000 s/div (auto-mode)

Record length	Horizontal scale range
50 points	400 fs/div to 8 ms/div
1 kpoints	8 ps/div to 160 ms/div
10 kpoints	80 ps/div to 1.6 s/div
100 kpoints	800 ps/div to 16 s/div
1 Mpoints	8 ns/div to 160 s/div
10 Mpoints	80 ns/div to 1000 s/div
100 Mpoints	800 ns/div to 1000 s/div
500 Mpoints	4 µs/div to 1000 s/div

Record length	Horizontal scale range
1 Gpoints (optional)	8 µs/div to 1000 s/div
2 Gpoints (optional)	16 µs/div to 1000 s/div

Aperture uncertainty (sample jitter)

Time duration	Aperture uncertainty RMS (mean + 3σ) (fs)							
	Internal reference[1]		External reference stable 15 ppm[1]		External reference tracking 1000 ppm[1]		External sample clock[1, 2]	
	125 GS/s	62.5 GS/s	125 GS/s	62.5 GS/s	125 GS/s	62.5 GS/s	125 GS/s	62.5 GS/s
<100 ns	≤50	≤60	≤50	≤60	≤50	≤60	≤40	≤60
1 µs	≤60	≤60	≤60	≤60	≤100	≤100	Follows jitter of 7.8125 GHz source with floor at ≤40 fs	Follows jitter of 7.8125 GHz source with floor at ≤60 fs
10 µs	≤70	≤70	≤70	≤70	≤200	≤200		
100 µs	≤70	≤70	≤70	≤70	≤400	≤400		
1 ms	≤70	≤70	≤70	≤70	≤600	≤600		

[1] Values are mean + 3σ computed on 50 consecutive acquisitions.

[2] Assumes the source 7.8125 GHz clock has much lower short term jitter than 35 fs.

Jitter Noise Floor (JNF)

N_{typ} = typical input-referred noise spec (volts rms)

SR = slew rate around the measurement

t_j = timebase jitter or aperture uncertainty (sample jitter)

$$JNF_{rms} = \sqrt{N_{typ}{}^2 \times (\frac{1}{SR})^2 + t_j{}^2}$$

The interpolated sample rate of the waveform must be at least 25 times the bandwidth of the signal being measured.

Example 1

For this example, we calculate the jitter noise floor of the oscilloscope to verify whether it is suitable to measure the PCIe Gen4 100 MHz RefClk (RMS phase jitter ≤ 500 fs RMS) using the following signal characteristics.

Signal characteristics:

- Frequency = 100 MHz
- Slew rate = 3.0 V/ns = 3 x 10^9 V/s (SR)
- Amplitude (single ended) = 300 mV

Oscilloscope settings:

- Bandwidth setting = 10 GHz
- BW Filter = Optimized for Flatness
- Vertical scale = 50 mV/div or 500 mV full scale

- Vertical offset = 125 mV
- Sample rate = 125 GS/s
- QuietChannel = Off
- Timebase reference = Internal

Step 1 - Identify the additional terms needed from specifications based on the specific oscilloscope settings:

- Random noise (125 GS/s, QuietChannel = Off, 50 mV/div, 10 GHz) = 595 µV = 595 x 10^{-6} V (N_{typ})
- Aperture uncertainty (100 µS time period, Internal timebase) = 70 fs = 70 x 10^{-15} s (t_j)

Step 2 – Calculate Jitter Noise Floor:

$$JNF_{rms} = \sqrt{{N_{typ}}^2 \times (\frac{1}{SR})^2 + {t_j}^2}$$

$$JNF_{rms} = \sqrt{(595 \times 10^{-6}\, V)^2 \times \left(\frac{1}{3 \times 10^{9}\, V/s}\right)^2 + (70 \times 10^{-15}\, s)^2}$$

$$JNF_{rms} = \sqrt{(3.54 \times 10^{-7} \times (1.11 \times 10^{-19}) + (4.9 \times 10^{-27} s)}$$

$$JNF_{rms} = 210.3 \times 10^{-15} s$$

$$JNF_{rms} = 210.3\, fs$$

Example 2

For this example, we calculate the jitter noise floor of the oscilloscope to verify whether it is suitable to measure the PCIe Gen4 16 Gbps (16 GT/s) transmitter using the following signal characteristics.

Signal characteristics:

- Frequency = 16 Gbps (16 GT/s)
- Slew rate = 80.0 V/ns = 80 x 10^9 V/s (SR)
- Amplitude (single ended) = 800 mV

Oscilloscope settings:

- Bandwidth setting = 25 GHz
- BW Filter = Optimized for Flatness
- Vertical scale = 100 mV/div or 1 V full scale
- Vertical offset = 0 mV
- Sample rate = 125 GS/s
- QuietChannel = Off
- Timebase reference = Internal

Step 1 - Identify the additional terms needed from specifications based on the specific oscilloscope settings:

- Random noise (125 GS/s, QuietChannel = Off, 1 V full scale, 25 GHz) = 2.35 mV = 2.35 x 10^{-3} V (N_{typ})
- Aperture uncertainty (100 µS time period, Internal timebase) = 70 fs = 70 x 10^{-15} s (t_j)

Step 2 – Calculate Jitter Noise Floor:

$$JNF_{rms} = \sqrt{N_{typ}{}^2 \times (\frac{1}{SR})^2 + t_j{}^2}$$

$$JNF_{rms} = \sqrt{(2.35 \times 10^{-3}\ V)^2 \times \left(\frac{1}{80 \times 10^9\ V/s}\right)^2 + (70 \times 10^{-15}\ s)^2}$$

$$JNF_{rms} = \sqrt{(5.52 \times 10^{-6} \times (1.56 \times 10^{-22}) + (4.9 \times 10^{-27} s)}$$

$$JNF_{rms} = 75.91371 \times 10^{-15} s$$

$$JNF_{rms} = 75.9\ fs$$

Timebase accuracy ✓

Description	Specification
Factory tolerance	≤12 ppb initial accuracy
Temperature stability	±20 ppb across the full operating range of 5 °C to 40 °C, after a sufficient soak time at temperature; tested at operating temperatures
Aging	≤2 ppb daily aging ≤300 ppb within first year aging ≤100 ppb for each year thereafter

The instrument needs to soak at a fixed temperature for an extended period of time to ensure the timebase frequency is stable. The following is a worst case estimation for the frequency error versus the amount of time the instrument has been soaking at a temperature.

Max error (in ppb) = ±10^[log[100/soak time(in hours)]]

For example, a 1-hour soak will have a max frequency error of ±100 ppb, but a 10-hour soak will have a max frequency error of ±10 ppb.

Delta-time measurement accuracy

Specification:

$$DTA_{rms} = \sqrt{\left(\frac{N_{rms}}{Slew_1}\right)^2 + \left(\frac{N_{rms}}{Slew_2}\right)^2 + t_j{}^2} + TBA \times t_p$$

Where:

Slew $_1$ = Slew Rate (1st Edge) around 1st point in measurement, s

Slew $_2$ = Slew Rate (2nd Edge) around 2nd point in measurement, s

t_j = Aperture uncertainty or sample jitter (RMS), s (see Aperture uncertainty specification)

TBA = Timebase accuracy including appropriate aging, fraction (see Timebase accuracy specification)

t_p = Delta time measurement duration, s

N_{rms} = Noise estimate (rms), V, given by:

$$N_{rms} = \sqrt{RN_{rms}{}^2 + DNE^2}$$

Where:

RN_{rms} = Random noise (rms), V (see Random noise specification)

DNE = Dynamic noise estimate, V, given by:

$$DNE = \frac{BW}{25\ GHz} \times DNF \times VS$$

Where:

BW = Selected bandwidth for acquisition, Hz

VS = Selected vertical scale (one division), V

DNF = Dynamic noise factor, no units (see following table)

Sample rate (GS/s)	Bandwidth setting (GHz)	DNF (unitless)
125	<25	0.01971
	25	0.01759
62.5	<25	0.02481
	25	0.02215

Example:

For this example, we calculate the accuracy of a period measurement of one cycle of a 100 MHz PCIe timing clock generator (single ended). As this is a measurement of the time difference between 2 waveform events, the Delta Time measurement Accuracy (DTA) specification applies. For timebase accuracy, we will assume that the scope is 1 year past its previous factory adjust event.

Signal characteristics:

- Frequency = 100 MHz
- Period = 10 ns (t_p)
- Slew Rate = 3.0 V/ns = 3×10^9 V/s (Slew1 and Slew2)
- Amplitude (single ended) = 300 mV

Oscilloscope settings:

- Bandwidth setting = 10 GHz (BW)
- BW Filter = Optimized for Flatness
- Vertical scale = 50 mV/div (VS)
- Vertical offset = 125 mV
- Sample Rate = 125 GS/s
- Quiet Channel = Off
- Timebase reference = Internal

First, identify the additional terms needed from specifications based on the specific oscilloscope settings:

- Random noise (125 GS/s, Optimized for Flatness, 50 mV/div, 10 GHz) = 595 µV (RN_{rms})
- Timebase accuracy (1 year) = 300 ppb (300×10^{-9}) (TBA)
- Aperture Uncertainty (<100 ns time period, Internal timebase) = 50 fs (t_j)

Next, we find the Dynamic Noise actor (DNF) from the supplied table:

- DNF (125 GS/s, <25 GHz) = 0.01971

Calculate Dynamic noise estimate (DNE) and Noise estimate (Nrms)

$$DNE = \frac{BW}{25\ GHz} \times DNF \times VS$$

$$DNE = \frac{(10\ GHz)}{25\ GHz} \times (0.01971) \times (0.050\ V) = 394.2 \times 10^{-6}\ V$$

$$N_{rms} = \sqrt{RN_{rms}{}^2 + DNE^2}$$

$$N_{rms} = \sqrt{(595 \times 10^{-6}\ \mathrm{V})^2 + (394.2 \times 10^{-6}\ V)^2} = 713.7 \times 10^{-6}\ V$$

Finally, calculate Delta time measurement accuracy (DTA):

$$DTA_{rms} = \sqrt{\left(\frac{N_{rms}}{Slew_1}\right)^2 + \left(\frac{N_{rms}}{Slew_2}\right)^2 + t_j{}^2 + TBA \times t_p}$$

$$DTA_{rms} = \sqrt{\left(\frac{(713.7 \times 10^{-6}\ V)}{(3 \times 10^9\ V/s)}\right)^2 + \left(\frac{(713.7 \times 10^{-6}\ V)}{(3 \times 10^9\ V/s)}\right)^2 + (50 \times 10^{-15}\ s)^2 + (300 \times 10^{-9}) \times (10 \times 10^{-9}\ s)}$$

$$DTA_{rms} = 343.1 \times 10^{-15}\ s = 343.1\ fs$$

Timebase delay range

-10 divisions to 5000 s

Deskew range

-125 ns to +125 ns

Deskew resolution

10 fs

Skew between analog channels

≤2 ps for any two channels with the following conditions on the two channels:

Channels on the same instrument; signal amplitude at least 5 divisions; same bandwidth setting; QuietChannel setting = Off

Trigger system

Trigger sources

All analog channel inputs, Aux input, AC line

Trigger modes

Auto, Normal

Trigger coupling

DC, noise reject (reduces sensitivity)

Trigger holdoff range

0 ns to 20 s

Trigger holdoff resolution

2.048 ns

Trigger bandwidth

Trigger type	Trigger bandwidth
Edge, Pulse (analog channels)	Bandwidth setting
Edge (Aux In)	8 GHz

Edge-type trigger sensitivity

Trigger source	Vertical scale (mV/div)	Minimum sensitivity (peak-to-peak)
Analog channels	1 to <5	≤10 mV
	5 to <10	≤2 divisions
	10 to 500	≤1 division
Aux In		100 mV from DC to <1 GHz 175 mV from 1 GHz to <4 GHz 300 mV from 4 GHz to ≤8 GHz

Trigger level may need to be adjusted to account for trigger hysteresis.

AC Line trigger

Line voltage (AC RMS): 90 V to 264 V

Line frequency: 50 Hz to 60 Hz

Aux Out trigger latency

The delay from the trigger event to trigger signal output.

Normal: ≤1.9 µs

Low-latency: ≤20 ns, Channel 1 and Aux In only, accessible from the User Preferences menu

Trigger jitter

Analog channels (RMS)

125 GS/s sample rate: ≤ 10 fs

62.5 GS/s sample rate: ≤ 100 fs

Conditions:

Vertical scale: 50 mV/div

Horizontal trigger position: 50%

Trigger mode: Edge

Trigger level: 0 V

Input signal: 3 division peak-to-peak sine wave > 1 GHz

Aux In (peak-to-peak)

≤ 80 ps

Trigger level ranges

Trigger source	Trigger level range
Analog channels	±5 divisions from center of screen
AC Line	Fixed near 50% of the line voltage
Aux In	±5 V

Trigger types

- **Edge:**
  Positive, negative, or either slope on any channel. Coupling includes DC and noise reject.
- **Pulse Width:**
  Trigger on width of positive or negative pulses. Event can be time- or logic-qualified.
- **Cycle:**
  Trigger on signals of specified frequency/period.
- **Dual Edge:**
  Trigger on width of positive or negative pulses. Event can be time- or logic-qualified.
- **Timeout:**
  Trigger on an event which remains high, low, or either, for a specified time period. Event can be logic-qualified.
- **Runt:**
  Trigger on a pulse that crosses one threshold but fails to cross a second threshold before crossing the first again. Event can be time- or logic-qualified.
- **Window:**
  Trigger on an event that enters, exits, stays inside, or stays outside of a window defined by two user-adjustable thresholds. Event can be time- or logic-qualified.
- **Rise / Fall Time:**
  Trigger on pulse edge rates that are faster or slower than specified. Slope may be positive, negative, or either. Event can be logic-qualified.
- **Sequence:**
  Trigger on B event after a user specified time delay or N events after A trigger with a reset on C event. In general, A and B trigger events can be set to any trigger type with a few exceptions: logic qualification is not supported.
- **Visual:**
  Qualifies standard triggers by scanning all waveform acquisitions and comparing them to on-screen areas (geometric shapes). An unlimited number of areas can be defined with In, Out, or Don't Care as the qualifier for each area. A boolean expression can be defined using any combination of visual trigger areas to further qualify the events that get stored into acquisition memory. Shapes include rectangle, triangle, trapezoid, hexagon and user-defined.
- **PCI Express Gen1-4:**
  Sync Header (8 Gb/s and 16 Gb/s speeds only), Ordered Set, Control Character (2.5 Gb/s and 5 Gb/s speeds only), Custom Pattern, Compliance Pattern, and Error.
- **USB 3.2 Gen2:**
  For USB 3.0 (5 Gbps) and USB 3.x Gen 1 (5 Gbps) speeds, the available options are Ordered Set, Control Character, Compliance Pattern, Packet, and Custom Pattern.

For USB 3.x Gen 2 (10 Gbps) speeds, the available options are Sync Header, Ordered Set, Control Character, Packet, and Custom Pattern.

Time Range for time qualified triggers

The minimum to maximum time, in seconds, to which the instrument can be set for discriminating Pulse Widths, Timeout, Time-qualified Runt, Time-qualified Window, and Transition Time Trigger.

Trigger type	Triggers condition	Minimum time	Maximum time
Pulse Width, Runt, Rise/Fall time	< Limit, > Limit	32 ps	20 s
	= Limit, ≠ Limit	320 ps	
Pulse Width	Inside range, Outside range	32 ps	
Cycle	< Limit, > Limit, Inside range, Outside range	64 ps	
	= Limit, ≠ Limit	640 ps	
Timeout	Stays high, Stays low, Either	32 ps	
Window	Inside > Limit, Outide > Limit	32 ps	

Trigger level accuracy

For signals having rise and fall times ≥10 ns and using a single trigger level, the limits are as follows:

Source	Range
Any input channel	±0.20 div ±(10% × | trigger threshold level - offset |) + (3.5% × full scale) + offset accuracy [1]
Aux In	Not specified
[1] Channel 1, Edge type, Low Latency Tigger Out = On	

Time accuracy for pulse width and timeout triggering

±(16 ps + (Timebase Accuracy × Setting))

Timebase Accuracy when locked to an external source is equivalent to the accuracy of the external source.

