LUXSHARE ICT
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DP 1.2 Test Fixture

User Manual

LUXSHARE ICT

CONTENTS

Product Name	Version	Date	Comments
DP 1.2 Test Fixture Series	01	Jan.16,2019	Initial release

1. Introduction

This document describes the Dimension and electrical specification for DP test fixture.

2. Objectives

This specification provides the requirements for test fixture performances and test methods of DP test fixture.

3. Method of operation & Cleaning

3-1. Handling

Before each use of the test fixture, ensure that all connectors are clean.

3-2. Visual Inspection

Be sure to inspect all test fixture carefully before making a connection. Inspect all test fixture for metal particles, scratches, deformed threads, dents, or bent, broken, or misaligned center conductors. Do not use damaged test fixture.

⚠ Cleaning method

If necessary, clean the connectors using low-pressure (less than 60 PSI) compressed air or nitrogen with an effective oil-vapor filter and condensation trap. Clean the cable threads, if necessary, using a lint-free swab or cleaning cloth moistened with isopropyl alcohol. Always completely dry a connector before use. Do not use abrasives to clean the connectors. Re- inspect connectors, making sure no particles or residue remains.

3-3. Precautions

Before making any connections, review the “Handling Precautions” section. Follow these guidelines when making connections:

- Align test fixture carefully
- Make preliminary connection lightly
- To tighten, turn connector nut only
- Do not apply bending force to test fixture
- Do not over-tighten preliminary connections
- Do not twist or screw-in test fixture
- Use an appropriately sized torque wrench (depends on SMA gender),and do not tighten past the “break” point of the torque wrench (normally set to 5 in-lbs.)

3-4. Calibration Through De-Embedding

The DP Test Fixture are fully passive components. Therefore, calibration compensating for the losses must occur within the test instrumentation that drives the Creating S2P files. These files will soon be available to de-embed the electrical length and losses within the test fixture up to the DP connector interface pads.

TFD-13P38	TFD-4C98
	
Figure 3-1. DP 1.2 Plug Test Fixture	Figure 3-2. DP 1.2 1X,2X and SOL Calibration Board
TFD-1601M	
	
Figure 3-3. DP 1.2 AUX Control Board	

4. Testing Equipment

Item	Product Model	Name	Manufacturer
01	E5071C-TDR	300KHz~20GHz ENA Network Analyzer	Keysight
02	N4433A	200KHz~20GHz Electronic Calibration Module	Keysight
03	TDS8300+80E04	TDR with TDR and TDT module	Tektronix

5. Test Conditions

(Reference DisplayPort 1.2 specification)

Test Fixture	Part No.	S/N
DP 1.2 Plug Test Fixture	TFD-13P38	001
DP 1.2 1X,2X and SOL Calibration Board	TFD-4C98	001

Test Item:	Condition	Requirement
Eye Diagram	35ps (10% - 90%)	Eye Height :75% ISI Jitter: 5% Rise/Fall Time (10-90): 50ps
Differential Insertion Loss	300KHz～10GHz	5GHz@-3dB
Differential Return Loss	300KHz～10GHz	N/A
Differential Near-End Crosstalk	300KHz～10GHz	N/A
Differential Far-End Crosstalk	300KHz～10GHz	N/A
Intra-Pair Skew	50ps (20%~80%)	<5ps
Traces Impedance	35ps (10% - 90%)	50 Ω ± 5%
Differential Impedance	130ps (20% - 80%) 35ps (10% - 90%)	100 Ω ± 10%

