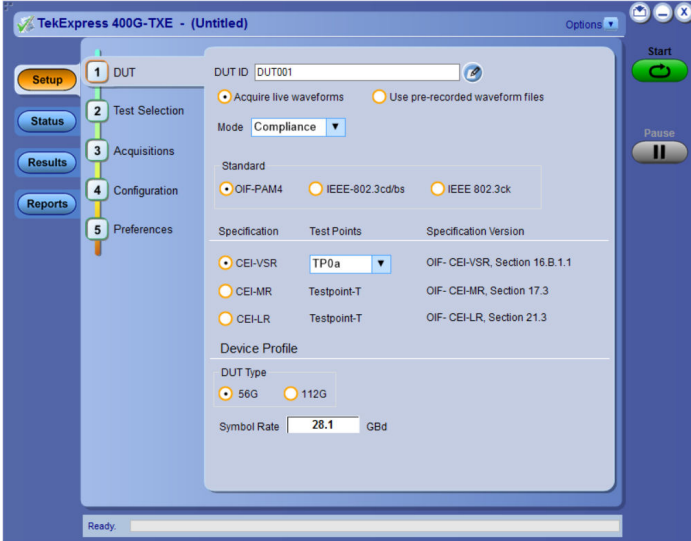


# TekExpress 400G Transmitter Test

## Electrical Conformance and Characterization Solution for Real-Time Oscilloscopes



- 802.3ck™ (100GCR-1, 200GCR-2, and 400GCR-4)

### OIF-CEI-56G-VSR/MR/LR, OIF-CEI-112G-VSR, IEEE-802.3bs/cd, IEEE-802.3ck AUI and CR fully automated electrical transmitter real-time oscilloscope measurements

This application package is designed for a 50 GHz or higher, 70K SX instrument pair. For 802.3ck the performance level is  $\geq 59$  GHz or higher, a 70K SX instrument pair is required. The software loads the required roll-off filters with appropriate bandwidth. The low noise level of the ATI architecture serves the key signal-to-noise and distortion ratio measurements, which are attained with margin on the 70K SX systems. The solution is also available on non-70K SX systems, such as 33 GHz, higher 70K DX, and MSO instruments with an understanding that these are for debug only and not for the specification level conformance validation.

The new Tektronix real-time instrument based OIF-CEI-56G-VSR/MR/LR, OIF-CEI-112G-VSR, IEEE: 802.3bs (200GAUI-4 and 400GAUI-8), 802.3cd (CR4, KR4), 802.3ck™ (100GAUI-1, 200GAUI-2, and 400GAUI-4), and 802.3ck™ (100GCR-1, 200GCR-2, and 400GCR-4) Transmitter Characterization automation system provides turnkey testing and debugging of the industry's most common 400G PAMJET electrical interfaces. The silicon designers need to perform the 400G based electrical validation of their silicon; the system designers need to perform the 400G based electrical validation.

### Key Features

- Offers streamlined and fully automated transmitter characterization of OIF-CEI-56G-VSR/MR/LR, OIF-CEI-112G-VSR, and IEEE: 802.3bs (200GAUI-4 and 400GAUI-8), 802.3cd (CR4, KR4), 802.3ck™ (100GAUI-1, 200GAUI-2, and 400GAUI-4), and 802.3ck™ (100GCR-1, 200GCR-2, and 400GCR-4) electrical transmitter specifications.
- Extends PAMJET software package (PAMJET software package) for in-depth analysis and debug of fully automated conformance test solution.

### Applications

- Validation of OIF-CEI-56G-VSR/MR/LR, OIF-CEI-112G-VSR, and IEEE-802.3bs/cd standards
- Measurements of electrical transmitter :
  - 802.3ck™ Electrical 100 Gb/s Signaling for 100GAUI-1, 200GAUI-2, and 400GAUI-4.

Technology	Specification Section and Table reference
OIF-CEI-56G-VSR	oif2017.346.03, Sections 16.B, Table 16-10
	oif2017.346.03, Sections 16.3.2, Table 16-1
	oif2017.346.03, Sections 16.3.3, Table 16-4
OIF-CEI-56G-MR	oif2014.245.12, section 17.3, Table 17-2, 17-3
OIF-CEI-56G-LR	oif2014.340.08, section 21.3, Table 21-2, 21-3
OIF-CEI-112G-VSR	oif2017.346.03, Table 23-9, Section 23.B.1.1
	oif2017.346.03, Table 23-1, Section 23.3.2
	oif2017.346.03, Table 23-4, Section 23.3
200GAUI-4 and 400GAUI-8	IEEE 802.3bs, Annex 120D.3.1, Table 120D-1
	IEEE 802.3bs, Annex 120D.3.1, Table 120E-1
	IEEE 802.3bs, Annex 120E.3.2, Table 120E-3
50GBASE-CR/ 100GBASE-CR2/200GBASE-CR4	IEEE802.3cd, Section 136.9.3, Table 136-11
50GBASE-KR/ 100GBASE-KR2/200GBASE-KR4	IEEE802.3cd, Section 137.9.2
100GAUI-1, 200GAUI-2, and 400GAUI-4	IEEE802.3ck, Annex 120F and Annex 120G
100GCR-1, 200GCR-2, and 400GCR-4	IEEE 802.3ck, Section 162.9.4, Table 162-11

