NICOMATIC

CREATIVE
INTERCONNECT
SOLUTIONS



USB

3.0

PHY LAYER QUALIFICATION

UNIVERSAL SERIAL BUS 3.0
SPECIFICATION

SUPERSPEED
CERTIFIED USB

NICOMATIC

Protocol Signal tested: USB 3.0
Connector tested: see description
Calibration Method: De-embbed

Operator Adnane JAGHMIM
According to standard

ROHDE&SCHWARZ



Instrument used :	VNA N°00651 R&S Model ZNB20
Last calibration date :	25/09/18
Next calibration date :	25/09/19
Calibration Method : SOLT and Deembbeding	

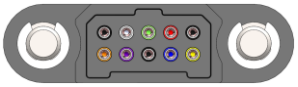
USB 3.0 Phy Layer NICOMATIC Compatibility Matrix

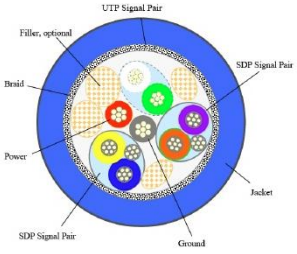
		LF Female Contact				
		Straight True hole	**90° True hole**	**Straight SMT**	**90° SMT**	**Cable**
LF Male Contact	**Straight True hole**	EMM	EMM			EMM CMM
	90° True hole	EMM	EMM CMM		CMM	EMM CMM
	Straight SMT					
	90° SMT		CMM		CMM	CMM
	Cable	EMM CMM	EMM CMM		CMM	

CMM Pin out recommanded



EMM Pin out recommanded





Pin nbr	Signal	AWG
1	Ground	24
2	USB2_P1	28
3	USB2_P2	28
4	Ground	24
5	Ground	-
6	USB3_TX_N	28
7	USB3_TX_P	28
8	Ground	-
9	USB3_RX_N	28
10	USB3_RX_P	28

Compliant Network Standards: USB 2.0 USB 3.0

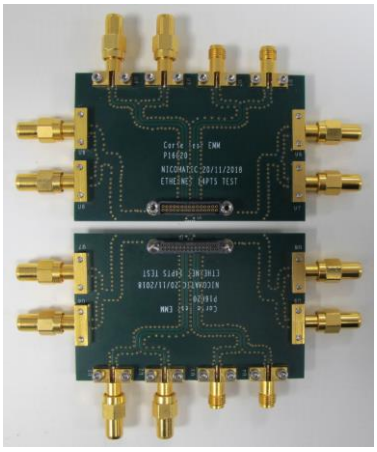
NICOMATIC

Operator
According to standard

Adnane JAGHMIM
Universal Serial Bus 3.0

EMM SERIES

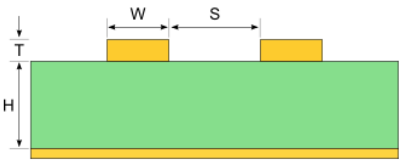
Straight PCB
vs
Straight PCB



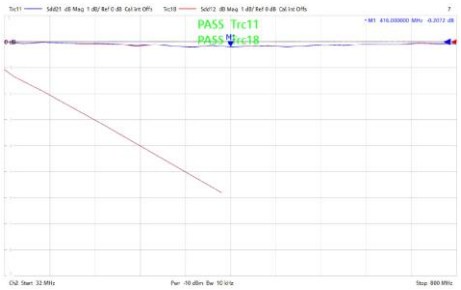
PCB recommandation

Total Thickness :	1600 µ
PCB Class :	4
Plating :	ENIG

W =	690 µ
S =	580 µ
H =	380 µ
T =	17 µ



D+D- Pair Attenuation (dB):



Limit (dB):
@ 12 MHz = -0.67
@ 400 MHz = -5.80

Measured (dB):
@ 400 MHz= -0.21

Statut: **Pass**

Differential Insertion Loss of SS Pairs (dB):