6. Testing Result

6-1. DP 1.2 Test Fixture

6-1-1. Eye Diagram

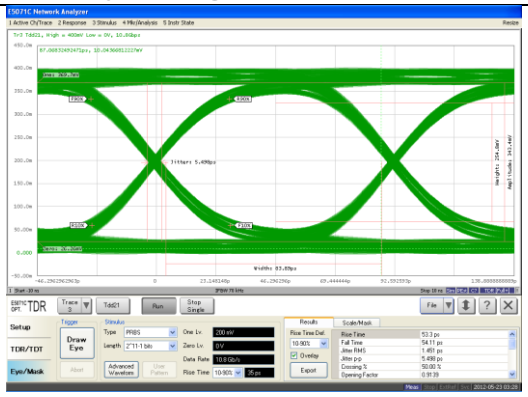

Figure 6-1. AUX Pair

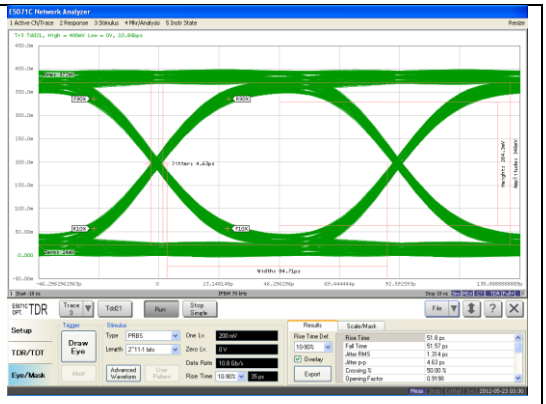

Figure 6-2. ML0 Pair

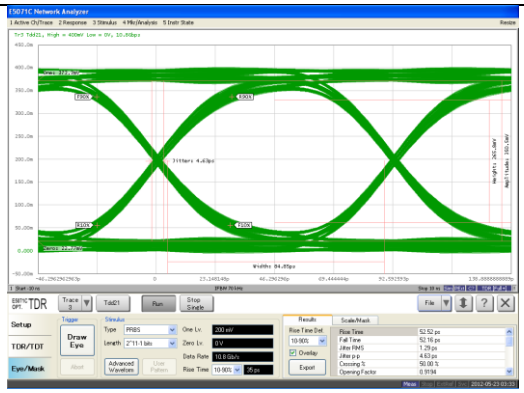

Figure 6-3. ML1 Pair

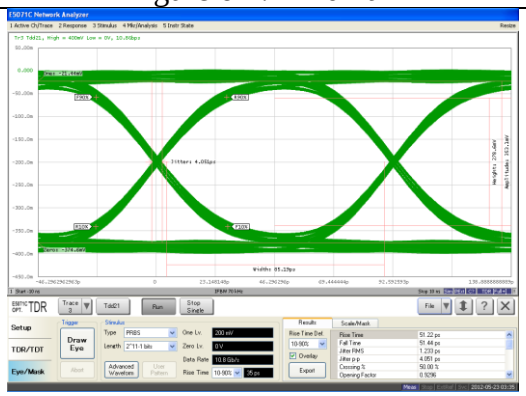

Figure 6-4. ML2 Pair

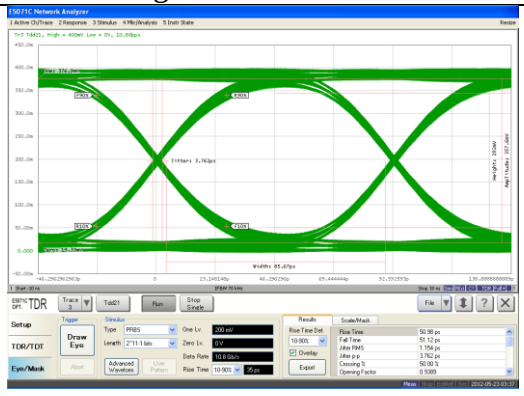

Figure 6-5. ML3 Pair

6-1-2. Differential Intra-Pair Skew

DUT / Test Pair	DP 1.2 Plug Test Fixture	
	Result (ps)	Remark
AUX	2.68	Refer to Fig. 6-6
ML0	2.89	Refer to Fig.6-7
ML1	2.53	Refer to Fig. 6-8
ML2	1.98	Refer to Fig. 6-9
ML3	3.14	Refer to Fig. 6-10