Modulation	Data Rate (GBd)	Lanes	Throughput (Gbps)
PAMJET	18 to 53.125	1 to N	Number of lanes*2*Data Rate

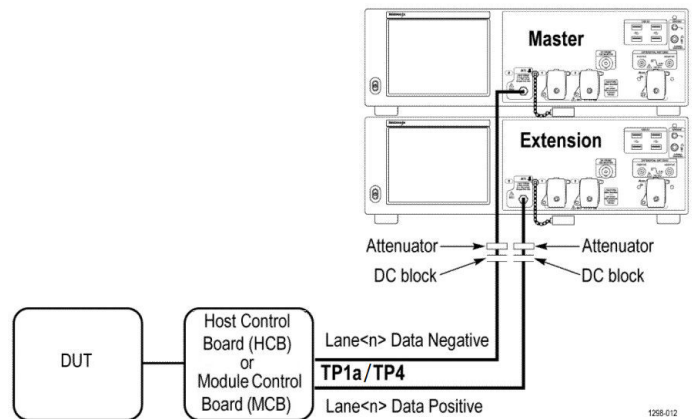
**OIF-CEI-56G/112G-VSR fully automated electrical transmitter measurements**

**Mapping of OIF-CEI-56G/112G-VSR measurements**

Parameter	Min	Max	Units
DC Common Mode Output Voltage			
TP0a	-0.3	2.8	V
TP1a	-0.3	2.8	V
TP4	-350	2850	mV
Common Mode Noise			
TP0a	-	12	mV
TP1a	-	17.5	mV
TP4	-	17.5	mV
Diff Peak to Peak Output Voltage Tx Enabled			
TP0a	750	-	mV
TP1a	-	880	mV
TP4	-	900	mV
Transition Time			
TP0a	7.5	-	ps
TP1a	12.0	-	ps
TP4	9.5	-	ps
Eye Width (TP1a)	0.2	-	UI
Eye Height (TP1a)	32	-	mV
Eye Linearity (TP1a)	0.85 (56G) 0.9 (112G)	-	-
Eye Symmetry Mask Width (TP1a)	0.2	-	UI
Near End Eye Width (TP4)	0.265 (56G) 0.2 (112G)	-	UI
Near End Eye Height (TP4)	70 (56G) 37 (112G)	-	mV

Table continued...

Parameter	Min	Max	Units
Near End Eye Linearity (TP4)	0.85 (56G) 0.9 (112G)	-	-
Near End Eye Symmetry Mask Width (TP4)	0.265	-	UI
Far End Eye Width (TP4)	0.2	-	UI
Far End Eye Height (TP4)	30	-	mV
Far End Eye Symmetry Mask Width (TP4)	0.2	-	UI
Signal to Noise and Distortion Ratio (TP0a)	31	-	dB
Even Odd Jitter (TP0a)	-	0.019	UI
Uncorrelated Bounded High Probability Jitter (TP0a)	-	0.05	UI <sub>RMS</sub>
Uncorrelated Unbounded Gaussian Jitter (TP0a)	-	0.01	UI



OIF-CEI-VSR at (TP1a/ TP4) fully automated electrical transmitter measurements

**OIF-CEI-56G-MR and OIF-CEI-56G-LR fully automated electrical transmitter measurements**

**Mapping of OIF-CEI-56G-MR and OIF-CEI-56G-LR measurements**

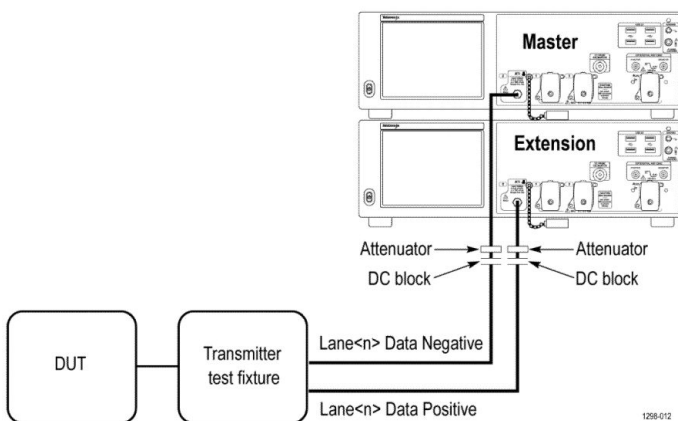
Parameter	Min	Max	Units
DC Common Mode Output Voltage	0	1.9	V
AC Common Mode Output Voltage	-	30	mVrms
Diff Peak to Peak Output Voltage Tx Enabled	-	1200	mVppd
Single-Ended Output Voltage	-0.3	1.9	V
Level Separation Mismatch Ratio	0.95	-	%
Steady State Voltage	0.4	0.6	V
Linear Fit Pulse Peak	0.80 * T <sub>v</sub> V <sub>f</sub>	-	V
Signal to Noise and Distortion Ratio	31	-	dB
Uncorrelated Bounded High Probability Jitter	-	0.118	U <sub>lpp</sub>
Uncorrelated Unbounded Gaussian Jitter	-	0.023	U <sub>lrms</sub>
Even Odd Jitter	-	0.019	U <sub>lpp</sub>