Limit (dB):
@ 100 MHz = -1.5
@ 7.5 GHz = -25

Measured (dB):
@ 7.5 GHz = -9.64

Statut: **Pass**

Differential to Common Mode Conversion (dB):

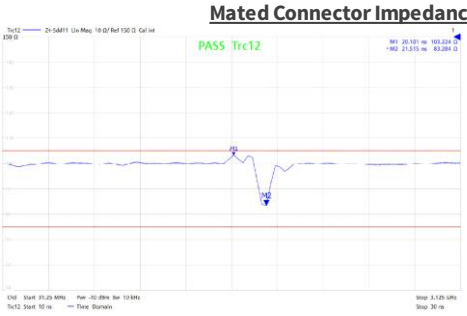


Limit (dB):
< -20

Measured (dB):
Max = -21.87

Statut: **Pass**

Mated Connector Impedance (Ohm):

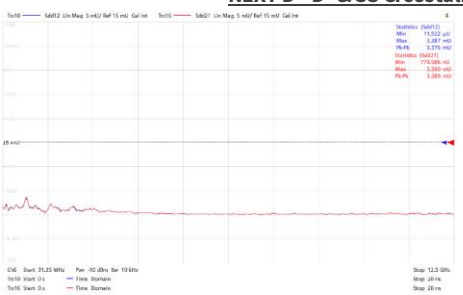


Limit (Ohm):
Max = 105
Min = 75

Measured (Ohm):
Max = 103.22
Min = 83.28

Statut: **Pass**

NEXT D+ D- & SS Crosstalk (mV):



Limit (mV):
Standard-A : p-p ? 3.6
Standard-B : p-p ? 7.2
Standard-A : p-p ? 4.8

Measured (mV):
p-p = 3.59

Statut: **Pass**

Intra Pair Skew / Propagation Delay (ps):



Limit (ps):
Intra pair skew ? 15
Propagation Delay < 10 000

Measured (ps):
Intra pair skew = 14.95
Propagation delay = 248.27

Statut: **Pass**

Compliant Network Standards: USB 2.0 USB 3.0

NICOMATIC

EMM SERIES

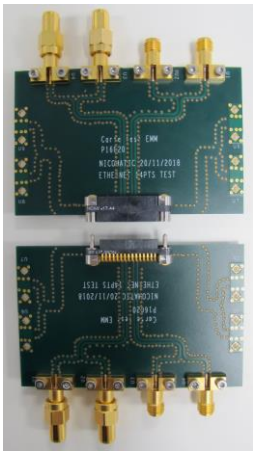
90° on PCB

vs

90° on PCB

Operator
According to standard

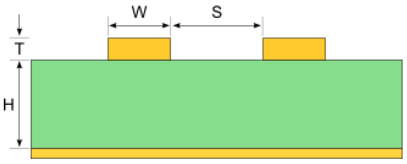
Adnane JAGHMIM
Universal Serial Bus 3.0



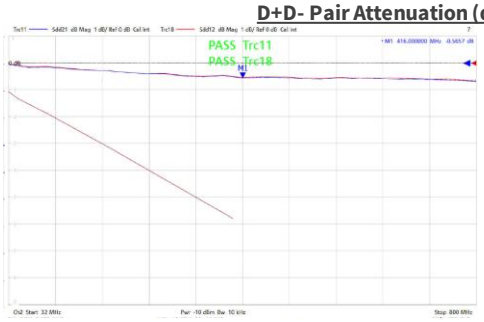
PCB recommandation

Total Thickness :	1600 µ
PCB Class :	4

W =	690 µ
S =	580 µ
H =	380 µ
T =	17 µ



D+D- Pair Attenuation (dB):



Limit (dB):
@ 12 MHz = -0.67
@ 400 MHz = -5.80

Measured (dB):
@ 400 MHz= -0.57

Statut: **Pass**

Differential Insertion Loss of SS Pairs (dB):



Limit (dB):
@ 100 MHz = -1.5
@ 7.5 GHz = -25

Measured (dB):
@ 7.5 GHz = -11.41

Statut: **Pass**

Differential to Common Mode Conversion (dB):