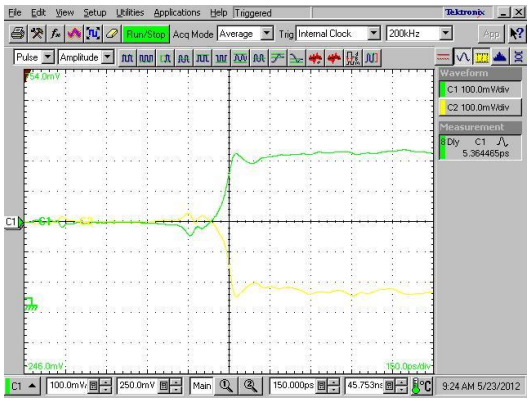

Figure 6-6. AUX Pair

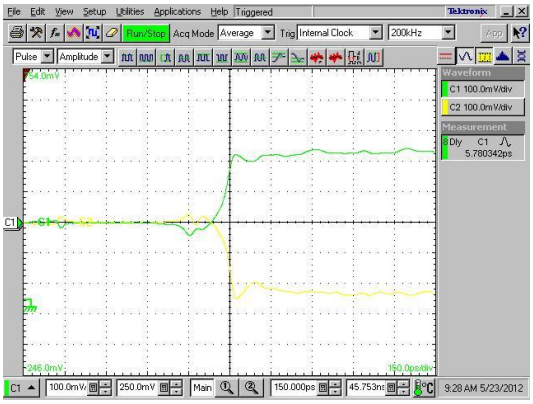

Figure 6-7. ML0 Pair

Figure 6-8. ML1 Pair

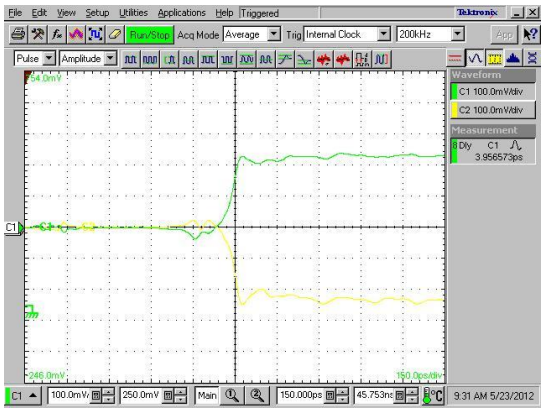

Figure 6-9. ML2 Pair

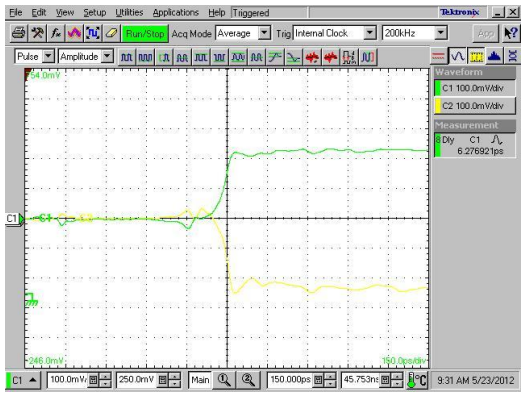

Figure 6-10. ML3 Pair

6-1-3. Far-End Crosstalk

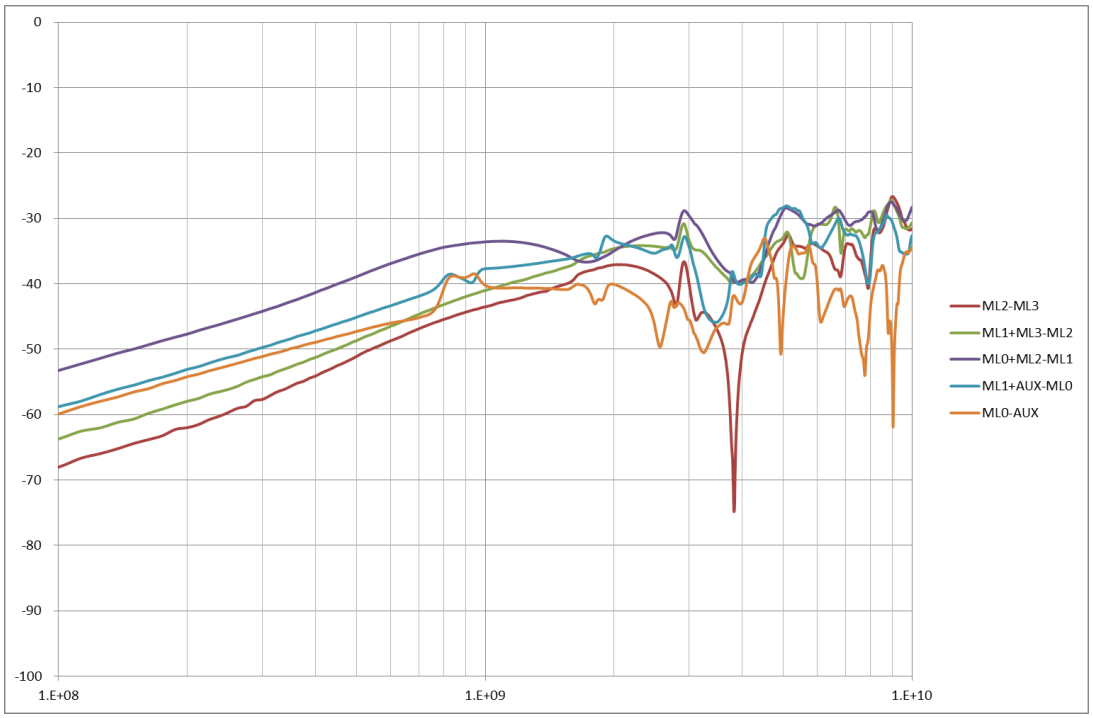