Pulse-type Trigger, Minimum Pulse, Re-arm Time, Transition Time

Pulse class	Minimum pulse width	Minimum rearm time
Runt	32 ps	32 ps
Time–qualified runt		
Width		

Trigger Time	Minimum transition time	Minimum rearm time
Rise/Fall Time	32 ps	32 ps

Pulse-type runt trigger sensitivities

≥2.0 division, at vertical scale ≥5 mV/div

Pulse-type trigger width sensitivities

≥2.0 division, at vertical scale ≥5 mV/div

B Trigger after events, minimum pulse width, and maximum event frequency

Minimum pulse width: 32 ps between threshold + hysteresis crossings

Maximum frequency of B-events counted: 62.5 Gevents/s (static event count to full sample rate, AC events are limited by instrument bandwidth)

B Trigger, minimum time arm and trigger

32 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: 32 ps to 100 s

Time accuracy: ±(16 ps + (Timebase error × Setting))

B Trigger after events, event range

1 event to 20 Gevents

Lowest frequency for successful operation of "Set Level to 50%" function

45 Hz

Triggered acquisition rate

For record/segment length = 1000 points, input frequency = 100 MHz

>550 per second

Acquisition system

Acquisition Modes

Acquisition mode	Description
Sample	Acquires sampled values
Peak Detect	Captures glitches as narrow as 32 ps at all sweep speeds
Envelope	Min-max envelope reflecting Peak Detect data over multiple acquisitions
Average	From 2 to 10,240 waveforms, default 16 waveforms

<table>
<tr><th>Acquisition mode</th><th colspan="2">Description</th></tr>
<tr><td>FastAcq™</td><td colspan="2">FastAcq optimizes the instrument for analysis of dynamic signals and capture of infrequent events.

Maximum waveform capture rate:

150,000 wfms/s (62.5 GS/s)

100,000 wfms/s (125 GS/s)</td></tr>
<tr><td rowspan="8">FastFrame™</td><td colspan="2">Acquisition memory divided into segments.

Maximum trigger rate >30,000,000 waveforms per second

Minimum frame size = 50 points</td></tr>
<tr><td>Frame length</td><td>Frame count</td></tr>
<tr><td>50</td><td>1M</td></tr>
<tr><td>1K</td><td>838.86K</td></tr>
<tr><td>10K</td><td>200K</td></tr>
<tr><td>100K</td><td>20K</td></tr>
<tr><td>1M</td><td>2K</td></tr>
<tr><td>10M</td><td>200</td></tr>
</table>

Peak Detect or Envelope Mode Minimum Detectable Pulse

≤16 ps

Sample rate range

DPO714AX:

- 4 channels: 625 S/s to 125 GS/s (real time), 250 GS/s to 12.5 TS/s (**interpolated**)

DPO718AX:

- Channels 1-4 only: 625 GS/s to 125 GS/s **(real time**), 250 GS/s to 12.5 TS/s (**interpolated**)
- Any of Channels 5-8 enabled: 625 S/s to 62.5 GS/s (**real time**), 250GS/s to 12.5TS/s (**interpolated**)

Waveform measurements

Cursor types

Waveform, Vertical (V) Bars, Horizontal (H) Bars, V&H Bars, and Polar (XY/XYZ plots only)

Automatic measurements

36 types of time and amplitude measurements. An unlimited number can be displayed as either individual measurement badges or collectively in a measurement results table.

Amplitude measurements

Amplitude, Maximum, Minimum, Peak-to-Peak, Positive Overshoot, Negative Overshoot, Mean, RMS, AC RMS, Top, Base, and Area

Timing measurements

Period, Frequency, Unit Interval, Data Rate, Positive Pulse Width, Negative Pulse Width, Skew, Delay, Rise Time, Fall Time, Phase, Rising Slew Rate, Falling Slew Rate, Burst Width, Positive Duty Cycle, Negative Duty Cycle, Time Outside Level, Setup Time, Hold Time, Duration N-Periods, High Time, Low Time, Time to Minimum, and Time to Maximum

Jitter measurements (standard)

TIE and Phase Noise

Measurement statistics

Mean, Standard Deviation, Maximum, Minimum, Peak-to-Peak, and Population. Statistics are available on both the current acquisition and all acquisitions.

Reference levels

User-definable reference levels for automatic measurements can be specified in either percent or units. Reference levels can be set to global for all measurements, per source channel or signal, or unique for each measurement.

Gating

Screen, Cursors, Logic, Search, or Time. Specifies the region of an acquisition in which to take measurements. Gating can be set to Global (affects all measurements set to Global) or Local (all measurements can have a unique Time gate setting; only one Local gate is available for Screen, Cursors, Logic, and Search actions).

Measurement plots

Histogram, Time Trend, Spectrum, Eye Diagram (TIE measurement only), Phase Noise (Phase Noise measurement only)

Measurement limits

Pass/fail testing for user-definable limits on measurement values. Act on event for measurement value failures include Save Screen Capture, Save Waveform, System Request (SRQ), and Stop Acquisitions

Advanced Jitter and Noise Analysis (optional):

Measurements

Jitter Measurements (Jitter Summary, TIE, Phase Noise, TJ@BER, RJ- δδ, DJ- δδ, SJ@Freq, PJ, RJ, DJ, DDJ, ISI, DCD, SRJ, J2, J9, NPJ, F/2, F/4, F/8, CC-Jitter, RJ(H), RJ(V), PJ(H), PJ(V))

Noise Measurements (Noise summary, TN@BER, DN, PN, RN, DDN, PN(V), RN(V), DDN(0), PN(H), RN(H), DDN(1), Unit Amplitude, NPN)

Amplitude Measurements (Bit High, Bit Low, Bit Amplitude, DC Common Mode, AC Common Mode (Pk-Pk), Differential Crossover, T/nT Ratio)

Time Measurements (Data Rate, Pattern Length, SSC Freq Dev, SSC Modulation Rate, SSC Slew Rate)

Measurement plots

Eye Diagram, Composite Jitter Histogram, and Jitter Bathtub

Fast eye rendering: Shows the Unit Intervals (UIs) that define the boundaries of the eye along with a user specified number of surrounding UIs for added visual context

Complete eye rendering: Shows all valid Unit Intervals (UIs)

Measurement limits

Pass/fail testing for user-definable limits on measurement values. Act on event for measurement value failures include Save Screen Capture, Save Waveform, System Request (SRQ), and Stop Acquisitions

Eye diagram mask testing

Automated mask pass/fail testing with mask autofit and mask hit ratio

Waveform math

Number of math waveforms

Unlimited

Arithmetic

Add, subtract, multiply, and divide waveforms and scalars

Algebraic expressions

Define extensive algebraic expressions including waveforms, scalars, user-adjustable variables, and results of parametric measurements. Performs math on math waveforms using advanced equations. For example (Integral (CH1 - LOG(CH1)) × SQRT(2) × VAR1)

Math functions

Invert, Integrate, Differentiate, Square Root, Exponential, Log 10, Log e, Absolute value, Ceiling, Floor, Minimum, Maximum, Degrees, Radians, Sin, Cos, Tan, Sin^{-1}, Cos^{-1}, and Tan^{-1}

Relational

Boolean result of comparison >, <, ≥, ≤, =, and ≠

Logic

AND, OR, NAND, NOR, XOR, and EQV

User definable filters (standard)

Loading of user definable filters. Users specify a file containing the coefficients of the filter.

User definable filters (optional)

Filter types

Low pass, High pass, Band pass, Band stop, All pass, Hilbert, Differentiator, Raised-Cosine, Root-Raised-Cosine

Filter response types

Butterworth, Chebyshev I, Chebyshev II, Elliptical, Gaussian, Bessel-Thomson, and Custom

FFT functions

Spectral Magnitude and Phase, and Real and Imaginary Spectra

FFT vertical units

Magnitude: Linear (RMS voltage) and Log (dBm)

Phase: Degrees, Radians, and Group Delay

FFT window functions

Hanning, Rectangular, Hamming, Blackman-Harris, Kaiser-Bessel, Flattop2, Gaussian, and TekExp

Search

Search types

Search through long records to find all occurrences of user specified criteria including edges, pulse widths, cycles, timeouts, runt pulses, window violations, rise/fall times, and bus protocol events. Search results can be viewed in the Waveform View or in the Results table.

Number of searches

Unlimited

Save

Save

Save files directly to the oscilloscope or USB media, to a remote network drive, or to your TekDrive collaboration workspace.

Waveform type

Tektronix Waveform Data (.wfm), Comma Separated Values (.csv), MATLAB (.mat)

Waveform gating

Cursors, Screen, Resample (save every nth sample)

Screen capture type

Portable Network Graphic (*.png), 24-bit Bitmap (*.bmp), JPEG (*.jpg)

Setup type

Tektronix Setup (.set)

Report type

Adobe Portable Documents (.pdf)

Session type

Tektronix Session Setup (.tss)

Display

Display type

15.6 in. (395 mm) liquid-crystal TFT color display

Display resolution

1920 horizontal × 1080 vertical pixels (High Definition)

Display modes

Overlay: traditional oscilloscope display where traces overlay each other

Stacked: display mode where each waveform is placed in its own slice and can take advantage of the full ADC range while still being visually separated from other waveforms. Groups of channels can also be overlaid within a slice to simplify visual comparison of signals.

Zoom

Horizontal and vertical zooming is supported in all waveform and plot views.

Interpolation

Sin(x)/x and Linear

Waveform styles

Vectors, dots, variable persistence, and infinite persistence

Graticules

Movable and fixed graticules, selectable between Grid, Time, Full, and None

Color palettes

Normal and inverted for screen captures

Individual waveform colors are user-selectable

Fonts

Font size is user selectable from 12 to 20 (default is 15)

Format

YT, XY, and XYZ

Inverted display

Windows OS only

Local Language User Interface

English, Japanese, Simplified Chinese, Traditional Chinese, French, German, Italian, Spanish, Portuguese, Russian, Korean

Local Language Help

English, Japanese, Simplified Chinese

Arbitrary Function Generator (optional)

All of the specifications in this section apply to the AFG Out BNC connector on the rear panel. This output is only functional with the Arbitrary Functional Generator (AFG) option.

Modes of operation

Off, Continuous, Burst

Function types

Arbitrary, Sine, Square, Pulse, Ramp, DC Level, Gaussian, Lorentz, Exponential Rise, Exponential Decay, Sine(x)/x, Random Noise, Haversine, Cardiac

Output

Waveforms available on rear-panel AFG Out output

Amplitude range

Waveform	Amplitude range (peak-to-peak)	
	Load impedance = 50 Ω	Load impedance = High Z
Sine, Square, Pulse, Ramp, Noise, Haversine, Cardiac, Arbitrary	10 mV to 2.5 V	20 mV to 5.0 V
Gaussian, Exponential rise, Exponential delay	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

Waveform	Amplitude range (peak-to-peak)	
	Load impedance = 50 Ω	Load impedance = High Z
Sin(x)/x	10 mV to 1.5 V	20 mV to 3.0 V
DC	-	-

Frequency range

Waveform	Frequency range
Sine	0.1 Hz to 100 MHz
Square, Pulse, Arbitrary	0.1 Hz to 50 MHz
Ramp, Cardiac	0.1 Hz to 1 MHz
Sin(x)/x	0.1 Hz to 4 MHz
Gaussian, Haversine, Lorentz, Exponential rise, Exponential delay	0.1 Hz to 10 MHz
Noise, DC	-

Frequency resolution

0.1 Hz

Frequency accuracy ✓

±130 ppm (frequency ≤ 10 kHz), ±50 ppm (frequency > 10 kHz)

Guaranteed for Sine and Ramp waveforms. Typical for Square and Pulse waveforms.

Sine waveform

Amplitude flatness

- ±0.5 dB (relative to 1 kHz level) at 30 MHz
- ±1.0 dB (relative to 1 kHz level) at 50 MHz
- ±1.5 dB (relative to 1 kHz level) at 100 MHz
- ±1.5 dB (relative to 1 kHz level) for amplitude (peak-to-peak) <20 mV at 30 MHz
- ±1.5 dB (relative to 1 kHz level) for amplitude (peak-to-peak) <20 mV at 50 MHz
- ±2.0 dB (relative to 1 kHz level) for amplitude (peak-to-peak) <20 mV at 100 MHz

Spurious free dynamic range

Frequency range	Amplitude range $_{\text{peak-to-peak}}$	
	20 mV to < 100 mV, Offset = 0 V	100 mV to ≤ 2.5 V, Offset = 0 V
> DC to < 50 MHz	-30 dBc	-40 dBc
50 MHz to 100 MHz	-25 dBc	-30 dBc

Total harmonic distortion

Specified values are percent of fundamental signal amplitude.

Frequency range	Amplitude range$_{peak-to-peak}$	
	0.05 V to < 0.2 V	**0.2 V to ≤ 2.5 V**
> DC to ≤ 25 MHz	≤2.5%	≤3%
25 MHz to < 50 MHz	≤3%	≤4%
50 MHz to 100 MHz	≤5.5%	≤4%

Square and Pulse waveform

Duty cycle range

10% to 90% or 5 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 5 ns off time

Duty cycle resolution

0.1%

Minimum pulse width, typical

5 ns. This is the minimum time for either on or off duration.

Rise/Fall time

≤5 ns, 10% to 90%

Pulse width resolution

100 ps

Overshoot

<6 % of the signal amplitude (peak-to-peak) for signal steps greater than 100 mV

This applies to overshoot of the positive-going transition (+overshoot) and of the negative-going (-overshoot) transition

Asymmetry (duty cycle accuracy)

±(1% + 5 ns × frequency × 100%) at 50% duty cycle

Jitter

TIE_{RMS} <60 ps

For amplitude$_{p-p}$ ≥ 100 mV and duty cycle, 40% to 60%. Square and Pulse waveforms, 5 GHz measurement bandwidth.

Ramp waveform

Symmetry range

0% to 100%

Symmetry resolution

0.1%

Arbitrary

Memory depth

1 to 128 kS

Sample rate

250 MS/s

Amplitude accuracy

±[(1.5% × peak-to-peak amplitude setting) + (1.5% × | DC offset setting |) + 1 mV] at frequency = 1 kHz

Amplitude resolution

- **50 Ω**: 500 µV
- **High Z**: 1 mV

DC offset range

- **50 Ω**: ±1.25
- **High Z**: ±2.5 V

DC offset resolution

- **50 Ω**: 500 µV
- **High Z**: 1 mV

DC offset accuracy

- **50 Ω**: ±[(1.5% × | offset voltage setting |) + 1 mV]
- Add 1.5 mV of uncertainty per 10 °C change from 25 °C ambient.
- **High Z**: ±[(1.5% of | offset voltage setting |) + 2 mV]
- Add 3 mV of uncertainty per 10 °C change from 25 °C ambient.

AFG Trigger Aux Out Frequency

The divided output frequency is dependent on the frequency of the AFG signal:

AFG signal frequency	Aux Out AFG trigger frequency
≤ 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 53.9 MHz	Signal frequency / 11
>53.9 MHz to 63.7 MHz	Signal frequency / 13
>63.7 MHz to 73.5 MHz	Signal frequency / 15
>73.5 MHz to 83.3 MHz	Signal frequency / 17
>83.3 MHz to 93.1 Mhz	Signal frequency / 19
>93.1 MHz to 100 MHz	Signal frequency / 21

Trigger frequency counter (optional)

Resolution

11 digits

Accuracy

± (20 ppb + timebase accuracy)

From 10 Hz to channel bandwidth for analog channels.

From 10 Hz to 6.25 GHz for Aux In.

Frequency range

10 Hz to (2 × maximum channel bandwidth)

Amplitude (peak-to-peak) of the signal must be at least 8 mV or 3 div, whichever is greater.

(2 × maximum channel bandwidth) can be obtained by setting the trigger condition to either Rising or Falling.