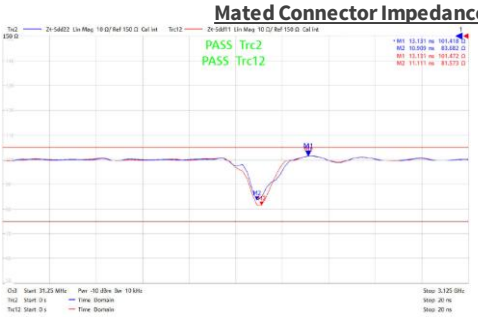


Limit (dB):
< -20

Measured (dB):
Max = -20.21

Statut: **Pass**

Mated Connector Impedance (Ohm):

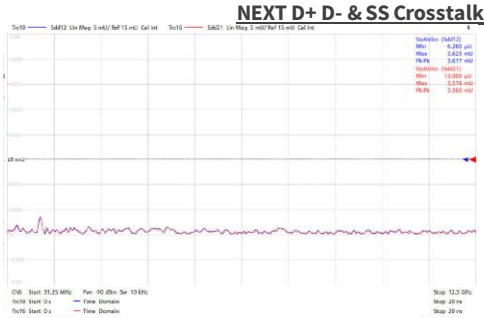


Limit (Ohm):
Max = 105
Min = 75

Measured (Ohm):
Max = 101.47
Min = 81.57

Statut: **Pass**

NEXT D+ D- & SS Crosstalk (mV):



Limit (mV):
Standard-A : p-p ≤ 3.6
Standard-B : p-p ≤ 7.2
Standard-A : p-p ≤ 4.8

Measured (mV):
p-p = 3.6

Statut: **Pass**

Intra Pair Skew / Propagation Delay (ps):



Limit (ps):
Intra pair skew ≤ 15
Propagation Delay < 10 000

Measured (ps):
Intra pair skew =0.541
Propagation delay = 766.77

Statut: **Pass**

Compliant Network Standards: USB 2.0 USB 3.0

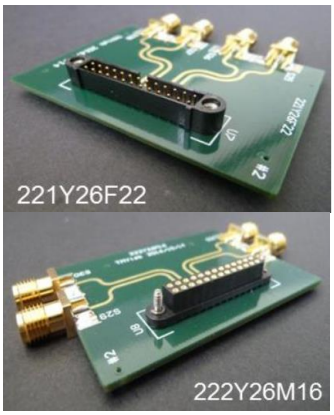
NICOMATIC

Operator
According to standard

Adnane JAGHMIM
Universal Serial Bus 3.0

CMM SERIES

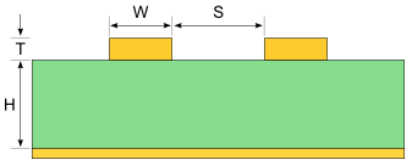
Straight True Hole
vs
Straight True Hole



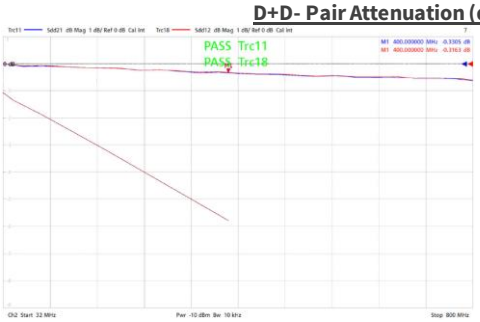
PCB recommandation

Total Thickness :	1600 µ
PCB Class :	4
Plating :	ENIG

W =	800 µ
S =	1200 µ
H =	380 µ
T =	17 µ



D+D- Pair Attenuation (dB):