**IEEE (200GAUI-4 and 400GAUI-8) fully automated electrical transmitter measurements**

**Mapping of IEEE (200GAUI-4 and 400GAUI-8) measurements**

Parameter	Min	Max	Units
DC Common Mode Output Voltage			
TP0a	0	1.9	V
TP1a	-0.3	2.8	V
TP4	-350	2850	mV
AC Common Mode Output Voltage			
TP0a	-	30	mV
TP1a	-	17.5	mV
TP4	-	17.5	mV
Diff Peak to Peak Output Voltage Tx Enabled			
TP0a	-	1200	mV
TP1a	-	880	mV
TP4	-	900	mV
Diff Peak to Peak Output Voltage Tx Disabled			
TP0a	-	30	mV
TP1a	-	35	mV
Transition Time			
TP1a	10	-	ps
TP4	9.5	-	ps
Eye Height (TP1a)	32	-	mV
Eye Symmetry Mask Width (TP1a)	0.22	-	UI
Near End Eye Height (TP4)	70	-	mV
Near End Eye Symmetry Mask Width (TP4)	0.265	-	UI
Far End Eye Height (TP4)	30	-	mV
Far End Eye Symmetry Mask Width (TP4)	0.2	-	UI
Far End pre-cursor ISI ratio (TP4)	-4.5	2.5	%

Table continued...

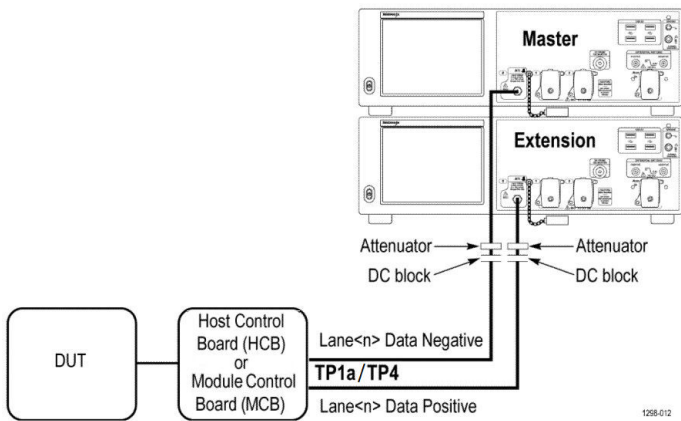


OIF-CEI-MR and OIF-CEI-LR at (Testpoint-T) fully automated electrical transmitter measurements

Parameter	Min	Max	Units
Signal to Noise And Distortion Ratio (TP0a)	31.5	-	dB
Level separation mismatch ratio RLM	0.95		
Steady state voltage vf	0.4	0.6	V
Linear fit pulse peak	0.76*vf	-	VV
Post-cursor equalization			
Pre-cursor equalization			
Even Odd Jitter (TP0a)	-	0.019	UI
Uncorrelated Bounded High Probability Jitter (TP0a)	-	0.05	UI <sub>RMS</sub>
Uncorrelated Unbounded Gaussian Jitter (TP0a)	-	0.01	UI

Parameter	Min	Max	Units
Diff Peak to Peak Output Voltage Tx Enabled	-	1200	mV
DC Common Mode Output Voltage	-	1.9	V
AC Common Mode RMS Output Voltage	-	30	mV
Transmitter steady-state voltage, vf	0.4	0.6	V
Linear Fit Pulse Peak	0.75*Vf	-	V
Level Separation Mismatch Ratio RLM	0.95	-	-
Signal to Noise and Distortion Ratio	32.5	-	dB

Transmitter output waveform			
abs step size for c(-1), c(0), and c(1)	0.005	0.05	-
abs step size for c(-2)	0.005	0.025	-
value at minimum state for c(-1) and c(1)	-	-0.25	-
value at maximum state for c(-2)	0.1	-	-
Output Jitter			
JRMS	-	0.023	UI
J3u	-	0.106	UI
Even Odd Jitter	-	0.019	UI