Processor system

Host processor

AMD EPYC Embedded 3351 @ 3 GHz, 64-bit, 12-core processor, 96 GB System RAM

GPU

NVIDIA T1000

Operating system

Closed Embedded OS (Linux)

Microsoft Windows 10 LTSC 2021 (initial purchase option)

Solid State Drive (SSD)

≥1.6 TB removable NVMe SSD

Additional SSD (optional)

Option 7-LNX-UP: Removeable SSD with closed Embedded OS (Linux)

Option 7-WIN-UP: Removeable SSD with Microsoft Windows 10 LTSC 2021 (64-bit) operating system

Input and output ports (front panel)

Analog inputs

TekConnect interface and 2.92 mm Planar Crown(R) interface

Auxiliary input

TekConnect interface

DC probe calibration output

BNC connector for DC probe calibration (signal available only during probe calibration)

Differential Fast Edge output

- Two 2.92 mm connectors
- **Frequency**: 1 kHz ± 20%
- **Amplitude (peak-to-peak)**: 1200 mV differential into a 100 Ω load
- **Common mode**: -300 mV

- **Skew**: ≤0.8 ps
- **Rise time**: < 40 ps (20% to 80% measurement) directly into an analog input channel
- **Aberrations**: Within ±1% of the final step amplitude after the first 500 ns following the edge transition
- For probe deskewing, it is recommended that a 50 Ω terminator be used in series with the deskew fixture to minimize high frequency aberrations
- Unused differential output needs to be terminated with a 50 Ω resistive terminator cap or the used output will have significant aberrations and overshoot

Antistatic ground

Banana jack, 1 MΩ resistor to ground

Chassis ground

Banana jack, direct to chassis ground

USB interface

Three Type-A USB 3.0 SuperSpeed host ports

Input and output ports (rear panel)

LAN SFP+ 10G network interface

SFP+ (Enhanced Small Form Factor Pluggable) port, 10G Ethernet

LAN 1G RJ-45 network interface

8-pin, 10/100/1000BASE-T(X) Ethernet

USB interface

- Four Type-A USB 3.0 SuperSpeed host ports
- One Type-B USB 3.0 SuperSpeed device port providing USBTMC support

DisplayPort connector

- 20-pin DisplayPort connector maximum supported resolution:
- **Windows**: 2560 x 1440 @ 60 Hz
- **Linux**: 1920 x 1080 @ 60 Hz

HDMI connector

- 29-pin HDMI connector, maximum supported resolution:
- **Windows**: 1920 x 1200 @ 60 Hz
- **Linux**: 1920 x 1080 @ 60 Hz

Simultaneous displays

Up to 3 displays (including the internal display) with a maximum of 1 display per port.

Sample clock out

- **Connector**: SMA
- **Termination**: 50 Ω
- **Frequency**: 7.8125 GHz ± 7.9 MHz
- $\text{Amplitude}_{\text{p-p:}}$ 1.3 V (6 dBm)

Sample clock in

- **Connector**: SMA
- **Termination**: 50 Ω
- **Frequency**: 7.8125 GHz ± 7.9 MHz
- Amplitude$_{p-p}$: 632 mV to 2 V (0 dBm to +10 dBm)

Sync out and Sync in

Reserved for future use.

External reference input

- External oscilloscope reference clock input.
- **Connector**: BNC
- **Termination**: 50 Ω
- **High accuracy reference clock**: 10 MHz ± 0.00015 MHz (±15 ppm)
- **Low accuracy reference clock**: 10 MHz ± 0.01 MHz (±1000 ppm)

External reference output

- Internal oscilloscope reference clock output.
- **Connector**: BNC
- **Termination**: 50 Ω
- **Frequency**: 10 MHz
- Amplitude$_{p-p}$: ≥1.0 V (+4 dBm)

Auxiliary output

- Acquisition Trigger Out and AFG Trigger Out.
- **Connector**: BNC
- **Voltage thresholds** are listed in the following table:

Characteristic	Limits
V_{out} (HI)	≥ 2.5 V open circuit; ≥ 1.0 V into a 50 Ω load to ground
V_{out} (LO)	≤ 0.7 V into a load of ≤ 4 mA; ≤0.25 V into a 50 Ω load to ground

AFG output

- **Connector**: BNC
- Amplitude range$_{p-p}$: ±5 V

AFG+ and AFG- outputs

- AFG+ and AFG– outputs are AC coupled differential. The single ended amplitudes are approximately 13 dB down from AFG amplitude setting.
- Maximum amplitude$_{p-p}$: ≥ 300 mV (each single ended output)
- **AFG settings**: Waveform type = sine, Frequency = 100 MHz, Amplitude = 2.5 V, Load impedance = 50 Ω

Kensington-style security slot

Security slot connects to standard Kensington-style lock.

Power source

Power consumption

1600 W maximum

Source voltage

100 V to 240 V at 50 Hz to 60 Hz

Power input

IEC C20 inlet

Compatible with IEC C19 Connector, 20 Amp power cords

Physical characteristics

Dimensions

Instrument

- **Height**: 327 mm (12.9 in)
- **Width**: 560 mm (22.1 in) handle to handle; 454 mm (17.9 in) without handles
- **Depth**: 620 mm (24.4 in) from back of rear protector to TCA292D

HC7B transit case

- **Height**: 448.3 mm (17.65 in)
- **Width**: 721.6 mm (28.4 in)
- **Depth**: 849.1 mm (33.43 in)

Palletized shipping box

- **Height**: 712 mm (28.0 in)
- **Width**: 851 mm (33.5 in)
- **Depth**: 794 mm (31.3 in)

Weights

Instrument only

38.0 kg (83.7 lbs)

HC7B transit case

17.99 kg (39.66 lbs)

Instrument, HC7B, and accessories

58.6 kg (129 lbs)

Instrument, HC7B, accessories and palletized shipping box

76.8 kg (169 lbs)

Clearance requirements

- 51 mm (2.0 in) of clearance on the left and right side from the handles
- 102 mm (4.0 in) of clearance on the rear of the instrument
- 0 mm (0.0 in) of clearance on bottom with feet installed
- 20 mm (0.8 in) of clearance on the bottom with feet removed

Rackmount configuration

8U (7U instrument plus 1U with optional RM7 rackmount kit)

Environmental

Temperature

- **Operating:** +5 °C to +40 °C (+41 °F to +104 °F)
- **Non-operating:** -20 °C to +60 °C (-4 °F to +140 °F)

Humidity

- **Operating:** 5% to 90% relative humidity at temperatures up to +40°C
- **Non-operating:** 5% to 90% relative humidity at temperatures up to +60°C, non-condensing, and as limited by a maximum wet-bulb temperature of +39°C

Altitude

- **Operating:** Up to 3000 meters (9800 feet)
- **Non-operating:** Up to 12,000 meters (39,300 feet)

Compliance, environmental, and safety

Product related safety and compliance

For complete safety, environmental, and compliance statements for this product,see the Safety Information section in the 7 Series DPO Performance Oscilloscope Help manual, available online at https://tek.com/docs/7-series.

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.

These 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 7 Series DPO instruments. Completion of the performance verification procedure does not update the calibration time and date shown on the **Utility** > **Calibration** menu.

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. All tests require a 20 minute minimum warm-up period unless otherwise noted.

Required equipment

Required equipment	Minimum requirements	Example
Oscilloscope calibrator	DC levels ±(15 mV to 5 V) ±0.1 % accuracy, input resistance function	Fluke 9500C Oscilloscope Calibrator with 9540C Output Module
TCA-BNC TekConnect™ adapter	TCA-BNC TekConnect™ adapter	Tektronix TCA-BNC TekConnect™ adapter
Planar Crown® to 2.92 mm adapter	Planar Crown® to 2.92 mm adapter	Planar Crown® to 2.92 mm adapter
Sine wave generator	Frequency range: 50 MHz to instrument bandwidth. Peak-to-peak amplitude range: 80 mV to 8 V into 50 Ω. (-18 dBm to +8 dBm) Frequency error <2.0 %	Anritsu MG36241A RF/Microwave Signal Generator
RF power meter and sensor	Frequency range: 50 MHz to instrument bandwidth. Peak-to-peak amplitude range: 40 mV to 4.0 V into 50 Ω. (-24 dBm to +2 dBm)	Rohde & Schwarz NRX and NRP40S (40 GHz)
RF power splitter	Frequency range: DC to 40 GHz. Tracking: <2.0%. 2.92 mm connector compatible	Anritsu K241C splitter (40 GHz)
Coax cable, 2.92 mm	2.92 mm connector compatible, male-to-female cable, 50 Ω, 40 GHz.	Gore PhaseFlex cable OK0CQ0CP0360 (40 GHz)
Adapter	2.92 mm connector compatible, male-to-male adapter, DC to 40 GHz	Anritsu K220B adapter (40 GHz)

Required equipment	Minimum requirements	Example
TCA-292D TekConnect™ adapter	TCA-292D TekConnect™ adapter	Tektronix TCA-292D TekConnect™ adapter
Frequency counter	10 digit resolution	Tektronix FCA3000 Timer/Counter/Analyzer
Coax cable, BNC	Male-to-male connectors, 50 Ω	Pasternack, PE36066-36 cable
(optional) Precision 10 MHz reference source	12 digit accuracy	Fluke 910/910R GPS Frequency Standard
Torque wrench	0.90 N·m (8 in·lb) for 2.92 mm connectors	Mountz 0600B, TB Break Over Wrench 3-12i
Backing wrench	Appropriately sized for the connectors used	Jensen Tools 461-180, Midget Open End Wrench Set

Self test and SPC

These procedures verify that the instrument passes the internal diagnostics and performs signal path compensation (SPC). No test equipment or hookups are required. Enter the instrument information and test results in the related tables in the test record section of this document.

Prior to running any performance verification tests, the instrument must pass internal diagnostics (self test) and calibration (signal path compensation).

NOTE: You cannot run the other performance tests in this document until the self tests pass and the SPC has successfully run.

Equipment needed

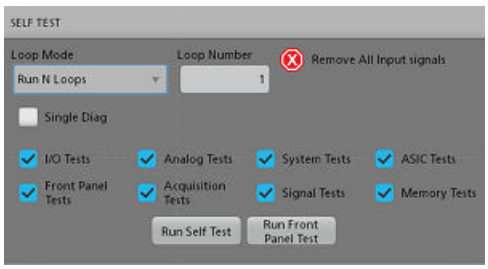
No test equipment is required for these tests.

Procedures

Power on the instrument and allow a 20 minute warm-up period before performing the following tests.

Self test

1. Disconnect all probes and cables from the oscilloscope inputs.
2. Tap **Utility > Self Test** to open its menu.
3. Verify test settings.



4. Tap the **Run Self Test** button.

5. 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.
6. Verify that the status of all tests is Pass and record status in the test record.
7. Tap outside the menu to close the menu.

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

Signal path compensation (SPC)

Run the SPC routine. This may take 10 to 15 minutes per channel.

1. Disconnect all probes and cables from the oscilloscope inputs.
2. Tap **Utility > Calibration** to display its menu.
3. Tap the **Run SPC** button to start the routine. This step will take 10 to 15 minutes per channel.
4. Verify that the **SPC Status** is **Passed** and record in the test record.
5. Tap outside the menu to close the menu.

This SPC procedure is complete. If the above test failed, run the test again. If there are still failures, contact Tektronix Customer Support.

DC input resistance

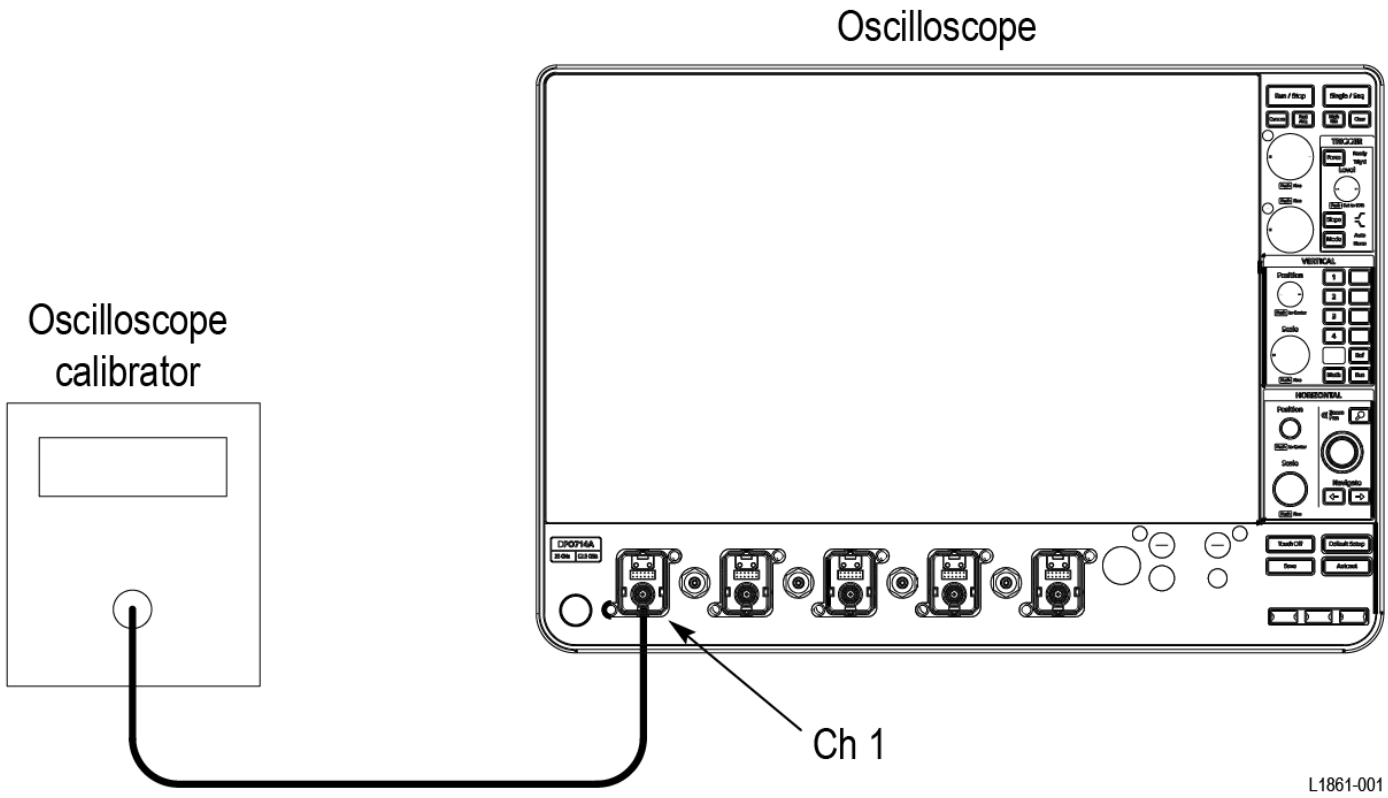
Follow this procedure to check the DC input resistance and record the results in the test record. If you are performing only this procedure, ensure SPC is completed before performing it. If you are performing this procedure in sequence and already performed SPC, there is no need to repeat SPC.

Equipment needed

Item	Minimum requirements	Example
Oscilloscope calibrator	Input resistance function	Fluke 9500C Oscilloscope Calibrator with 9540C Output Module
TCA-BNC TekConnect™ adapter	TCA-BNC TekConnect™ adapter	Tektronix TCA-BNC TekConnect
2.92 mm BNC adapter	2.92 mm BNC adapter	2.92 mm BNC adapter
Planar Crown® to 2.92 mm adapter	Planar Crown® to 2.92 mm adapter	Planar Crown® to 2.92 mm adapter

Procedure

1. Connect the output of the calibrated oscilloscope calibrator to a TCA-BNC TekConnect™ adapter connected to oscilloscope channel 1 input, as shown in the following illustrations.



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.

CAUTION: Resistance measuring equipment that produces a voltage across the channel that exceeds the measurement range of the instrument may report erroneous resistance results. A measurement voltage exceeds the measurement range of the instrument when the resulting trace is not visible on the graticule.

2. Set the calibrator to measure 50 Ω resistance.
3. Tap **File > Default Setup** to reset the oscilloscope.
4. Configure the channel under test.
   a. Double tap the **channel** badge for the channel to test to open its menu.
   b. Tap the **Vertical Scale** and set the value to test in the test record (the first value is 10 mV/div).
   c. Tap outside the menu to close the menu.
5. Measure the input resistance of the oscilloscope using the calibrator and enter the value in the test record.
6. Repeat steps 4 through 5 for all vertical scale settings in the test record for channel 1.
7. Repeat the procedure for all remaining channels as follows:
   a. Turn the calibrator output off.
   b. Move the calibrator output and the TCA-BNC TekConnect adapter to the next channel input 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 oscilloscope Settings bar of the next channel to test to display it.
   e. Repeat steps 4 through 7 until all channels have been tested.
8. For DPO718AX instruments only:

a. Remove the calibrator output from the TCA-BNC TekConnect.
b. Connect the calibrator output to the BNC 2.92 mm adapter.
c. Connect the 292 adapter to channel 5.
d. Repeat steps 4-7 for remaining channels. Note you will use the BNC 2.92 mm adapter and not the TCA-BNC.