Figure 6-11. FEXT

6-1-4. Near-End Crosstalk

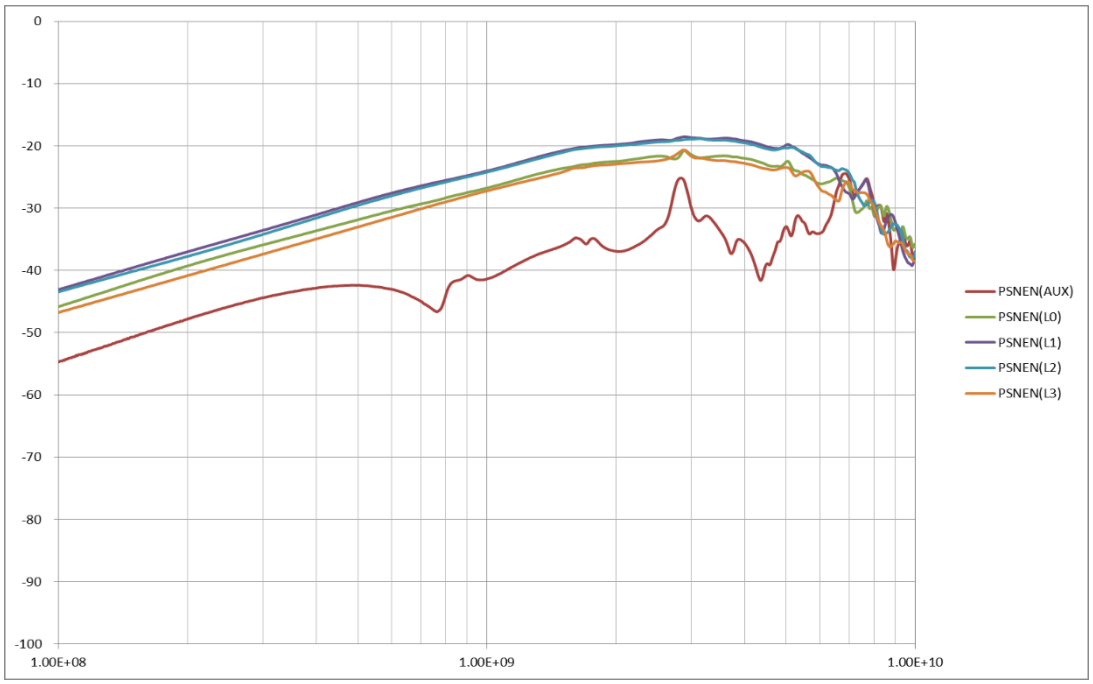

Figure 6-12. NEXT

6-1-5. Insertion Loss

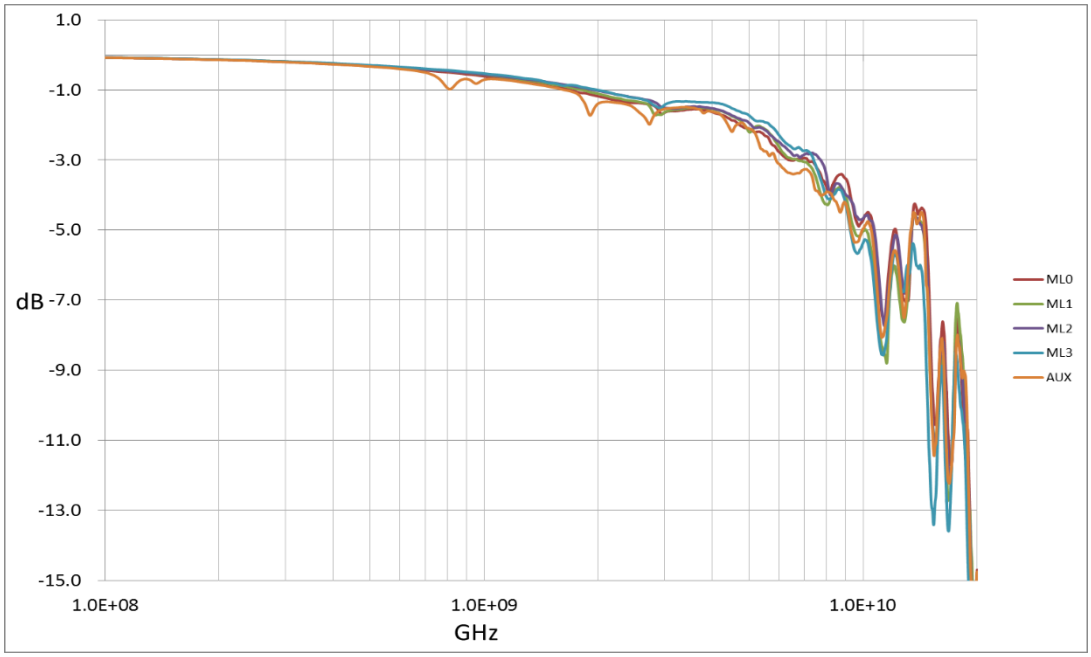

Figure 6-13. Insertion Loss

6-1-6. Return Loss

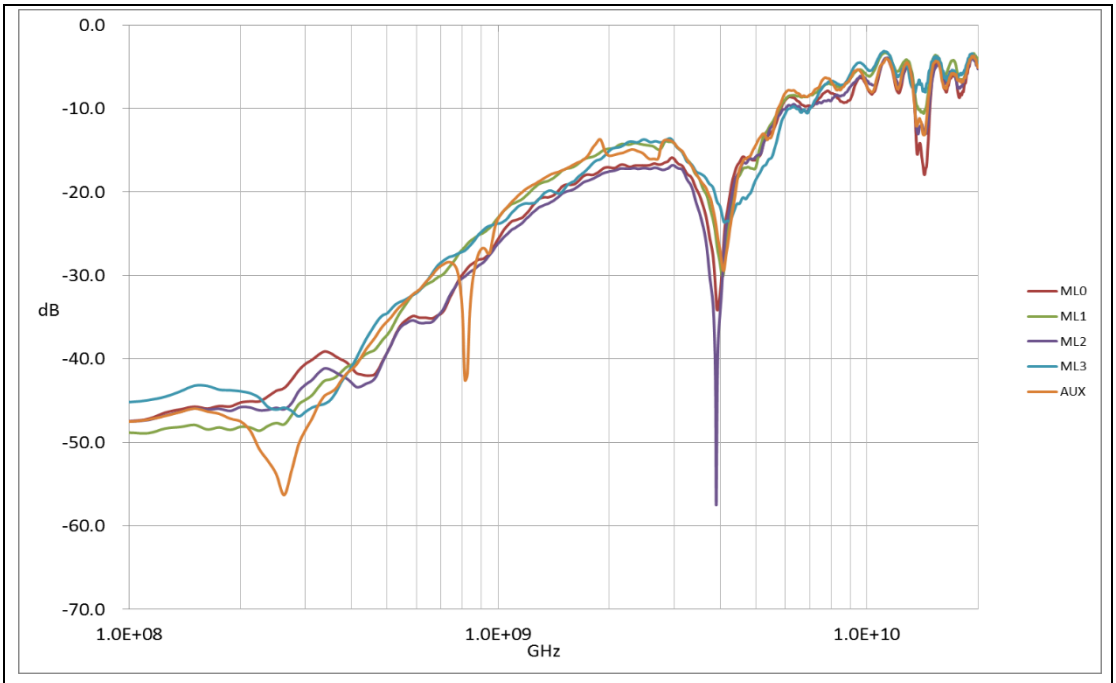

Figure 6-14. Return Loss

6-1-7. Traces Impedance

Test Item		Impedance (Ω)			