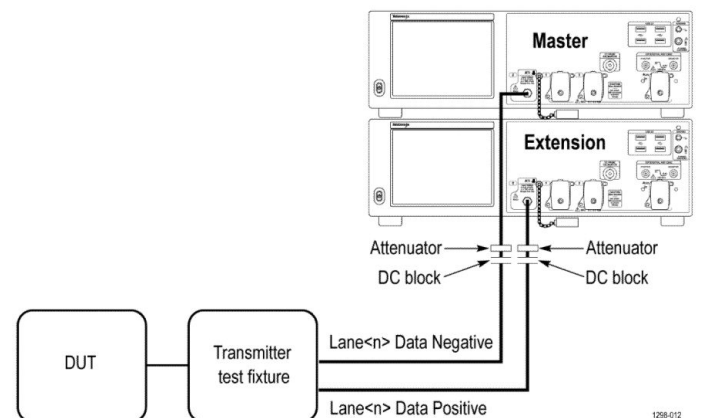
IEEE 200GAUI-4 and IEEE 400GAUI-8 at (TP1a/ TP4) fully automated electrical transmitter measurements

### IEEE KR4 fully automated electrical transmitter measurements

#### Mapping of IEEE KR4 measurements

Parameter	Min	Max	Units
Signaling Rate	26.5625-100ppm	26.5625+100ppm	GBd
Diff Peak to Peak Output Voltage Tx Disabled	-	30	mV

Table continued...

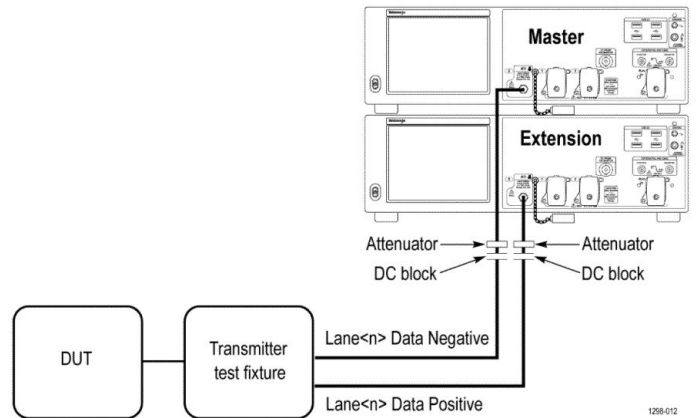


IEEE KR4 at (TP0a) fully automated electrical transmitter measurements

## IEEE CR4 fully automated electrical transmitter measurements

### Mapping of IEEE CR4 measurements

Parameter	Min	Max	Units
Signaling Rate	26.5625-100ppm	26.5625+100ppm	GBd
Diff Peak to Peak Output Voltage Tx Disabled	-	30	mV
Diff Peak to Peak Output Voltage Tx Enabled	-	1200	mV
DC Common Mode Output Voltage	-	1.9	V
AC Common Mode RMS Output Voltage	-	30	mV
Transmitter steady-state voltage, vf	0.354	0.6	V
Linear Fit Pulse Peak	0.49*Vf	-	V
Level Separation Mismatch Ratio RLM	0.95	-	-
Signal to Noise And Distortion Ratio	32.2	-	dB
Transmitter output waveform			
abs step size for c(-1), c(0), and c(1)	0.005	0.05	-
abs step size for c(-2)	0.005	0.025	-
value at minimum state for c(-1) and c(1)	-	-0.25	-
value at maximum state for c(-2)	0.1	-	-
Output Jitter			
Even Odd Jitter	-	0.019	UI
JRMS	-	0.023	UI
J3u	-	0.115	UI



IEEE CR4 at (TP2) fully automated electrical transmitter measurements

## IEEE 802.3ck 100GAUI-1, 200GAUI-2, 400GAUI-4 measurements

### Mapping of IEEE 100GAUI-1, 200GAUI-2, 400GAUI-4 measurements

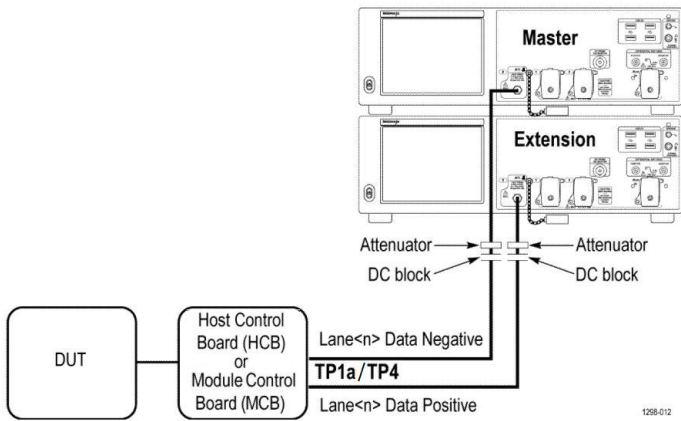
Parameter	Min	Max	Units
<b>DC Common Mode Output Voltage</b>			
TP0v C2C	0.2	1	V
TP1a C2M Host	-0.3	2.8	V
TP4 C2M Module	-0.35	2.85	V
<b>Single-ended Output Voltage</b>			
TP1a C2M Host	-0.4	3.3	V
<b>Diff peak to peak Output Voltage Tx Enabled</b>			
TP0v C2C	NA	1200	mV
TP1a C2M Host	NA	750	mV
TP4 C2M Module	NA	600 (Short mode)	mV
		845 (Long mode)	
<b>Diff peak to peak Output Voltage Tx Disabled</b>			
TP0v C2C	NA	35	mV
TP1a C2M Host	NA	35	mV
<b>Transition Time</b>			
TP1a C2M Host	10 (Short mode)	NA	ps
	15 (Long mode)		
TP4 C2M Module	8.5	NA	ps
<b>Eye height</b>			
Table continued...			