DC gain accuracy

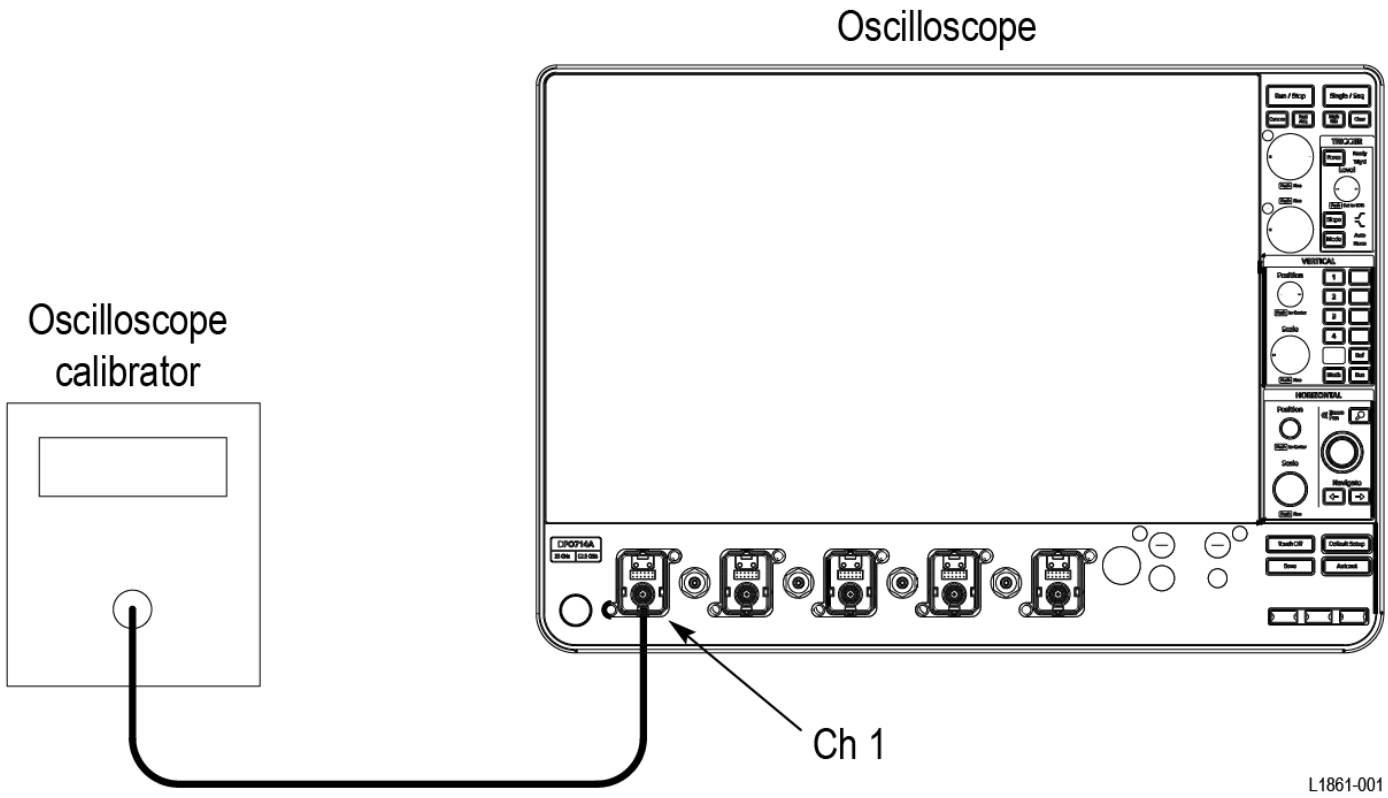
Follow this procedure to check the DC gain accuracy for 62.5 GS/s sample rate and 125 GS/s sample rate and record the results in the appropriate test record. If you are performing only this procedure, ensure SPC is completed before performing it. If you are performing this procedure in sequence and already performed SPC, there is no need to repeat SPC.

Equipment needed

Item	Minimum requirements	Example
Oscilloscope calibrator	DC levels ±(15 mV to 5 V) ±0.1 % accuracy	Fluke 9500C Oscilloscope Calibrator with 9540C Output Module
TCA-BNC TekConnect™ adapter	TCA-BNC TekConnect™ adapter	Tektronix TCA-BNC TekConnect™ adapter
TCA292D TekConnect to 2.92 mm adapter	TCA292D TekConnect to 2.92 mm adapter	TCA292D TekConnect to 2.92 mm adapter
Planar Crown® to 2.92 mm adapter	Planar Crown® to 2.92 mm adapter	Planar Crown® to 2.92 mm adapter

Procedure

1. Connect the output of the oscilloscope calibrator to a TCA-BNC TekConnect™ adapter connected to oscilloscope channel 1 input, 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. Configure Acquisition settings.
   a. Tap **File > Default Setup**.
   b. Double tap the **Acquisition** badge and set **Acquisition Mode** to Average.
   c. Set the **Number of Waveforms** to 16.
   d. Tap outside the menu to close the menu.
3. Configure Trigger settings.
   a. Double tap the **Trigger** badge and set the trigger **Source** to AC line.
   b. Tap outside the menu to close the menu.
4. 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.
   d. Tap outside the menu to close the menu.
5. Configure the Mean measurement.
   a. Double tap the **Mean** results badge.
   b. Tap **Show Statistics in Badge**.
   c. Tap **Filter/Limit Results** to open the panel.
   d. Tap **Limit Measurement Population** to switch it to On.
   e. Set the **Limit** to 100.
   f. Tap outside the menu to close the menu.
6. Configure Horizontal settings.

a. Double tap the **Horizontal** badge.
b. Set the **Horizontal Mode** to Manual.
c. Set the **Sample Rate** to the value indicated in the header of the test record table (the first setting is 62.5 GS/s).
d. Set the **Record Length** to 5 Mpts.
e. Tap outside the menu to close the menu.

7. Configure the channel under test.
   a. Tap the **channel button** of the channel to test to add the channel badge to the Settings bar (the first value is Channel 1).
   b. Double tap the **channel** to test badge to open its menu.
   c. Tap the **Bandwidth Limit** and set to 500 MHz.
   d. Tap the **Quiet Channel** and set the value to the value in the test record header (the first value is Off).
   e. Tap outside the menu to close the menu.
8. Set the vertical scale for the channel to test.
   a. Double tap the **Channel** badge for the channel to test to open its menu.
   b. Tap the **Vertical Scale** to the value to test in the test record (the first value is 5 mV/div).
   c. Tap outside the menu to close the menu.
9. Record the “negative-measured” and “positive-measured” mean readings in the DC Vertical Gain Worksheet.
   a. On the calibrator, set the DC Voltage Source to the $V_{negative}$ value as listed in the test record (the first value is -17.5 mV).
   b. Select the **Clear** button to clear previous acquisition data in the oscilloscope.
   c. After a minimum of 100 acquisitions (N ≥ 100), enter the **Mean** measurement value (indicated in the measurement badge by μ) in the test record as $V_{negative\text{-}measured}$.
   d. On the calibrator, set the DC Voltage Source to the $V_{positive}$ value as listed in the test record (the first value is 17.5 mV).
   e. Select the **Clear** button clear previous acquisition data in the oscilloscope.
   f. After a minimum of 100 acquisitions (N ≥ 100), enter the **Mean** measurement value (indicated in the measurement badge by μ) in the worksheet as $V_{positive\text{-}measured}$.
10. Calculate Gain Accuracy.
    a. Calculate the absolute measured difference as follows and enter it in the test record:
    b. $V_{diff\text{-}measured} = | V_{positive\text{-}measured} - V_{negative\text{-}measured} |$
    c. Calculate Gain Accuracy as follows:
    d. DC Gain Accuracy = $[(V_{diff\text{-}measured} - V_{diff\text{-}expected})/V_{diff\text{-}expected}] \times 100\ \%$
    e. Enter the Gain Accuracy value in the as Test result in the test record.
11. Repeat steps 8 through 10 for all vertical scale settings in the test record.
12. Repeat the procedure for all remaining channels as follows:
    a. Set the calibrator to 0 volts and 50 Ω output resistance.
    b. Move the calibrator output and the TCA-BNC TekConnect™ adapter to the next channel input to test.
    c. **For DPO718AX instruments (channels 5-8):** Remove the calibrator output from the TCA-BNC TekConnect and connect the calibrator output to the 2.92 mm BNC adapter. Connect the 2.92 mm adapter to the channel.
    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. Double tap the **channel** badge of the channel that you have finished testing and set **Display** to Off.

h. Double tap the **channel** button on the oscilloscope Settings bar of the next channel to test and set **Display** to On.

i. Repeat steps 7 through 12 until all channels have been tested.

13. Repeat steps 6 through 12 for the 125 GS/s sample rate and record the results in the appropriate test record.

Offset accuracy

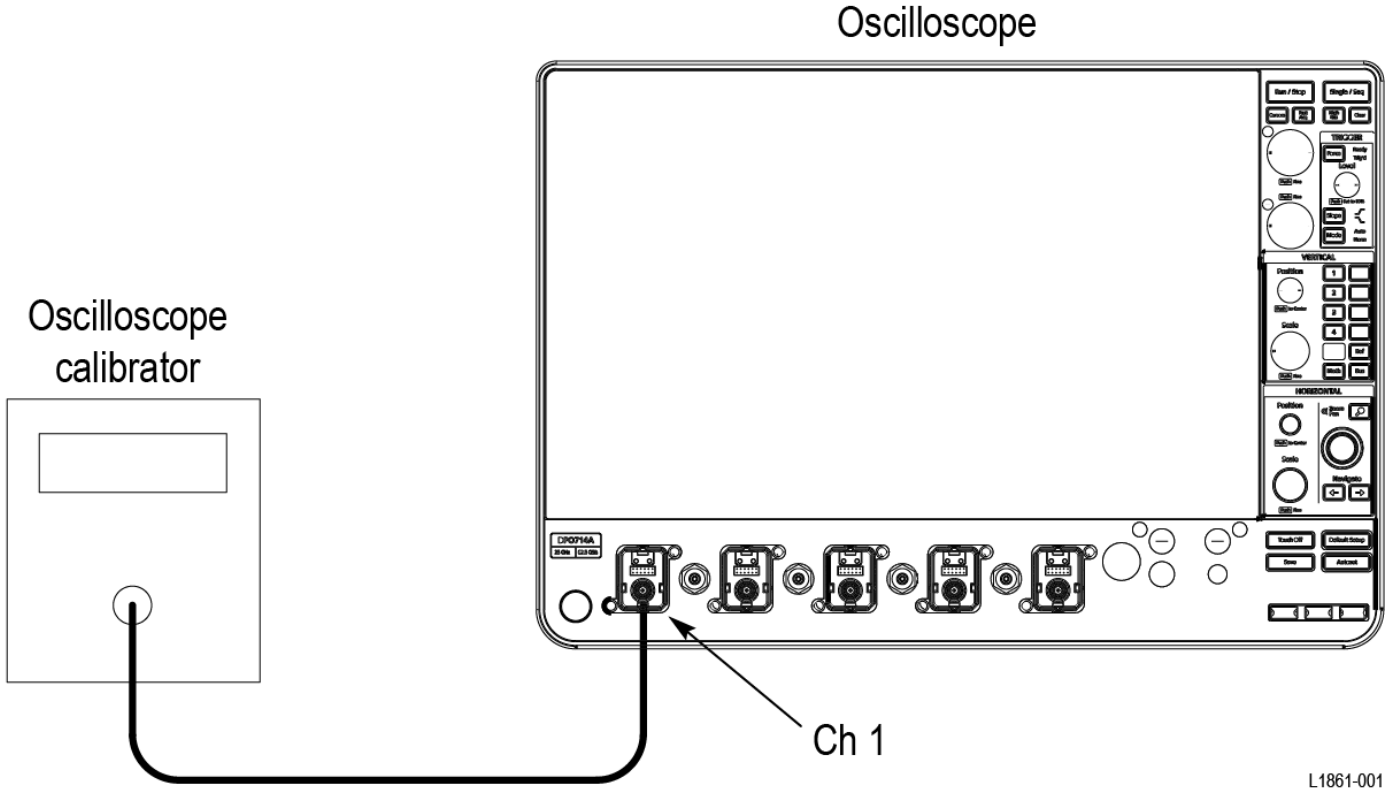
Follow this procedure to check the Offset accuracy and record the results in the test record. If you are performing only this procedure, ensure SPC is completed before performing it. If you are performing this procedure in sequence and already performed SPC, there is no need to repeat SPC.

Equipment needed

Item	Minimum requirements	Example
Oscilloscope calibrator	DC levels ±(15 mV to 5 V) ±0.1 % accuracy	Fluke 9500C Oscilloscope Calibrator with 9540C Output Module
TCA-BNC TekConnect™ adapter	TCA-BNC TekConnect™ adapter	Tektronix TCA-BNC TekConnect™
Planar Crown® to 2.92 mm adapter	Planar Crown® to 2.92 mm adapter	Planar Crown® to 2.92 mm adapter
2.92 mm / SMA to BNC adapter	2.92 mm / SMA to BNC adapter	2.92 mm to BNC adapter

Procedure

1. Connect the output of the oscilloscope calibrator to a TCA-BNC TekConnect™ adapter connected to oscilloscope channel 1 input, 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. Configure Acquisition settings.
   a. Tap **File > Default Setup**.
   b. Double tap the **Acquisition** badge and set **Acquisition Mode** to Average.
   c. Set the **Number of Waveforms** to 16.
   d. Tap outside the menu to close the menu.
3. Configure Trigger settings.
   a. Double-tap the **Trigger** badge and set the trigger **Source** to AC line.
   b. Tap outside the menu to close the menu.
4. 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.
   d. Tap outside the menu to close the menu.
5. Configure the Mean measurement.
   a. Double tap the **Mean** results badge.
   b. Tap **Show Statistics in Badge**.
   c. Tap **Filter/Limit Results** to open the panel.
   d. Tap **Limit Measurement Population** to switch it to On.
   e. Set the **Limit** to 100.
   f. Tap outside the menu to close the menu.
6. Configure the channel under test.
   a. Tap the **channel button** of the channel to test to add the channel badge to the Settings bar (the first value is Channel 1).
   b. Double tap the **channel** badge of the channel to test to open its menu.
   c. Tap the **Bandwidth Limit** and set to 500 MHz.
   d. Tap the **Quiet Channel** and set the value to Off.
   e. Tap outside the menu to close the menu.
7. Set the vertical scale and offset for the channel to test.
   a. Double tap the **channel** badge for the channel to test to open its menu.
   b. Tap the **Vertical Scale** to the value to test in the test record (the first value is 4 mV/div).
   c. Set the **Offset** to the value to test in the test record (the first value is 900 mV).
   d. Set Position to 0 by tapping **Set to 0**.
   e. Tap outside the menu to close the menu.

8. Configure the oscilloscope calibrator.
   a. Set the oscilloscope calibrator to output the Vertical Offset level indicated in the test record (the first value is 900 mV).
   b. Turn the calibrator output On.
9. Record the measured offset.
   a. Select the **Clear** button to clear previous acquisition data in the oscilloscope.
   b. After a minimum of 100 acquisitions (N ≥ 100), enter the Mean measurement value (indicated in the measurement badge by μ) in the test record.
10. Repeat steps 7 through 9 for all vertical scale and vertical offsets entries in the test record for the channel under test.
11. Repeat the procedure for all remaining channels as follows:
    a. Set the calibrator to 0 volts and 50 Ω output impedance.
    b. Move the calibrator output and the TCA-BNC TekConnect™ adapter to the next channel input to test.
    c. **For DPO718AX instruments (channels 5-8):** Remove the calibrator output from the TCA-BNC TekConnect and connect the calibrator output to the 2.92 mm BNC adapter. Connect the 2.92 mm adapter to the channel.
    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. Double tap the **channel** badge of the channel that you have finished testing and set **Display** to Off.
    h. Double tap the **channel** button on the oscilloscope Settings bar of the next channel to test and set **Display** to On.
    i. Repeat steps 6 through 11 until all channels have been tested.