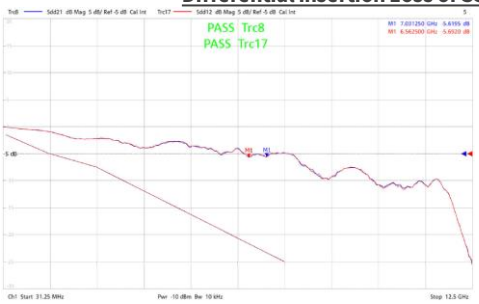


Limit (dB):
@ 12 MHz = -0.67
@ 400 MHz = -5.80

Measured (dB):
@ 400 MHz= -0.33

Statut: **Pass**

Differential Insertion Loss of SS Pairs (dB):

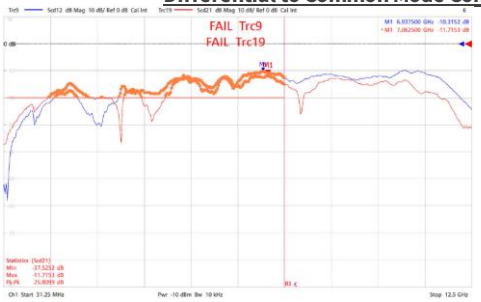


Limit (dB):
@ 100 MHz = -1.5
@ 7.5 GHz = -25

Measured (dB):
@ 7.5 GHz = -5.69

Statut: **Pass**

Differential to Common Mode Conversion (dB):

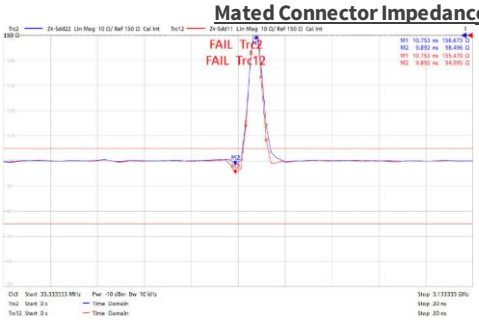


Limit (dB):
< -20

Measured (dB):
Max = -10.32

Statut: **Failed**

Mated Connector Impedance (Ohm):

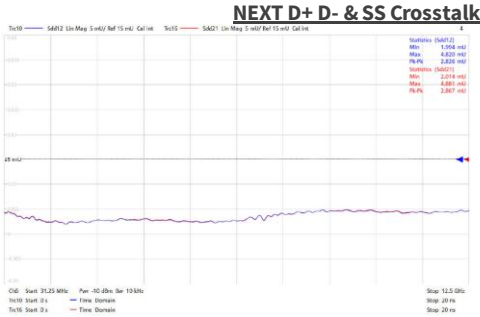


Limit (Ohm):
Max = 105
Min = 75

Measured (Ohm):
Max = 156.67
Min = 94.99

Statut: **Failed**

NEXT D+ D- & SS Crosstalk (mV):

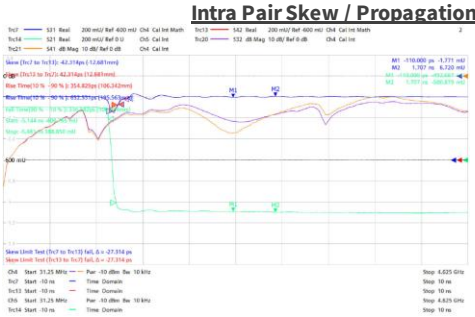


Limit (mV):
Standard-A : p-p ≤ 3.6
Standard-B : p-p ≤ 7.2
Standard-A : p-p ≤ 4.8

Measured (mV):
p-p = 2.867

Statut: **Pass**

Intra Pair Skew / Propagation Delay (ps):