Parameter	Min	Max	Units
TP1a C2M Host	10	NA	mV
<b>Vertical Eye closure</b>			
TP1a C2M Host	NA	12	dB
<b>Near end Eye height</b>			
TP4 C2M Module	15	NA	mV
<b>Far end Eye height</b>			
TP4 C2M Module	15	NA	mV
<b>Near end Vertical Eye closure</b>			
TP4 C2M Module	NA	12	dB
<b>Far end Vertical Eye closure</b>			
TP4 C2M Module	NA	12	dB
<b>Signal to Noise and Distortion Ratio</b>			
TP0v C2C	32.5	NA	dB
<b>Coefficient range(IEEE)</b>			
TP0v C2C (C(-3) decrement)	NA	=<-0.05	
TP0v C2C (C(-3) increment)	0>=	NA	
TP0v C2C (C(-2) decrement)	NA	<=0.0	
TP0v C2C (C(-2) increment)	>=0.1	NA	
TP0v C2C (C(-1) decrement)	NA	<=-0.3	
TP0v C2C (C(-1) increment)	>=0.0	NA	
TP0v C2C (C(0))	NA	=<0.5	
TP0v C2C (C(1) decrement)	NA	=<-0.1	
TP0v C2C (C(1) increment)	>=0.0	NA	
<b>Normalized Coefficients Step Size</b>			
TP0v C2C (Increment)	0.005	0.025	
TP0v C2C (Decrement)	-0.025	-0.0005	
<b>Signaling Rate</b>			
TP0v C2C	53.125±50ppm <sup>1</sup>		GBd
TP1a C2M Host	53.125±50ppm <sup>1</sup>		GBd

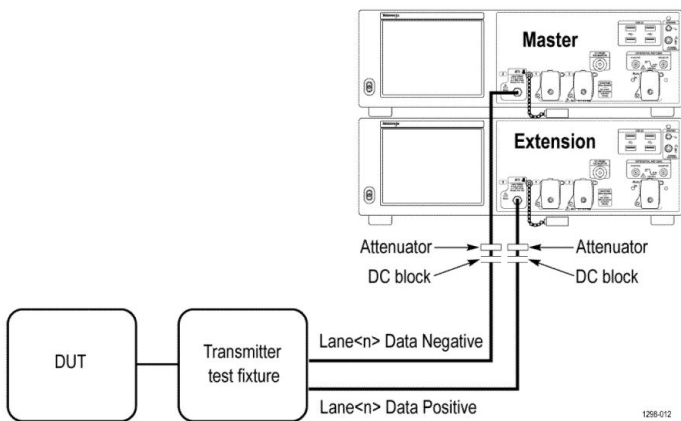
Table continued...

Parameter	Min	Max	Units
TP4 C2M Module	53.125 <sup>1</sup>		GBd
<b>Level Separation Mismatch Ratio (R<sub>LM</sub>)</b>			
TP0v C2C	0.95	NA	
<b>Steady State Voltage</b>			
TP1a C2M Host	NA	375	mV
<b>Even Odd Jitter</b>			
TP0v	NA	0.025	UI
<b>Uncorrelated Jitter RMS and Uncorrelated J3 and J4 Jitter</b>			
TP0v C2C (J4u jitter limits)	NA	0.128	UI
TP0v C2C (Uncorrelated Jitter J4u03)	NA	0.118	UI
TP0v C2C (Jrms limits)	NA	0.023	UI
<b>Signal to AC Common Mode Noise Ratio (SCMR)</b>			
TP0v C2C	15	NA	dB
<b>Peak-Peak AC Common Mode Voltage</b>			
TP0v C2C	NA	32 (Low Frequency(VCM <sub>LF</sub> ))	mV
TP1a C2M Host	NA	32 (Low Frequency (VCM <sub>LF</sub> )) 80 (Full Band (VCM <sub>FB</sub> ))	mV
TP4 C2M Module	NA	32 (Low Frequency (VCM <sub>LF</sub> )) 80 (Full Band (VCM <sub>FB</sub> ))	mV
<b>Signal to Residual Inter Symbol Interface Ratio (SNR<sub>ISI</sub>)</b>			
TP0v C2C	28	NA	dB
<b>Difference Steady-State Voltage d<sub>vf</sub></b>			
TP0v C2C	0	NA	V
<b>Difference Linear Fit Pulse Peak Ratio dR<sub>peak</sub></b>			
TP0v C2C	0	NA	

<sup>1</sup> For a PMA in the same package as the PCS sublayer. In other cases, the signaling rate is derived from the signaling rate presented to the input lanes by the adjacent PMD, PMA, or FEC sublayers.