DC voltage measurement accuracy

Follow this procedure to check the DC voltage measurement accuracy and record the results in the test record. If you are performing only this procedure, ensure SPC is completed before performing it. If you are performing this procedure in sequence and already performed SPC, there is no need to repeat SPC.

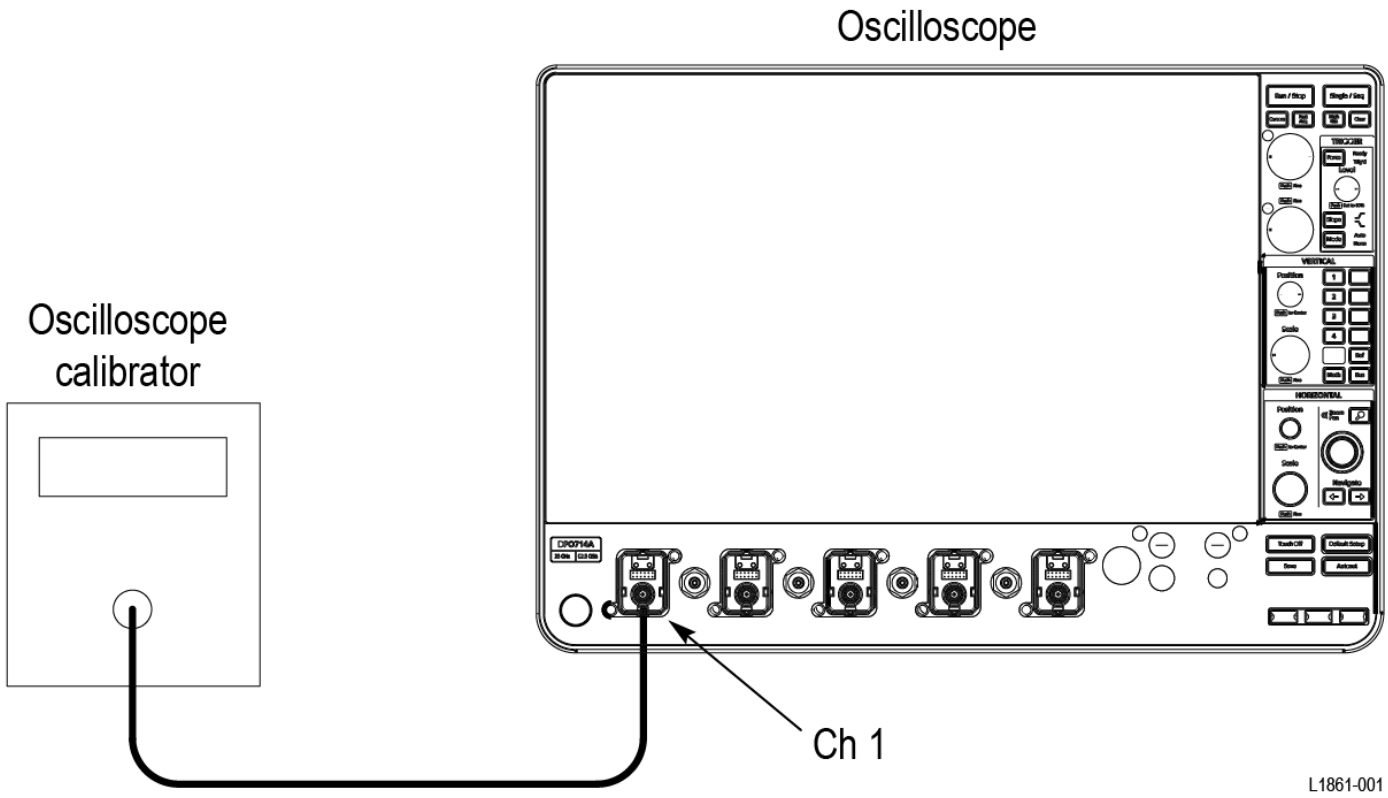
Equipment needed

You will need the following equipment to perform this test.

Item	Minimum requirements	Example
Oscilloscope calibrator	DC levels ±(15 mV to 5 V) ±0.1 % accuracy	Fluke 9500C Oscilloscope Calibrator with 9540C Output Module
TCA-BNC TekConnect™ adapter	TCA-BNC TekConnect™ adapter	Tektronix TCA-BNC TekConnect™
Planar Crown® to 2.92 mm adapter	Planar Crown® to 2.92 mm adapter	Planar Crown® to 2.92 mm adapter
2.92 mm / SMA to BNC adapter	2.92 mm / SMA to BNC adapter	2.92 mm to BNC adapter

Procedure

1. Connect the output of the oscilloscope calibrator to a TCA-BNC TekConnect™ adapter connected to oscilloscope channel 1 input, 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. Configure Acquisition settings.
   a. Tap **File > Default Setup**.
   b. Double tap the **Acquisition** badge and set **Acquisition Mode** to Average.
   c. Set the **Number of Waveforms** to 16.
   d. Tap outside the menu to close the menu.
3. Configure Trigger settings.
   a. Double tap the **Trigger** badge and set the trigger **Source** to AC line.
   b. Tap outside the menu to close the menu.
4. 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.
   d. Tap outside the menu to close the menu.
5. Configure the Mean measurement.
   a. Double tap the **Mean** results badge.
   b. Tap **Show Statistics in Badge**.
   c. Tap **Filter/Limit Results** to open the panel.
   d. Tap **Limit Measurement Population** to switch it to On.
   e. Set the **Limit** to 100.
   f. Tap outside the menu to close the menu.
6. Configure the Horizontal settings.

a. Double tap the **Horizontal** badge.
b. Set the **Horizontal Mode** to Manual.
c. Set the **Sample Rate** to the value indicated in the header of the test record table (the first setting is 62.5 GS/s).
d. Tap outside the menu to close the menu.

7. Configure the channel under test.
   a. Tap the **channel button** of the channel to test to add the channel badge to the Settings bar (the first value is Channel 1).
   b. Double tap the **channel** badge for the channel to test to open its menu.
   c. Tap **Bandwidth Limit** and set to 500 MHz.
   d. Tap **Quiet Channel** and set the value to Off.
   e. Tap outside the menu to close the menu.
8. Set the vertical settings for the channel to test.
   a. Double tap the **channel** badge for the channel to test to open its menu.
   b. Tap the **Vertical Scale** to the value to test in the test record (the first value is 5 mV/div).
   c. Set the **Offset** to the value to test in the test record (the first value is -82.5 mV).
   d. Set Position to 0 by tapping **Set to 0**.
   e. Tap outside the menu to close the menu.
9. Set the calibrator output to the DC Input Level in the test record (the first value is -100 mV).
10. Record measured offset.
    a. Select the **Clear** button to clear previous acquisition data in the oscilloscope.
    b. After a minimum of 100 acquisitions (N ≥ 100), enter the **Mean** measurement value (indicated in the measurement badge by μ) in the test record.
11. Repeat steps 7 through 9 for all vertical scale, vertical offset, and DC input level entries in the test record for the channel under test.
12. Repeat the procedure for all remaining channels as follows:
    a. Set the calibrator to 0 volts.
    b. Move the calibrator output and the TCA-BNC TekConnect™ adapter to the next channel input to test.
    c. **For DPO718AX instruments (channels 5-8):** Remove the calibrator output from the TCA-BNC TekConnect and connect the calibrator output to the 2.92 mm BNC adapter. Connect the 2.92 mm adapter to the channel.
    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. Double tap the **channel** badge of the channel that you have finished testing and set **Display** to Off.
    h. Double tap the **channel** button on the oscilloscope Settings bar of the next channel to test and set **Display** to On.
    i. Repeat steps 6 through 11 until all channels have been tested.
13. Repeat steps 6 through 12 for the next test record table using 125 GS/s sample rate.

Analog bandwidth

Follow this procedure to check the Analog bandwidth and record the results in the test record. If you are performing only this procedure, ensure SPC is completed before performing it. If you are performing this procedure in sequence and already performed SPC, there is no need to repeat SPC.

Analog bandwidth is defined as the frequency at which the measured level is 3 dB below the level at a low reference frequency. To verify that the oscilloscope meets the bandwidth specification, amplitude measurements are made at the reference frequency and test frequency using the same input amplitude. The gain (or ratio) between these two measured amplitudes is calculated and converted to dB scale. If the gain is greater than -3 dB, then the bandwidth of the oscilloscope is above the test frequency. Accordingly, this test method will directly measure gain between the reference and test frequencies to verify the bandwidth of the product.

Equipment needed

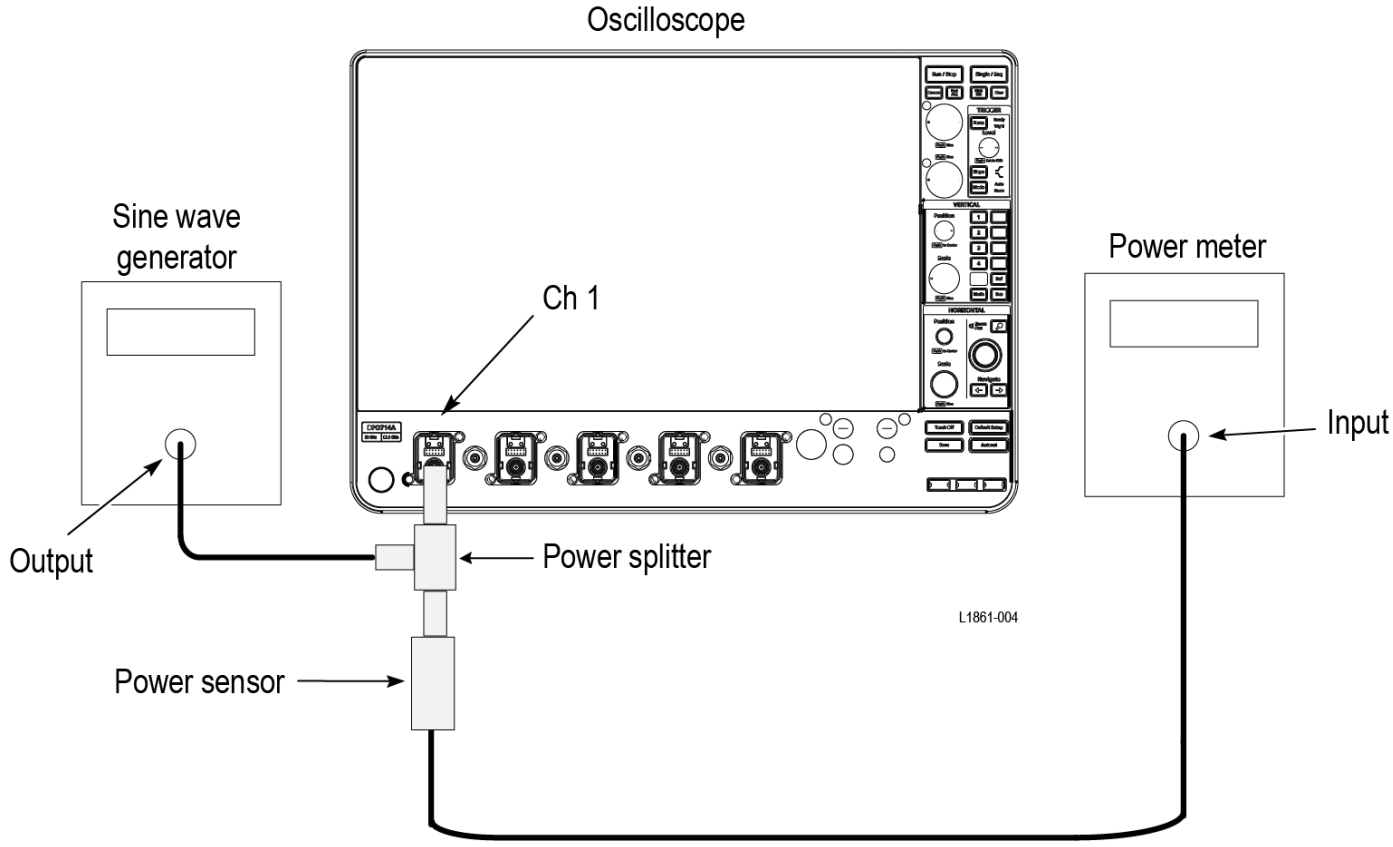
Item	Minimum requirements	Example
Sine wave generator	Frequency range: 50 MHz to at least the instrument bandwidth. Peak-to-peak amplitude range: 80 mV to 8.0 V into 50 Ω. (-18 dBm to +8 dBm) Frequency error <2.0%	Anritsu MG36241A RF/Microwave Signal Generator
RF power meter and sensor	Frequency range: 50 MHz to the instrument bandwidth. Peak-to-peak amplitude range: 40 mV to 4.0 V into 50 Ω. (-24 dBm to +2 dBm)	Rohde & Schwarz NRX and NRP40S (40 GHz)
RF power splitter	Frequency range: DC to 40 GHz. Tracking: <2.0%. 2.92 mm connector compatible	Anritsu K241C splitter (40 GHz)
Coax cable, 2.92 mm	2.92 mm connector compatible, male-to-female cable, 50 Ω, 40 GHz	Gore PhaseFlex cable OK0CQ0CP0360 (40 GHz)
Adapter	2.92 mm connector compatible male-to-male adapter, DC to 40 GHz	Anritsu K220B Adapter (40 GHz)
TCA-292D TekConnect™ adapter	TCA-292D TekConnect™ adapter	Tektronix TCA-292D TekConnect™ adapter
Torque wrench	0.90 N·m (8 in·lb) for 2.92 mm connectors	Mountz 0600B, TB Break Over Wrench 3-12i
Backing wrench	Appropriately sized	Jensen Tools 461-180, Midget Open End Wrench Set
Planar Crown® to 2.92 mm adapter	Planar Crown® to 2.92 mm adapter	Planar Crown® to 2.92 mm adapter

Procedure

Perform the following procedure fully for each of the listed sample rate and Quiet Channel setting combinations. There is a test record table for each setting.

- Sample rate 62.5 GS/s; Quiet Channel = Off
- Sample rate 62.5 GS/s; Quiet Channel = QC4
- Sample rate 62.5 GS/s; Quiet Channel = QC
- Sample rate 125 GS/s; Quiet Channel = Off
- Sample rate 125 GS/s; Quiet Channel = QC4
- Sample rate 125 GS/s; Quiet Channel = QC7

1. Connect the equipment 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. Tap **File > Default Setup** to reset the oscilloscope.
3. Configure Trigger settings.
   a. Double tap the **Trigger** badge.
   b. Set the trigger **Source** to AC line.
   c. Tap outside the menu to close the menu.
4. Add the Peak-to-Peak amplitude 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 **Peak-to-Peak** button to add the Peak-to-Peak measurement badge to the Results bar.
   d. Tap outside the menu to close the menu.
5. Configure the Peak-to-Peak amplitude measurement.

a. Double tap the **Peak-to-Peak** results badge.
b. Tap **Show Statistics in Badge**.
c. Tap **Filter/Limit Results** to open the panel.
d. Tap **Limit Measurement Population** to switch it to On.
e. Set the **Limit** to 100.
f. Tap outside the menu to close the menu.

6. Configure Horizontal settings.
   a. Double tap the **Horizontal** badge.
   b. Set the **Horizontal Mode** to Manual.
   c. Set the **Sample Rate** to the value indicated in the header of the test record table (the first setting is 62.5 GS/s).
   d. Set the **Record Length** to 5 Mpts.
   e. Tap outside the menu to close the menu.
7. Configure the channel under test.
   a. Tap the **channel button** on the Settings bar to add the channel under test to the Settings bar (the first value is Channel 1).
   b. Double tap the **channel** badge for the channel to test to open its menu.
   c. Tap **Bandwidth Limit** and set to the maximum value for the specific model.
   d. Tap the **Flatness** option for Bandwidth Filter Optimization.
   e. Select the **Quiet Channel** setting indicated in the test record header (the first setting is Off).
   f. Set **Vertical Scale** to the setting indicated in the test record (the first value is 5 mV/div).
   g. Tap outside the menu to close the menu.
8. Set source for reference frequency and amplitude.
   a. Set the sine wave signal source frequency to 50 MHz.
   b. Set the power meter to measure 50 MHz input signal.
   c. Adjust the sine wave signal source to display a waveform of 8 vertical divisions. For example, at 10 mV/div, use a peak-to-peak amplitude of about 80 mV.