Limit (ps):
Intra pair skew ≤ 15
Propagation Delay < 10 000

Measured (ps):
Intra pair skew = 27.31
Propagation delay = 652.53

Statut: **Failed**

Compliant Network Standards: USB 2.0 USB 3.0

NICOMATIC

Operator
According to standard

Adnane JAGHMIM
Universal Serial Bus 3.0

CMM SERIES

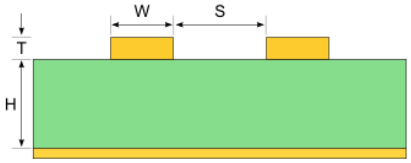
90° True Hole
vs
90° True Hole



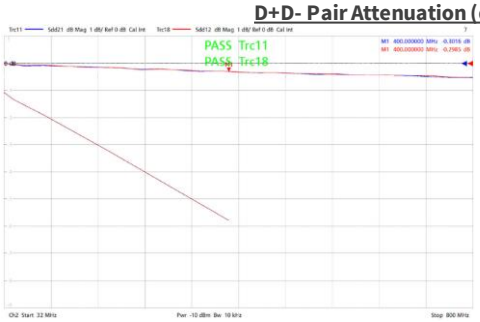
PCB recommandation

Total Thickness :	1600 µ
PCB Class :	4

W =	800 µ
S =	1200 µ
H =	380 µ
T =	17 µ



D+D- Pair Attenuation (dB):



Limit (dB):
@ 12 MHz = -0.67
@ 400 MHz = -5.80

Measured (dB):
@ 400 MHz= -0.57

Statut: **Pass**

Differential Insertion Loss of SS Pairs (dB):

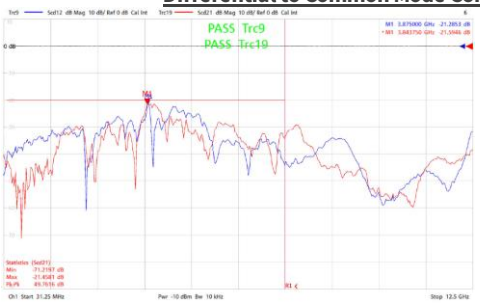


Limit (dB):
@ 100 MHz = -1.5
@ 7.5 GHz = -25

Measured (dB):
@ 7.5 GHz = -19.80

Statut: **Pass**

Differential to Common Mode Conversion (dB):

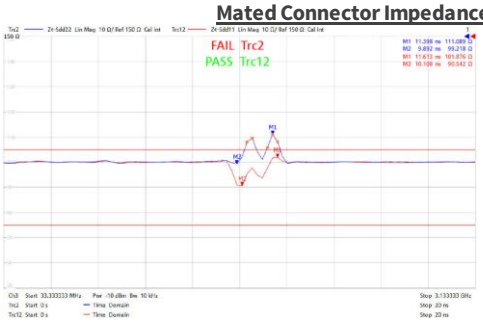


Limit (dB):
< -20

Measured (dB):
Max = -21.59

Statut: **Pass**

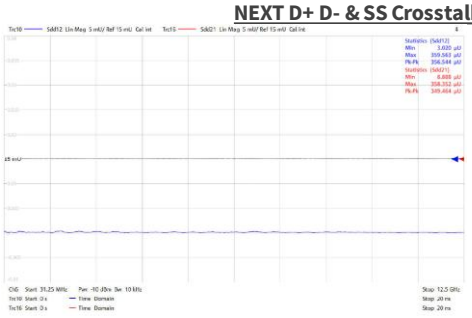
Mated Connector Impedance (Ohm):



Limit (Ohm):
Max = 105
Min = 75

Measured (Ohm):
Max = 111.10
Min = 90.542
Statut: **Pass**

NEXT D+ D- & SS Crosstalk (mV):

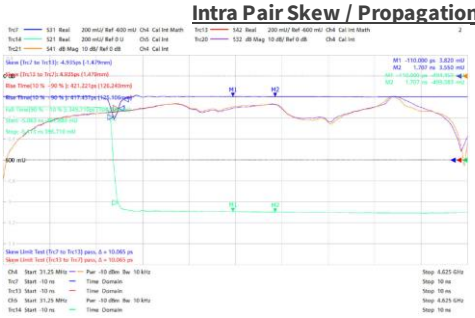


Limit (mV):
Standard-A : p-p ≤ 3.6
Standard-B : p-p ≤ 7.2
Standard-A : p-p ≤ 4.8

Measured (mV):
p-p = 0.36

Statut: **Pass**

Intra Pair Skew / Propagation Delay (ps):