IEEE 802.3ck C2M Host (TP1a) and C2M Module (TP4) fully automated electrical transmitter measurements



IEEE 802.3ck C2C (TP0v) fully automated electrical transmitter measurements

### IEEE 802.3ck 100GCR-1, 200CR-2, 400CR-4 measurements

#### Mapping of IEEE 802.3ck 100GCR-1, 200CR-2, 400CR-4 measurements

Parameter	Min	Max	Units
<b>DC common mode output voltage</b>			
TP2	NA	1.9	V
<b>Diff peak to peak output voltage Tx enabled</b>			
TP2	NA	1200	mV
<b>Diff peak to peak output voltage Tx disabled</b>			
TP2	NA	30	mV
<b>Signal-to-noise and distortion ratio</b>			

Table continued...

Parameter	Min	Max	Units
TP2	31.5	NA	dB
<b>Coefficient range(IEEE)</b>			
C(-3) decrement	NA	<= - 0.06	
C(-2) decrement	>= 0.12	NA	
C(-1) decrement	NA	<= - 0.34	
C(0) decrement	NA	<= - 0.5	
C(1) decrement	NA	<= - 0.2	
<b>Signaling rate</b>			
TP2	53.125 ± 50 ppm <sup>a</sup>		GBd
<b>Normalized Coefficients Step Size</b>			
TP2(Increment)	0.005	0.025	
TP2(Decrement)	-0.025	-0.005	
<b>Level separation mismatch ratio (R<sub>LM</sub>)</b>			
TP2	0.95	NA	
<b>Steady state voltage</b>			
TP2	0.387	0.6	V
<b>Even odd jitter</b>			
TP2	NA	0.025	UI
<b>Uncorrelated jitter RMS and uncorrelated J3 and J4 Jitter</b>			
TP2(J3u jitter limits)	NA	0.125	UI
TP2(J3u03 jitter limits)	NA	0.115	UI
TP2(Jrms limits)	NA	0.023	UI
<b>Peak-Peak AC Common mode voltage</b>			
TP2	30	80	mV
<b>Signal to Residual Inter symbol Interface Ratio (SNR<sub>ISI</sub>)</b>			
TP2	26.7	NA	dB
<b>Linear fit pulse peak ratio R<sub>peak</sub></b>			
TP2	0.397	NA	V

### 400G-Tx test fixtures examples



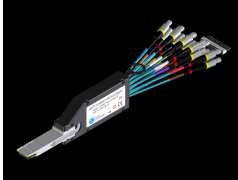
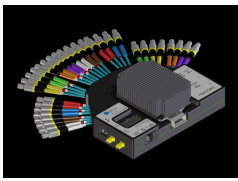
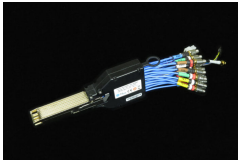
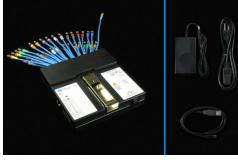
Description	Image
<p><b>Description:</b> QSFDD-TPA2.92-HCB-TX-P (HCB, 8-TX-Pairs, 5-inch 2.92mm Fem, 56G / 400G)</p> <p><b>Part number:</b> 640-0899-041 <sup>2</sup></p> <p><b>Model number:</b> QSFDD-TPA2.92-HCB-TX-P <sup>2</sup></p> <p><b>Quantity:</b> 1</p>	
<p><b>Description:</b> QSFDD-TPA2.92-MCB-R, (MCB, 2.92mm Fem, 400G)</p> <p><b>Part number:</b> 640-0900-000 <sup>2</sup></p> <p><b>Model number:</b> QSFDD-TPA2.92-MCB-R <sup>2</sup></p> <p><b>Quantity:</b> 1</p>	
<p><b>Description:</b> QSFDD-TPA2.4-HCB-RX-P (HCB, 8-RX-Pairs, 5-inch 2.4mm Fem, 112G / 800G)</p> <p><b>Note:</b> Test fixture plugs into QSFP-DD port</p> <p><b>Part number:</b> 640-0899-131 <sup>2</sup></p> <p><b>Model number:</b> QSFDD-TPA2.4-HCB-RX-P <sup>2</sup></p> <p><b>Quantity:</b> 1</p>	
<p><b>Description:</b> QSFDD-TPA1.85-MCB-R, (MCB, 1.85mm Fem, 800G)</p> <p><b>Note:</b> Test fixture receives QSFP-DD module</p> <p><b>Part number:</b> 640-0900-200 <sup>2</sup></p> <p><b>Model number:</b> QSFDD-TPA1.85-MCB-R <sup>2</sup></p> <p><b>Quantity:</b> 1</p>	

Table continued...