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

   d. Record the power meter reading in the test record.
9. Measure the amplitude at the reference frequency.
   a. Select the **Clear** button to clear previous acquisition data in the oscilloscope.
   b. After a minimum of 100 acquisitions (N ≥ 100), enter the average Peak-to-Peak amplitude measurement value (indicated in the measurement badge by μ) in the test record Vref-p-p column.
10. Set source for test frequency.
    a. Use the following table to determine the Bandwidth Test Frequency for the maximum bandwidth of the device under test. Write this value in the Header of the test record.
    b. Set the sine wave signal source frequency to the test frequency in the table.
    c. Set the power meter to measure the test frequency in the table.
    d. Adjust the sine wave generator amplitude until the power meter again reads the value noted in step 8d. The signal amplitude is now correctly set for the new frequency.

       Bandwidth test frequency (A slight frequency offset is required to avoid synchronicity with the sample rate.)

Bandwidth of oscilloscope model (GHz)	Bandwidth test frequency (GHz)
25	24.999
20	19.999
16	15.999
13	12.999
10	9.999
8	7.999

e. Measure the amplitude at the test frequency.
   - Select the **Clear** button to clear previous acquisition data in the oscilloscope.
   - After a minimum of 100 acquisitions (N ≥ 100), enter the average Peak-to-Peak measurement value (indicated in the measurement badge by μ) in the test record $\mathbf{V}_{test\text{-}p\text{-}p}$ column.

11. Calculate the gain.
    a. Calculate the gain (fraction) between the reference and test frequencies with the following equation: $Gain_{fraction} = V_{test\text{-}pp} / V_{ref\text{-}pp}$. Enter value in the test record.
    b. Calculate the gain (dB) between the reference and test frequencies with the following equation: $Gain_{dB} = 20 \log_{10} (Gain_{fraction})$. Enter value in the test record.
12. Repeat Steps 7 through 12 for all vertical settings in the test record for the channel under test.
13. Repeat the procedure for all remaining channels as follows:
    a. Disable the output to the sine wave source.
    b. Move the source output to the next channel input to test.
    c. Double tap the **Peak-to-Peak** measurement badge.
    d. Tap the **Configure** panel.
    e. Tap the **Source 1** field and select the next channel to test.
    f. Double tap the **channel** badge of the channel that you have finished testing and set **Display** to Off.
    g. Double tap the **channel** button on the oscilloscope Settings bar of the next channel to test and set **Display** to On.
    h. Repeat steps 7 through 14 until all channels have been tested.
14. Repeat steps 7 or 14 for the next test record and Quiet Channel setting.
15. Repeat steps 6 through 15 for the next set of test records for the 125 GS/s sample rate.

AFG sine and ramp frequency accuracy

Follow this procedure to check the AFG sine and ramp frequency accuracy and record the results in the test record. If you are performing only this procedure, ensure SPC is completed before performing it. If you are performing this procedure in sequence and already performed SPC, there is no need to repeat SPC.

This test verifies the frequency accuracy of the arbitrary function generator. All output frequencies are derived from a single internally generated frequency.

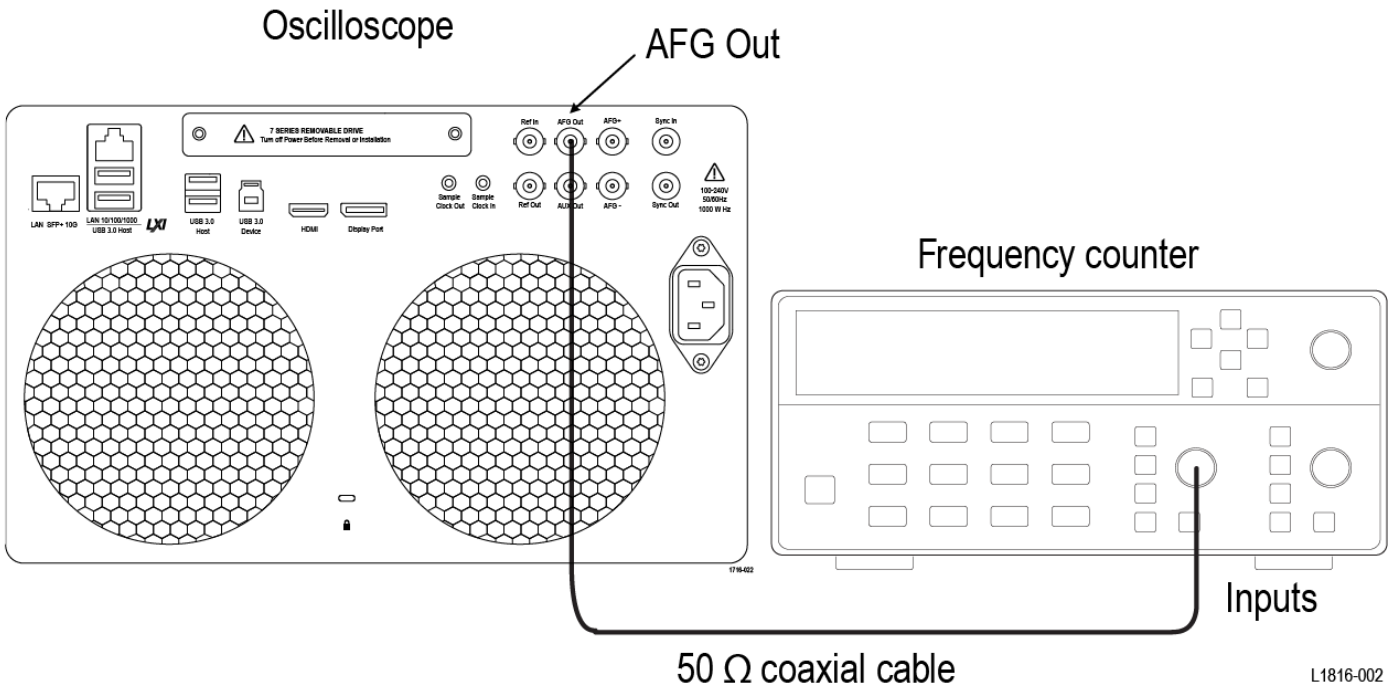
Equipment needed

You will need the following equipment to perform this test.

Item	Minimum requirements	Example
Frequency counter	10 digit resolution	Tektronix FCA3000 Timer/Counter/ Analyzer
Coax cable, BNC	Male-to-male connectors, 50 Ω	Pasternack, PE36066-36 cable

Procedure

1. Connect the **AFG Out** on the back panel of the oscilloscope to the frequency counter with a 50 Ω BNC cable, as shown in the following illustration.



2. Tap **File > Default Setup** to reset the oscilloscope.
3. Configure the frequency counter to be stable to 7 digits. This can be done by setting the gate time, or aperture. Consult the manual for your frequency counter.
4. Configure AFG.
   a. Tap the **AFG** badge to open the AFG menu.
   b. Set the **Load Impedance** to 50 Ω.
   c. Set the **Output** to **Continuous**.
   d. Set the **Waveform Type** to the waveform listed in the test record (the first setting is Sine).
   e. Set the **Frequency** to the value listed in the test record (the first setting is 10 kHz).
   f. Set the **Amplitude** to 2.5 V_{p-p}.
   g. Tap outside the menu to close the menu.
5. Read the measured frequency from the frequency counter and enter it into the test record.
6. Repeat steps 4 through 5 for all entries in the test record.

Timebase accuracy

Follow this procedure to check the Timebase accuracy of the acquisition system and record the results in the test record. If you are performing only this procedure, ensure SPC is completed before performing it. If you are performing this procedure in sequence and already performed SPC, there is no need to repeat SPC.

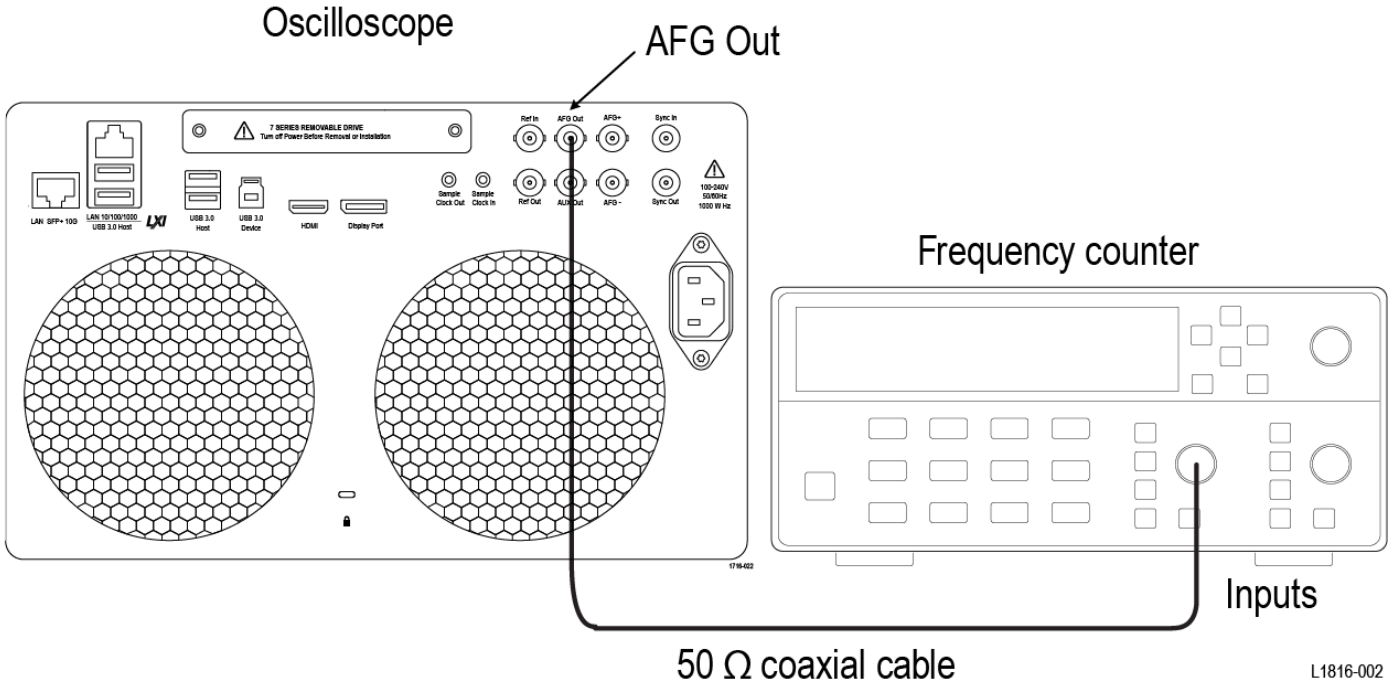
Equipment needed

You will need the following equipment to perform this test.

Item	Minimum requirements	Example
Frequency counter	10 digit resolution	Tektronix FCA3000 Timer/Counter/ Analyzer
Coax cable, BNC	Male-to-male connectors, 50 Ω	Pasternack, PE36066-36 cable
(optional) Precision 10 MHz reference source	12 digit accuracy	Fluke 910/910R GPS Frequency Standard

Procedure

1. Allow the oscilloscope to warm up for a minimum of 10 hours (12 ppb time base accuracy) or 1 hour (100 ppb time base accuracy).
2. Tap **Utility** > **Calibration**. The initial/last factory adjust date is listed. Record that date in the test record.
3. Connect the **Ref Out** connector on the back panel of the oscilloscope to the frequency counter with a 50 Ω cable as shown in the following illustration.
4. (Optional) For the most accurate results, connect the GPS disciplined 10 MHz oscillator to the frequency reference input of the frequency counter.



5. Tap **File > Default Setup** and reset the oscilloscope.

6. Configure the frequency counter to be stable to 7 digits. This can be done by setting the gate time, or aperture. Consult the manual for your frequency counter.
7. Read the measured frequency from the frequency counter and enter it into the test record row for the relevant time since initial/last adjustment.
8. Compare the measured frequency to the limits for the relevant time since initial/last adjustment.

Test records

Use these tables to record performance verification test results.

Test product information

Model	Serial number	Procedure performed by	Date

Self test test record

Test	Status
IO	
Front Panel	
Analog	
Acquisition	
System	
Signal	
ASIC	
Memory	
Overall Status	

Signal Path Compensation (SPC) test record

Test	Status
SPC Status	

DC input resistance test record

Ambient temperature

Input resistance, ambient temperature 18 °C to 28 °C				
Channel	**Vertical scale**	**Low limit**	**Test result**	**High limit**
1	10 mV/div	48.5 Ω		51.5 Ω
	500 mV/div	48.35 Ω		51.65 Ω
2	10 mV/div	48.5 Ω		51.5 Ω
	500 mV/div	48.35 Ω		51.65 Ω
3	10 mV/div	48.5 Ω		51.5 Ω
	500 mV/div	48.35 Ω		51.65 Ω
4	10 mV/div	48.5 Ω		51.5 Ω
	500 mV/div	48.35 Ω		51.65 Ω

DPO718AX only Input resistance, ambient temperature 18 °C to 28 °C				
Channel	**Vertical scale**	**Low limit**	**Test result**	**High limit**
5	10 mV/div	48.5 Ω		51.5 Ω
	500 mV/div	48.35 Ω		51.65 Ω
6	10 mV/div	48.5 Ω		51.5 Ω
	500 mV/div	48.35 Ω		51.65 Ω

7	10 mV/div	48.5 Ω		51.5 Ω
	500 mV/div	48.35 Ω		51.65 Ω
8	10 mV/div	48.5 Ω		51.5 Ω
	500 mV/div	48.35 Ω		51.65 Ω

DC gain accuracy test records

The following notes are referenced in the tables in this section:

1. $V_{diff\text{-}measured} = |V_{positive\text{-}measured}| - V_{negative\text{-}measured}$
2. DC Gain Accuracy = $[(V_{diff\text{-}measured} - V_{diff\text{-}expected})/V_{diff\text{-}expected}] \times 100\ \%$

DC gain accuracy, sample rate = 62.5 GS/s										
Channel	**Vertical scale**	**$V_{negative}$**	**$V_{positive}$**	**$V_{diff\text{-}expected}$**	**$V_{negative\text{-}measured}$**	**$V_{positive\text{-}measured}$**	**$V_{diff\text{-}measured}$[1]**	**Low limit**	**Test result[2]**	**High limit**
1	5 mV/div	-17.5 mV	17.5 mV	35 mV				-2 %		2 %
	10 mV/div	-35 mV	35 mV	70 mV				-2 %		2 %
	20 mV/div	-70 mV	70 mV	140 mV				-2 %		2 %
	50 mV/div	-175 mV	175 mV	350 mV				-2 %		2 %
	99 mV/div	-346.5 mV	346.5 mV	693 mV				-2 %		2 %
	100 mV/div	-350 mV	350 mV	700 mV				-2 %		2 %
	200 mV/div	-700 mV	700 mV	1400 mV				-2 %		2 %
	500 mV/div	-1750 mV	1750 mV	3500 mV				-2 %		2 %
2	5 mV/div	-17.5 mV	17.5 mV	35 mV				-2 %		2 %
	10 mV/div	-35 mV	35 mV	70 mV				-2 %		2 %

DC gain accuracy, sample rate = 62.5 GS/s										
Channel	**Vertical scale**	**$V_{negative}$**	**$V_{positive}$**	**$V_{diff\text{-}expected}$**	**$V_{negative\text{-}measured}$**	**$V_{positive\text{-}measured}$**	**$V_{diff\text{-}measured}$[1]**	**Low limit**	**Test result[2]**	**High limit**
	20 mV/div	-70 mV	70 mV	140 mV				-2 %		2 %
	50 mV/div	-175 mV	175 mV	350 mV				-2 %		2 %
	99 mV/div	-346.5 mV	346.5 mV	693 mV				-2 %		2 %
	100 mV/div	-350 mV	350 mV	700 mV				-2 %		2 %
	200 mV/div	-700 mV	700 mV	1400 mV				-2 %		2 %
	500 mV/div	-1750 mV	1750 mV	3500 mV				-2 %		2 %
3	5 mV/div	-17.5 mV	17.5 mV	35 mV				-2 %		2 %
	10 mV/div	-35 mV	35 mV	70 mV				-2 %		2 %
	20 mV/div	-70 mV	70 mV	140 mV				-2 %		2 %
	50 mV/div	-175 mV	175 mV	350 mV				-2 %		2 %
	99 mV/div	-346.5 mV	346.5 mV	693 mV				-2 %		2 %
	100 mV/div	-350 mV	350 mV	700 mV				-2 %		2 %
	200 mV/div	-700 mV	700 mV	1400 mV				-2 %		2 %
	500 mV/div	-1750 mV	1750 mV	3500 mV				-2 %		2 %
4	5 mV/div	-17.5 mV	17.5 mV	35 mV				-2 %		2 %
	10 mV/div	-35 mV	35 mV	70 mV				-2 %		2 %