Limit (ps):
Intra pair skew ≤ 15
Propagation Delay < 10 000

Measured (ps):
Intra pair skew =10.07
Propagation delay = 421.22

Statut: **Pass**

Compliant Network Standards: USB 2.0 USB 3.0

NICOMATIC

Operator
According to standard

Adnane JAGHMIM
Universal Serial Bus 3.0

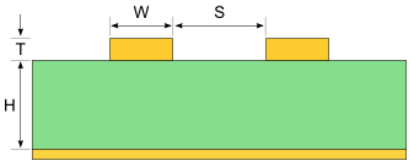
CMM SERIES

Straight SMT
vs
Straight SMT

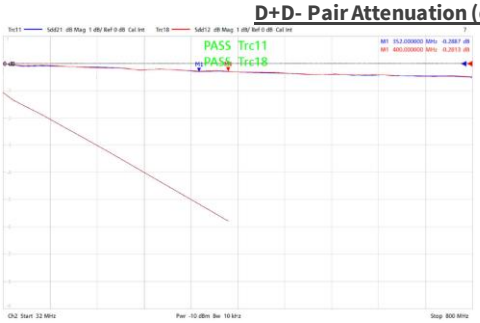


PCB recommandation

Total Thickness :	1600 µ
PCB Class :	4
W =	800 µ
S =	1200 µ
H =	380 µ
T =	17 µ



D+D- Pair Attenuation (dB):



Limit (dB):
@ 12 MHz = -0.67
@ 400 MHz = -5.80

Measured (dB):
@ 400 MHz= -0.29

Statut: **Pass**

Differential Insertion Loss of SS Pairs (dB):

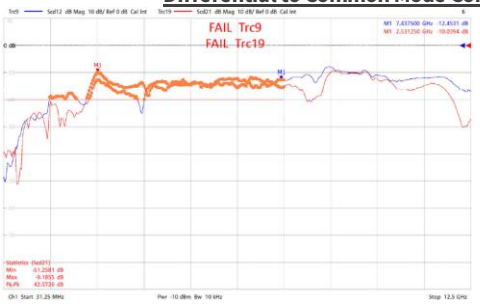


Limit (dB):
@ 100 MHz = -1.5
@ 7.5 GHz = -25

Measured (dB):
@ 7.5 GHz = -5.56

Statut: **Pass**

Differential to Common Mode Conversion (dB):

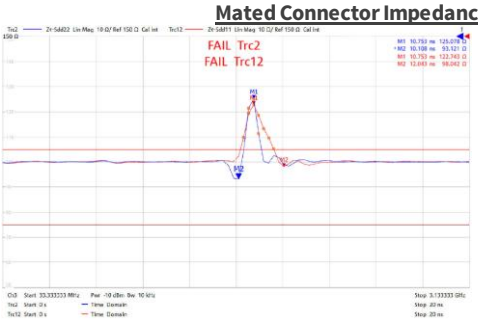


Limit (dB):
< -20

Measured (dB):
Max = -10.04

Statut: **Failed**

Mated Connector Impedance (Ohm):

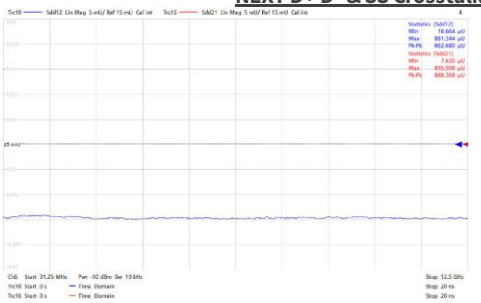


Limit (Ohm):
Max = 105
Min = 75

Measured (Ohm):
Max = 125.08
Min = 93.12

Statut (F to M): **Failed**

NEXT D+ D- & SS Crosstalk (mV):