Description	Image
<p><b>Description:</b> OSFP-TPA1.85-HCB-P (HCB, 8-Channels, 5-inch 1.85mm Fem, 112G / 800G)</p> <p><b>Note:</b> Test fixture plugs into OSFP port</p> <p><b>Part number:</b> 640-0935-200 <sup>2</sup></p> <p><b>Model number:</b> OSFP-TPA1.85-HCB-P <sup>2</sup></p> <p><b>Quantity:</b> 1</p>	
<p><b>Description:</b> OSFP-TPA1.85-MCB-R (MCB, 8-Channels, 5-inch 1.85mm Fem, 112G / 800G)</p> <p><b>Note:</b> Test fixture receives OSFP module</p> <p><b>Part number:</b> 640-0937-200 <sup>2</sup></p> <p><b>Model number:</b> OSFP-TPA1.85-MCB-R <sup>2</sup></p> <p><b>Quantity:</b> 1</p>	

Refer to Wilder Technologies [www.wilder-tech.com](http://www.wilder-tech.com) for details regarding the various methods of signal break-out.

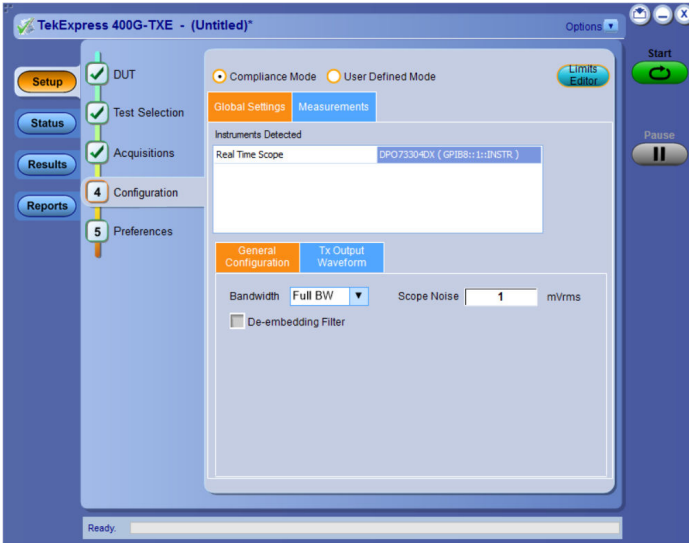
### User-defined mode

In user-defined mode, users can configure Global parameters, test specific parameters, measurement repeat parameters, and notification parameters. This supports the characterization of measurements rather than developing custom lab setups, reducing the testing time and complexity.

De-embedding filters help in compensating for any loss that happens due to cables/accessories present between specification mentioned test point to analog channel of oscilloscope. SDLA can be used for creating de-embedding filter files.

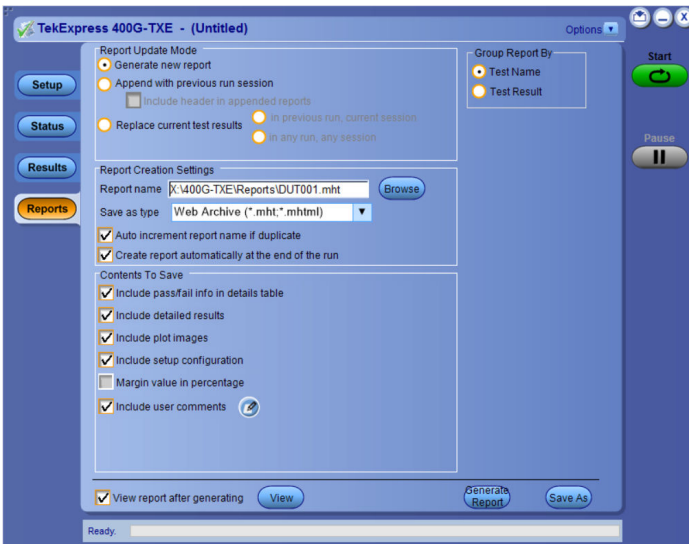
<sup>2</sup> Refer to Wilder Technologies [www.wilder-tech.com/en](http://www.wilder-tech.com/en) to get up-to-date part number and model number informations.