DC gain accuracy, sample rate = 62.5 GS/s										
Channel	**Vertical scale**	**$V_{negative}$**	**$V_{positive}$**	**$V_{diff-expected}$**	**$V_{negative-measured}$**	**$V_{positive-measured}$**	**$V_{diff-measured}$[1]**	**Low limit**	**Test result[2]**	**High limit**
	20 mV/div	-70 mV	70 mV	140 mV				-2 %		2 %
	50 mV/div	-175 mV	175 mV	350 mV				-2 %		2 %
	99 mV/div	-346.5 mV	346.5 mV	693 mV				-2 %		2 %
	100 mV/div	-350 mV	350 mV	700 mV				-2 %		2 %
	200 mV/div	-700 mV	700 mV	1400 mV				-2 %		2 %
	500 mV/div	-1750 mV	1750 mV	3500 mV				-2 %		2 %

DPO718AX only DC gain accuracy, sample rate = 62.5 GS/s										
Channel	**Vertical scale**	**$V_{negative}$**	**$V_{positive}$**	**$V_{diff-expected}$**	**$V_{negative-measured}$**	**$V_{positive-measured}$**	**$V_{diff-measured}$[1]**	**Low limit**	**Test result[2]**	**High limit**
5	5 mV/div	-17.5 mV	17.5 mV	35 mV				-2 %		2 %
	10 mV/div	-35 mV	35 mV	70 mV				-2 %		2 %
	20 mV/div	-70 mV	70 mV	140 mV				-2 %		2 %
	50 mV/div	-175 mV	175 mV	350 mV				-2 %		2 %
	99 mV/div	-346.5 mV	346.5 mV	693 mV				-2 %		2 %
	100 mV/div	-350 mV	350 mV	700 mV				-2 %		2 %
	200 mV/div	-700 mV	700 mV	1400 mV				-2 %		2 %
	500 mV/div	-1750 mV	1750 mV	3500 mV				-2 %		2 %

DPO718AX only DC gain accuracy, sample rate = 62.5 GS/s										
Channel	**Vertical scale**	**$V_{negative}$**	**$V_{positive}$**	**$V_{diff-expected}$**	**$V_{negative-measured}$**	**$V_{positive-measured}$**	**$V_{diff-measured}$[1]**	**Low limit**	**Test result[2]**	**High limit**
6	5 mV/div	-17.5 mV	17.5 mV	35 mV				-2 %		2 %
	10 mV/div	-35 mV	35 mV	70 mV				-2 %		2 %
	20 mV/div	-70 mV	70 mV	140 mV				-2 %		2 %
	50 mV/div	-175 mV	175 mV	350 mV				-2 %		2 %
	99 mV/div	-346.5 mV	346.5 mV	693 mV				-2 %		2 %
	100 mV/div	-350 mV	350 mV	700 mV				-2 %		2 %
	200 mV/div	-700 mV	700 mV	1400 mV				-2 %		2 %
	500 mV/div	-1750 mV	1750 mV	3500 mV				-2 %		2 %
7	5 mV/div	-17.5 mV	17.5 mV	35 mV				-2 %		2 %
	10 mV/div	-35 mV	35 mV	70 mV				-2 %		2 %
	20 mV/div	-70 mV	70 mV	140 mV				-2 %		2 %
	50 mV/div	-175 mV	175 mV	350 mV				-2 %		2 %
	99 mV/div	-346.5 mV	346.5 mV	693 mV				-2 %		2 %
	100 mV/div	-350 mV	350 mV	700 mV				-2 %		2 %
	200 mV/div	-700 mV	700 mV	1400 mV				-2 %		2 %
	500 mV/div	-1750 mV	1750 mV	3500 mV				-2 %		2 %

DPO718AX only DC gain accuracy, sample rate = 62.5 GS/s										
Channel	**Vertical scale**	**$V_{negative}$**	**$V_{positive}$**	**$V_{diff-expected}$**	**$V_{negative-measured}$**	**$V_{positive-measured}$**	**$V_{diff-measured}$**[1]	**Low limit**	**Test result**[2]	**High limit**
8	5 mV/div	-17.5 mV	17.5 mV	35 mV				-2 %		2 %
	10 mV/div	-35 mV	35 mV	70 mV				-2 %		2 %
	20 mV/div	-70 mV	70 mV	140 mV				-2 %		2 %
	50 mV/div	-175 mV	175 mV	350 mV				-2 %		2 %
	99 mV/div	-346.5 mV	346.5 mV	693 mV				-2 %		2 %
	100 mV/div	-350 mV	350 mV	700 mV				-2 %		2 %
	200 mV/div	-700 mV	700 mV	1400 mV				-2 %		2 %
	500 mV/div	-1750 mV	1750 mV	3500 mV				-2 %		2 %

DC gain accuracy, sample rate = 125 GS/s										
Channel	**Vertical scale**	**$V_{negative}$**	**$V_{positive}$**	**$V_{diff-expected}$**	**$V_{negative-measured}$**	**$V_{positive-measured}$**	**$V_{diff-measured}$**[1]	**Low limit**	**Test result**[2]	**High limit**
1	5 mV/div	-17.5 mV	17.5 mV	35 mV				-2 %		2 %
	10 mV/div	-35 mV	35 mV	70 mV				-2 %		2 %
	20 mV/div	-70 mV	70 mV	140 mV				-2 %		2 %
	50 mV/div	-175 mV	175 mV	350 mV				-2 %		2 %
	99 mV/div	-346.5 mV	346.5 mV	693 mV				-2 %		2 %
	100 mV/div	-350 mV	350 mV	700 mV				-2 %		2 %

DC gain accuracy, sample rate = 125 GS/s										
Channel	**Vertical scale**	**$V_{negative}$**	**$V_{positive}$**	**$V_{diff-expected}$**	**$V_{negative-measured}$**	**$V_{positive-measured}$**	**$V_{diff-measured}$[1]**	**Low limit**	**Test result[2]**	**High limit**
	200 mV/div	-700 mV	700 mV	1400 mV				-2 %		2 %
	500 mV/div	-1750 mV	1750 mV	3500 mV				-2 %		2 %
2	5 mV/div	-17.5 mV	17.5 mV	35 mV				-2 %		2 %
	10 mV/div	-35 mV	35 mV	70 mV				-2 %		2 %
	20 mV/div	-70 mV	70 mV	140 mV				-2 %		2 %
	50 mV/div	-175 mV	175 mV	350 mV				-2 %		2 %
	99 mV/div	-346.5 mV	346.5 mV	693 mV				-2 %		2 %
	100 mV/div	-350 mV	350 mV	700 mV				-2 %		2 %
	200 mV/div	-700 mV	700 mV	1400 mV				-2 %		2 %
	500 mV/div	-1750 mV	1750 mV	3500 mV				-2 %		2 %
3	5 mV/div	-17.5 mV	17.5 mV	35 mV				-2 %		2 %
	10 mV/div	-35 mV	35 mV	70 mV				-2 %		2 %
	20 mV/div	-70 mV	70 mV	140 mV				-2 %		2 %
	50 mV/div	-175 mV	175 mV	350 mV				-2 %		2 %
	99 mV/div	-346.5 mV	346.5 mV	693 mV				-2 %		2 %
	100 mV/div	-350 mV	350 mV	700 mV				-2 %		2 %

DC gain accuracy, sample rate = 125 GS/s										
Channel	**Vertical scale**	**$V_{negative}$**	**$V_{positive}$**	**$V_{diff\text{-}expected}$**	**$V_{negative\text{-}measured}$**	**$V_{positive\text{-}measured}$**	**$V_{diff\text{-}measured}$[1]**	**Low limit**	**Test result[2]**	**High limit**
	200 mV/div	-700 mV	700 mV	1400 mV				-2 %		2 %
	500 mV/div	-1750 mV	1750 mV	3500 mV				-2 %		2 %
4	5 mV/div	-17.5 mV	17.5 mV	35 mV				-2 %		2 %
	10 mV/div	-35 mV	35 mV	70 mV				-2 %		2 %
	20 mV/div	-70 mV	70 mV	140 mV				-2 %		2 %
	50 mV/div	-175 mV	175 mV	350 mV				-2 %		2 %
	99 mV/div	-346.5 mV	346.5 mV	693 mV				-2 %		2 %
	100 mV/div	-350 mV	350 mV	700 mV				-2 %		2 %
	200 mV/div	-700 mV	700 mV	1400 mV				-2 %		2 %
	500 mV/div	-1750 mV	1750 mV	3500 mV				-2 %		2 %

DP0718AX only DC gain accuracy, sample rate = 125 GS/s										
Channel	**Vertical scale**	**$V_{negative}$**	**$V_{positive}$**	**$V_{diff\text{-}expected}$**	**$V_{negative\text{-}measured}$**	**$V_{positive\text{-}measured}$**	**$V_{diff\text{-}measured}$[1]**	**Low limit**	**Test result[2]**	**High limit**
5	5 mV/div	-17.5 mV	17.5 mV	35 mV				-2 %		2 %
	10 mV/div	-35 mV	35 mV	70 mV				-2 %		2 %
	20 mV/div	-70 mV	70 mV	140 mV				-2 %		2 %
	50 mV/div	-175 mV	175 mV	350 mV				-2 %		2 %

DPO718AX only DC gain accuracy, sample rate = 125 GS/s										
Channel	**Vertical scale**	**$V_{negative}$**	**$V_{positive}$**	**$V_{diff-expected}$**	**$V_{negative-measured}$**	**$V_{positive-measured}$**	**$V_{diff-measured}$[1]**	**Low limit**	**Test result[2]**	**High limit**
	99 mV/div	-346.5 mV	346.5 mV	693 mV				-2 %		2 %
	100 mV/div	-350 mV	350 mV	700 mV				-2 %		2 %
	200 mV/div	-700 mV	700 mV	1400 mV				-2 %		2 %
	500 mV/div	-1750 mV	1750 mV	3500 mV				-2 %		2 %
6	5 mV/div	-17.5 mV	17.5 mV	35 mV				-2 %		2 %
	10 mV/div	-35 mV	35 mV	70 mV				-2 %		2 %
	20 mV/div	-70 mV	70 mV	140 mV				-2 %		2 %
	50 mV/div	-175 mV	175 mV	350 mV				-2 %		2 %
	99 mV/div	-346.5 mV	346.5 mV	693 mV				-2 %		2 %
	100 mV/div	-350 mV	350 mV	700 mV				-2 %		2 %
	200 mV/div	-700 mV	700 mV	1400 mV				-2 %		2 %
	500 mV/div	-1750 mV	1750 mV	3500 mV				-2 %		2 %
7	5 mV/div	-17.5 mV	17.5 mV	35 mV				-2 %		2 %
	10 mV/div	-35 mV	35 mV	70 mV				-2 %		2 %
	20 mV/div	-70 mV	70 mV	140 mV				-2 %		2 %
	50 mV/div	-175 mV	175 mV	350 mV				-2 %		2 %

DPO718AX only DC gain accuracy, sample rate = 125 GS/s										
Channel	**Vertical scale**	**$V_{negative}$**	**$V_{positive}$**	**$V_{diff\text{-}expected}$**	**$V_{negative\text{-}measured}$**	**$V_{positive\text{-}measured}$**	**$V_{diff\text{-}measured}$[1]**	**Low limit**	**Test result[2]**	**High limit**
	99 mV/div	-346.5 mV	346.5 mV	693 mV				-2 %		2 %
	100 mV/div	-350 mV	350 mV	700 mV				-2 %		2 %
	200 mV/div	-700 mV	700 mV	1400 mV				-2 %		2 %
	500 mV/div	-1750 mV	1750 mV	3500 mV				-2 %		2 %
8	5 mV/div	-17.5 mV	17.5 mV	35 mV				-2 %		2 %
	10 mV/div	-35 mV	35 mV	70 mV				-2 %		2 %
	20 mV/div	-70 mV	70 mV	140 mV				-2 %		2 %
	50 mV/div	-175 mV	175 mV	350 mV				-2 %		2 %
	99 mV/div	-346.5 mV	346.5 mV	693 mV				-2 %		2 %
	100 mV/div	-350 mV	350 mV	700 mV				-2 %		2 %
	200 mV/div	-700 mV	700 mV	1400 mV				-2 %		2 %
	500 mV/div	-1750 mV	1750 mV	3500 mV				-2 %		2 %

Offset accuracy test record

The following note is referenced in the tables in this section:

1. Use this value for both the Calibrated DC voltage source output and the oscilloscope offset setting.

Offset accuracy					
Channel	**Vertical scale**	**Vertical offset**	**Low limit**	**Test result**	**High limit**
1	4 mV/div	900 mV	896.3 mV		903.7 mV

Offset accuracy					
Channel	**Vertical scale**	**Vertical offset**	**Low limit**	**Test result**	**High limit**
	4 mV/div	-900 mV	-903.7 mV		-896.3 mV
	100 mV/div	5 V	4.9728 V		5.0272 V
	100 mV/div	-5 V	-5.0272 V		-4.9728 V
2	4 mV/div	900 mV	896.3 mV		903.7 mV
	4 mV/div	-900 mV	-903.7 mV		-896.3 mV
	100 mV/div	5 V	4.9728 V		5.0272 V
	100 mV/div	-5 V	-5.0272 V		-4.9728 V
3	4 mV/div	900 mV	896.3 mV		903.7 mV
	4 mV/div	-900 mV	-903.7 mV		-896.3 mV
	100 mV/div	5 V	4.9728 V		5.0272 V
	100 mV/div	-5 V	-5.0272 V		-4.9728 V
4	4 mV/div	900 mV	896.3 mV		903.7 mV
	4 mV/div	-900 mV	-903.7 mV		-896.3 mV
	100 mV/div	5 V	4.9728 V		5.0272 V
	100 mV/div	-5 V	-5.0272 V		-4.9728 V
5	4 mV/div	900 mV	896.3 mV		903.7 mV
	4 mV/div	-900 mV	-903.7 mV		-896.3 mV
	100 mV/div	5 V	4.9728 V		5.0272 V

Offset accuracy					
Channel	**Vertical scale**	**Vertical offset**	**Low limit**	**Test result**	**High limit**
	100 mV/div	-5 V	-5.0272 V		-4.9728 V
6	4 mV/div	900 mV	896.3 mV		903.7 mV
	4 mV/div	-900 mV	-903.7 mV		-896.3 mV
	100 mV/div	5 V	4.9728 V		5.0272 V
	100 mV/div	-5 V	-5.0272 V		-4.9728 V
7	4 mV/div	900 mV	896.3 mV		903.7 mV
	4 mV/div	-900 mV	-903.7 mV		-896.3 mV
	100 mV/div	5 V	4.9728 V		5.0272 V
	100 mV/div	-5 V	-5.0272 V		-4.9728 V
8	4 mV/div	900 mV	896.3 mV		903.7 mV
	4 mV/div	-900 mV	-903.7 mV		-896.3 mV
	100 mV/div	5 V	4.9728 V		5.0272 V
	100 mV/div	-5 V	-5.0272 V		-4.9728 V

DC voltage measurement accuracy test record

Channel	Vertical scale	Vertical offset	DC input level	Low limit	Test result	High limit
1	5 mV/div	-82.5 mV	-100 mV	-102 mV		-98 mV
	50 mV/div	825 mV	1 V	0.988 V		1.012 V
	50 mV/div	825 mV	650 mV	638 mV		662 mV