Limit (mV):
Standard-A : p-p ≤ 3.6
Standard-B : p-p ≤ 7.2
Standard-A : p-p ≤ 4.8

Measured (mV):
p-p = 0.89

Statut: **Pass**

Intra Pair Skew / Propagation Delay (ps):



Limit (ps):
Intra pair skew ≤ 15
Propagation Delay < 10 000

Measured (ps):
Intra pair skew = 21.33
Propagation delay = 704.76

Statut: **Failed**

Compliant Network Standards: USB 2.0 USB 3.0

NICOMATIC

Operator
According to standard

Adnane JAGHMIM
Universal Serial Bus 3.0

CMM SERIES

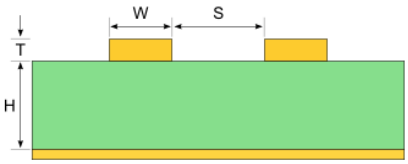
90° SMT
vs
90° SMT



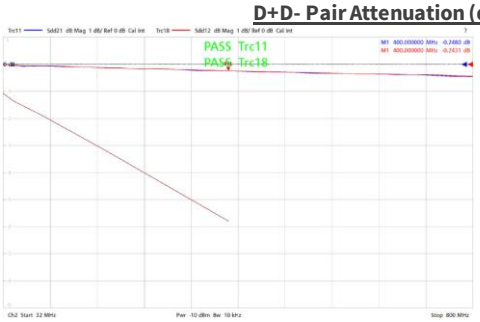
PCB recommandation

Total Thickness :	1600 µ
PCB Class :	4
Plating :	ENIG

W =	800 µ
S =	1200 µ
H =	380 µ
T =	17 µ



D+D- Pair Attenuation (dB):



Limit (dB):
@ 12 MHz = -0.67
@ 400 MHz = -5.80

Measured (dB):
@ 400 MHz= -0.25

Statut: **Pass**

Differential Insertion Loss of SS Pairs (dB):



Limit (dB):
@ 100 MHz = -1.5
@ 7.5 GHz = -25

Measured (dB):
@ 7.5 GHz = -16.17

Statut: **Pass**

Differential to Common Mode Conversion (dB):

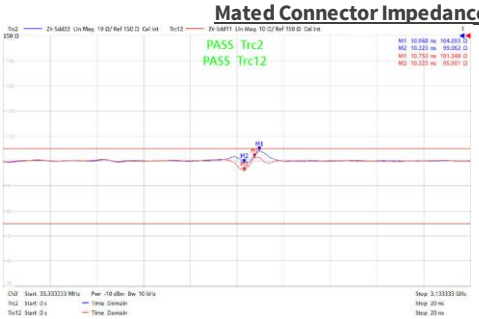


Limit (dB):
< -20

Measured (dB):
Max = -20.25

Statut: **Pass**

Mated Connector Impedance (Ohm):

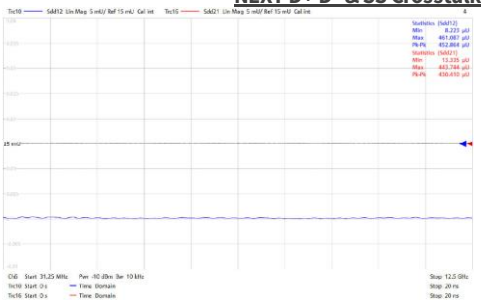


Limit (Ohm):
Max = 105
Min = 75

Measured (Ohm):
Max = 104.09
Min = 95.90

Statut: **Pass**

NEXT D+ D- & SS Crosstalk (mV):



Limit (mV):
Standard-A : p-p ≤ 3.6
Standard-B : p-p ≤ 7.2
Standard-A : p-p ≤ 4.8

Measured (mV):
p-p = 0.44

Statut: **Pass**

Intra Pair Skew / Propagation Delay (ps):



Limit (ps):
Intra pair skew ≤ 15
Propagation Delay < 10 000

Measured (ps):
Intra pair skew = 0.63
Propagation delay = 545.43

Statut: **Pass**

Compliant Network Standards: USB 2.0 USB 3.0