TekExpress 400G-TXE Test Report IEEE-CK (AUI-C2C)								
<b>Setup Information</b>								
DUT ID	DUT001	Master Scope Information	DPO77002SX, B300072					
Date/Time	2022-08-04 07:14:15	Master Scope F/W Version	10.12.0 Build 26					
TekExpress 400G-TXE Version	10.5.0.5	Master Scope SPC Status	PASS					
TekExpress Framework Version	5.3.0.25	Extension-1 Scope Information	DPO77002SX, B300062					
Specification Version	IEEE 802.3ck(TM)	Extension-1 Scope F/W Version	10.12.0 Build 26					
Compliance Mode	True	Extension-1 Scope SPC Status	PASS					
Execution Mode	Live	Bandwidth	Full BW					
Symbol Rate(Configured)	53.125GBd	PAMJET version	10.9.0.228(Beta)					
Overall Test Result	Pass	DPOJET Version	10.4.0.5					
Overall Execution Time	0:03:22	Scope Noise	1mVrms					
		Deskew	0.0ps, 45.0ps					
		Attenuation	0.0dB, 0.0dB					
		Pattern Length	8191					
DUT COMMENT: 400G-TXE AUI-C2C								
<b>Test Name Summary Table</b>								
DC Common Mode Output Voltage	Pass							
Diff Peak to Peak Output Voltage Tx Enabled	Pass							
Signaling Rate	Pass							
Jitter RMS	Pass							
Difference linear fit pulse peak ratio (dRpeak)	Pass							
<b>DC Common Mode Output Voltage</b>								
Measurement Details	Iteration	Measured Value	Test Result	Margin	Low Limit	High Limit	Units	Comments
DC Common Mode Output Voltage	1	1.0000	Pass	L:0.8000 H:0.0000	0.2	1.0	V	N.A
COMMENTS: D.C. Common Mode Output Voltage is measured using multimeter								

### Reports and measurements results



### Ordering information

Compliance testing to IEEE 802.3bs, 802.3cd, and 802.3ck Standards or OIF Standards for 400G at PAMJET, 26+ GBd /50Gb/s, and 53+ GBd / 100Gb/s per lane requires a minimum of 2-stack SX oscilloscopes with Bandwidth ≥50 GHz (50Gb/s per lane) and 59 GHz (100Gb/s per lane). When Tektronix oscilloscopes with lower bandwidth support the option, they might be used for troubleshooting.

### Models

Software description	Supported oscilloscopes	Ordering option
802.3bs/802.3cd permanent node locked license ordered with a DPS70000SX or DPO70000SX or DPO73304DX or MSO73304DX Series Real-Time Oscilloscope	DPO73304SX, DPS73308SX, DPO75002SX, DPS75004SX, DPO75902SX, DPS75904SX, DPO77002SX, DPS77004SX, DPO73304DX, MSO73304DX	400G-TXE
802.3bs/802.3cd Floating License for use on any Real-Time Oscilloscope listed above	-	DPOFL-400G-TXE

Table continued...

Software description	Supported oscilloscopes	Ordering option
802.3bs/802.3cd Free 30-Day Trial License for use on any Real-Time Oscilloscope listed above	-	DPOFT-400G-TXE
802.3ck permanent node locked license ordered with a DPS70000SX or DPO70000SX Series Real-Time Oscilloscope	DPO75002SX, DPS75004SX, DPO75902SX, DPS75904SX, DPO77002SX, DPS77004SX	400GCK-TX
802.3ck Floating License for use on any Real-Time Oscilloscope listed above	-	DPOFL-400GCK-TX
802.3ck Free 30-Day Trial License for use on any Real-Time Oscilloscope listed above	-	DPOFT-400GCK-TX

## Prerequisites

The following oscilloscope software is required:

Software details	Ordering option
PAMJET <sup>3</sup> Transmitter Analysis Software for electrical signals	PAMJET-E
PAMJET <sup>3</sup> Measurement Analysis Software for 802.3ck (required for 802.3ck only)	PAM400GCK
DPOJET Jitter and Eye Analysis Tools - Advanced	DJA
DPOJET Jitter and Eye Analysis Tools - Noise (Optional)	DJAN
Serial Data Link Analysis toolkit (Optional)	SDLA64

## Tektronix Asset Management System (AMS)

Optional software requires the purchase of a license before they are functional. Some software may require additional software licenses. Licenses are managed within the Tektronix Asset Management System (Tek AMS). The Tek AMS website address is [www.tek.com/en/support/products/product-license](http://www.tek.com/en/support/products/product-license). Product license management requires a login account.

- Node Locked Licenses provide your own copy of the application on your instrument or personal computer and are permanently assigned to a specific Host ID or product model/serial number.
- Floating licenses can be moved between different Host IDs or product models.

Use the Tektronix Asset Management system to check in and check out floating licenses.



Tektronix is registered to ISO 9001 and ISO 14001 by SRI Quality System Registrar.



Product(s) complies with IEEE Standard 488.1-1987, RS-232-C, and with Tektronix Standard Codes and Formats.

<sup>3</sup> The PAMJET software package was formerly known as (fka) "PAM4".

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\* European toll-free number. If not accessible, call: +41 52 675 3777

**For Further Information.** Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology. Please visit [www.tek.com](http://www.tek.com).

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