Channel	Vertical scale	Vertical offset	DC input level	Low limit	Test result	High limit
	90 mV/div	0 V	-315 mV	-332 mV		-298 mV
	200 mV/div	3 V	2.5 V	2.435 V		2.566 V
2	5 mV/div	-82.5 mV	-100 mV	-102 mV		-98 mV
	50 mV/div	825 mV	1 V	0.988 V		1.012 V
	50 mV/div	825 mV	650 mV	638 mV		662 mV
	90 mV/div	0 V	-315 mV	-332 mV		-298 mV
	200 mV/div	3 V	2.5 V	2.435 V		2.566 V
3	5 mV/div	-82.5 mV	-100 mV	-102 mV		-98 mV
	50 mV/div	825 mV	1 V	0.988 V		1.012 V
	50 mV/div	825 mV	650 mV	638 mV		662 mV
	90 mV/div	0 V	-315 mV	-332 mV		-298 mV
	200 mV/div	3 V	2.5 V	2.435 V		2.566 V
4	5 mV/div	-82.5 mV	-100 mV	-102 mV		-98 mV
	50 mV/div	825 mV	1 V	0.988 V		1.012 V
	50 mV/div	825 mV	650 mV	638 mV		662 mV
	90 mV/div	0 V	-315 mV	-332 mV		-298 mV
	200 mV/div	3 V	2.5 V	2.435 V		2.566 V
5	5 mV/div	-82.5 mV	-100 mV	-102 mV		-98 mV
	50 mV/div	825 mV	1 V	0.988 V		1.012 V
	50 mV/div	825 mV	650 mV	638 mV		662 mV
	90 mV/div	0 V	-315 mV	-332 mV		-298 mV
	200 mV/div	3 V	2.5 V	2.435 V		2.566 V
6	5 mV/div	-82.5 mV	-100 mV	-102 mV		-98 mV

Channel	Vertical scale	Vertical offset	DC input level	Low limit	Test result	High limit
	50 mV/div	825 mV	1 V	0.988 V		1.012 V
	50 mV/div	825 mV	650 mV	638 mV		662 mV
	90 mV/div	0 V	-315 mV	-332 mV		-298 mV
	200 mV/div	3 V	2.5 V	2.435 V		2.566 V
7	5 mV/div	-82.5 mV	-100 mV	-102 mV		-98 mV
	50 mV/div	825 mV	1 V	0.988 V		1.012 V
	50 mV/div	825 mV	650 mV	638 mV		662 mV
	90 mV/div	0 V	-315 mV	-332 mV		-298 mV
	200 mV/div	3 V	2.5 V	2.435 V		2.566 V
8	5 mV/div	-82.5 mV	-100 mV	-102 mV		-98 mV
	50 mV/div	825 mV	1 V	0.988 V		1.012 V
	50 mV/div	825 mV	650 mV	638 mV		662 mV
	90 mV/div	0 V	-315 mV	-332 mV		-298 mV
	200 mV/div	3 V	2.5 V	2.435 V		2.566 V

Analog bandwidth test record

The following notes are referenced in the tables in this section:

1. Set both sine wave generator and RF power meter.
2. See Analog bandwidth specification in the Specifications section of this manual.
3. QC4 is limited to a channel bandwidth of 20 GHz.

Analog bandwidth: Sample rate = 62.5 GS/s; Quiet Channel = Off								
			50 MHz, reference frequency[1]		_____GHz, test frequency [2]			
Channel	**Vertical scale**	**Nominal source input power, dBm**	**Power meter reading, dBm**	**Meas p-p amplitude, V** $V_{ref\text{-}pp}$	**Meas p-p amplitude, V** $V_{test\text{-}pp}$	**Gain fraction** $Gain_{fraction} = V_{test\text{-}pp}/V_{ref\text{-}pp}$	**Low limit, dB**	**Test result, dB** $Gain_{dB} = 20 \log_{10} (Gain_{fraction})$
1	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
2	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
3	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
4	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	

Analog bandwidth: Sample rate = 62.5 GS/s; Quiet Channel = Off								
			50 MHz, reference frequency[1]		_____GHz, test frequency [2]			
Channel	**Vertical scale**	**Nominal source input power, dBm**	**Power meter reading, dBm**	**Meas p-p amplitude, V** $V_{ref\text{-}pp}$	**Meas p-p amplitude, V** $V_{test\text{-}pp}$	**Gain fraction** $Gain_{fraction} = V_{test\text{-}pp}/V_{ref\text{-}pp}$	**Low limit, dB**	**Test result, dB** $Gain_{dB} = 20 \log_{10} (Gain_{fraction})$
5	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
6	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
7	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
8	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	

Analog bandwidth: Sample rate = 62.5 GS/s; Quiet Channel = QC4								
			50 MHz, reference frequency[1]		**_____GHz, test frequency [1], [2], [3]**			
Channel	**Vertical scale**	**Nominal source input power, dBm**	**Power meter reading, dBm**	**Meas p-p amplitude, V** $V_{ref\text{-}pp}$	**Meas p-p amplitude, V** $V_{test\text{-}pp}$	**Gain fraction** $Gain_{fraction} = V_{test\text{-}pp}/V_{ref\text{-}pp}$	**Low limit, dB**	**Test result, dB** $Gain_{dB} = 20 \log_{10} (Gain_{fraction})$
1	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
2	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
3	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	

Analog bandwidth: Sample rate = 62.5 GS/s; Quiet Channel = QC4								
			50 MHz, reference frequency[1]		**_____GHz, test frequency [1, 2, 3]**			
Channel	**Vertical scale**	**Nominal source input power, dBm**	**Power meter reading, dBm**	**Meas p-p amplitude, V** $V_{ref\text{-}pp}$	**Meas p-p amplitude, V** $V_{test\text{-}pp}$	**Gain fraction** $Gain_{fraction} = V_{test\text{-}pp}/V_{ref\text{-}pp}$	**Low limit, dB**	**Test result, dB** $Gain_{dB} = 20 \log_{10}(Gain_{fraction})$
4	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	

DPO718AX only **Analog bandwidth: Sample rate = 62.5 GS/s; Quiet Channel = QC4**								
			50 MHz, reference frequency[1]		**_____GHz, test frequency [1, 2, 3]**			
Channel	**Vertical scale**	**Nominal source input power, dBm**	**Power meter reading, dBm**	**Meas p-p amplitude, V** $V_{ref\text{-}pp}$	**Meas p-p amplitude, V** $V_{test\text{-}pp}$	**Gain fraction** $Gain_{fraction} = V_{test\text{-}pp}/V_{ref\text{-}pp}$	**Low limit, dB**	**Test result, dB** $Gain_{dB} = 20 \log_{10}(Gain_{fraction})$
5	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	

DPO718AX only **Analog bandwidth: Sample rate = 62.5 GS/s; Quiet Channel = QC4**								
			50 MHz, reference frequency[1]		**_____GHz, test frequency [1], [2], [3]**			
Channel	**Vertical scale**	**Nominal source input power, dBm**	**Power meter reading, dBm**	**Meas p-p amplitude, V** $V_{ref\text{-}pp}$	**Meas p-p amplitude, V** $V_{test\text{-}pp}$	**Gain fraction** $Gain_{fraction} = V_{test\text{-}pp}/V_{ref\text{-}pp}$	**Low limit, dB**	**Test result, dB** $Gain_{dB} = 20 \log_{10} (Gain_{fraction})$
6	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
7	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
8	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	

Analog bandwidth: Sample rate = 62.5 GS/s; Quiet Channel = QC7								
			50 MHz, reference frequency[1]		_____GHz, test frequency [1,2]			
Channel	**Vertical scale**	**Nominal source input power, dBm**	**Power meter reading, dBm**	**Meas p-p amplitude, V** $V_{ref\text{-}pp}$	**Meas p-p amplitude, V** $V_{test\text{-}pp}$	**Gain fraction** $Gain_{fraction} = V_{test\text{-}pp}/V_{ref\text{-}pp}$	**Low limit, dB**	**Test result, dB** $Gain_{dB} = 20\ log_{10}\ (Gain_{fraction})$
1	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
2	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
3	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
4	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	

DPO718AX only **Analog bandwidth: Sample rate = 62.5 GS/s; Quiet Channel = QC7**								
			50 MHz, reference frequency[1]		**_____GHz, test frequency [1,2]**			
Channel	**Vertical scale**	**Nominal source input power, dBm**	**Power meter reading, dBm**	**Meas p-p amplitude, V** $V_{ref\text{-}pp}$	**Meas p-p amplitude, V** $V_{test\text{-}pp}$	**Gain fraction** $Gain_{fraction} = V_{test\text{-}pp}/V_{ref\text{-}pp}$	**Low limit, dB**	**Test result, dB** $Gain_{dB} = 20 \log_{10} (Gain_{fraction})$
5	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
6	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
7	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	

DPO718AX only **Analog bandwidth: Sample rate = 62.5 GS/s; Quiet Channel = QC7**								
			50 MHz, reference frequency[1]		**_____GHz, test frequency [1,2]**			
Channel	**Vertical scale**	**Nominal source input power, dBm**	**Power meter reading, dBm**	**Meas p-p amplitude, V** $V_{ref\text{-}pp}$	**Meas p-p amplitude, V** $V_{test\text{-}pp}$	**Gain fraction** $Gain_{fraction} = V_{test\text{-}pp}/V_{ref\text{-}pp}$	**Low limit, dB**	**Test result, dB** $Gain_{dB} = 20 \log_{10} (Gain_{fraction})$
8	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	

Analog bandwidth: Sample rate = 125 GS/s; Quiet Channel = Off								
			50 MHz, reference frequency[1]		**_____GHz, test frequency [1, 2]**			
Channel	**Vertical scale**	**Nominal source input power, dBm**	**Power meter reading, dBm**	**Meas p-p amplitude, V** $V_{ref\text{-}pp}$	**Meas p-p amplitude, V** $V_{test\text{-}pp}$	**Gain fraction** $Gain_{fraction} = V_{test\text{-}pp}/V_{ref\text{-}pp}$	**Low limit, dB**	**Test result, dB** $Gain_{dB} = 20 \log_{10} (Gain_{fraction})$
1	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
2	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	

Analog bandwidth: Sample rate = 125 GS/s; Quiet Channel = Off								
			50 MHz, reference frequency[1]		**_____GHz, test frequency [1, 2]**			
Channel	**Vertical scale**	**Nominal source input power, dBm**	**Power meter reading, dBm**	**Meas p-p amplitude, V** $V_{ref\text{-}pp}$	**Meas p-p amplitude, V** $V_{test\text{-}pp}$	**Gain fraction** $Gain_{fraction} = V_{test\text{-}pp}/V_{ref\text{-}pp}$	**Low limit, dB**	**Test result, dB** $Gain_{dB} = 20 \log_{10} (Gain_{fraction})$
3	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
4	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	

DPO718AX only **Analog bandwidth: Sample rate = 125 GS/s; Quiet Channel = Off**								
			50 MHz, reference frequency[1]		**_____GHz, test frequency [1, 2]**			
Channel	**Vertical scale**	**Nominal source input power, dBm**	**Power meter reading, dBm**	**Meas p-p amplitude, V** $V_{ref\text{-}pp}$	**Meas p-p amplitude, V** $V_{test\text{-}pp}$	**Gain fraction** $Gain_{fraction} = V_{test\text{-}pp}/V_{ref\text{-}pp}$	**Low limit, dB**	**Test result, dB** $Gain_{dB} = 20 \log_{10} (Gain_{fraction})$
5	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	

DPO718AX only **Analog bandwidth: Sample rate = 125 GS/s; Quiet Channel = Off**								
			50 MHz, reference frequency[1]		**_____GHz, test frequency [1], [2]**			
Channel	**Vertical scale**	**Nominal source input power, dBm**	**Power meter reading, dBm**	**Meas p-p amplitude, V** $V_{ref\text{-}pp}$	**Meas p-p amplitude, V** $V_{test\text{-}pp}$	**Gain fraction** $Gain_{fraction} = V_{test\text{-}pp}/V_{ref\text{-}pp}$	**Low limit, dB**	**Test result, dB** $Gain_{dB} = 20 \log_{10} (Gain_{fraction})$
6	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
7	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
8	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	

Analog bandwidth: Sample rate = 125 GS/s; Quiet Channel = QC4								
			50 MHz, reference frequency[1]		**_____GHz, test frequency [1], [2], [3]**			
Channel	**Vertical scale**	**Nominal source input power, dBm**	**Power meter reading, dBm**	**Meas p-p amplitude, V** $V_{ref\text{-}pp}$	**Meas p-p amplitude, V** $V_{test\text{-}pp}$	**Gain fraction** $Gain_{fraction} = V_{test\text{-}pp}/V_{ref\text{-}pp}$	**Low limit, dB**	**Test result, dB** $Gain_{dB} = 20 \log_{10} (Gain_{fraction})$
1	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
2	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
3	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
4	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	

DPO718AX only: **Analog bandwidth: Sample rate = 125 GS/s; Quiet Channel = QC4**								
			50 MHz, reference frequency[1]		**_____GHz, test frequency [1], [2], [3]**			
Channel	**Vertical scale**	**Nominal source input power, dBm**	**Power meter reading, dBm**	**Meas p-p amplitude, V** $V_{ref\text{-}pp}$	**Meas p-p amplitude, V** $V_{test\text{-}pp}$	**Gain fraction** $Gain_{fraction} = V_{test\text{-}pp}/V_{ref\text{-}pp}$	**Low limit, dB**	**Test result, dB** $Gain_{dB} = 20 \log_{10} (Gain_{fraction})$
5	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
6	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
7	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	

DPO718AX only: **Analog bandwidth: Sample rate = 125 GS/s; Quiet Channel = QC4**								
			50 MHz, reference frequency[1]		**_____GHz, test frequency [1], [2], [3]**			
Channel	**Vertical scale**	**Nominal source input power, dBm**	**Power meter reading, dBm**	**Meas p-p amplitude, V** $V_{ref\text{-}pp}$	**Meas p-p amplitude, V** $V_{test\text{-}pp}$	**Gain fraction** $Gain_{fraction} = V_{test\text{-}pp}/V_{ref\text{-}pp}$	**Low limit, dB**	**Test result, dB** $Gain_{dB} = 20 \log_{10} (Gain_{fraction})$
8	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
1	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
2	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	

DPO718AX only: **Analog bandwidth: Sample rate = 125 GS/s; Quiet Channel = QC4**								
			50 MHz, reference frequency[1]		**_____GHz, test frequency [1], [2], [3]**			
Channel	**Vertical scale**	**Nominal source input power, dBm**	**Power meter reading, dBm**	**Meas p-p amplitude, V** $V_{ref\text{-}pp}$	**Meas p-p amplitude, V** $V_{test\text{-}pp}$	**Gain fraction** $Gain_{fraction} = V_{test\text{-}pp}/V_{ref\text{-}pp}$	**Low limit, dB**	**Test result, dB** $Gain_{dB} = 20 \log_{10} (Gain_{fraction})$
3	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
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	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
4	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
5	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	

DPO718AX only: **Analog bandwidth: Sample rate = 125 GS/s; Quiet Channel = QC4**								
			50 MHz, reference frequency[1]		**_____GHz, test frequency [1], [2], [3]**			
Channel	**Vertical scale**	**Nominal source input power, dBm**	**Power meter reading, dBm**	**Meas p-p amplitude, V** $V_{ref\text{-}pp}$	**Meas p-p amplitude, V** $V_{test\text{-}pp}$	**Gain fraction** $Gain_{fraction} = V_{test\text{-}pp}/V_{ref\text{-}pp}$	**Low limit, dB**	**Test result, dB** $Gain_{dB} = 20 \log_{10} (Gain_{fraction})$
6	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
7	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	
8	5 mV/div	-23.98					-3	
	10 mV/div	-17.96					-3	
	25 mV/div	-10.00					-3	
	50 mV/div	-3.98					-3	
	100 mV/div	2.04					-3	

AFG sine and ramp frequency accuracy

Waveform type	Frequency	Low limit	Test result	High limit
Sine	10 kHz	9.9987 kHz		10.0013 kHz
Sine	100 MHz	99.995 MHz		100.005 MHz
Ramp	10 kHz	9.9987 kHz		10.0013 kHz

Waveform type	Frequency	Low limit	Test result	High limit
Ramp	1 MHz	0.99995 MHz		1.00005 MHz

Timebase accuracy

Date of initial/last factory adjustment

Time since initial/last adjustment	Low limit	Test result	High limit
0	9999.99988 kHz		10000.00012 kHz
1 year	9999.997 kHz		10000.003 kHz
2 years	9999.996 kHz		10000.004 kHz
3 years	9999.995 kHz		10000.005 kHz