DUT / Test Pin		DP 1.2 Plug Test Fixture			
Pair	Pin	Max	Min	Δ	Remark
AUX	P-Pair	48.67	48.00	0.67	Refer to Fig. 6-15
	N-Pair	48.84	48.14	0.70	Refer to Fig. 6-16
ML0	P-Pair	49.28	48.73	0.55	Refer to Fig. 6-17
	N-Pair	49.44	48.82	0.62	Refer to Fig. 6-18
ML1	P-Pair	49.16	48.36	0.80	Refer to Fig. 6-19
	N-Pair	49.25	48.71	0.54	Refer to Fig. 6-20
ML2	P-Pair	49.25	48.77	0.48	Refer to Fig. 6-21
	N-Pair	49.33	48.55	0.78	Refer to Fig. 6-22
ML3	P-Pair	49.12	48.46	0.66	Refer to Fig. 6-23
	N-Pair	49.09	48.15	0.94	Refer to Fig. 6-24

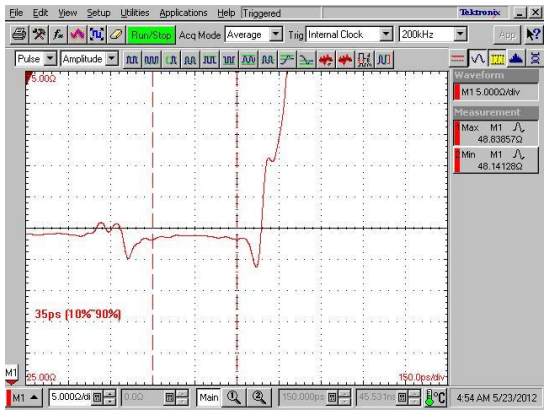

Figure 6-15. AUX P-Pair

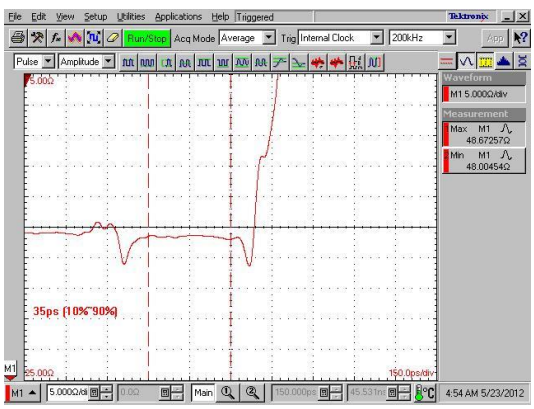

Figure 6-16. AUX N-Pair

Figure 6-17. ML0 P-Pair

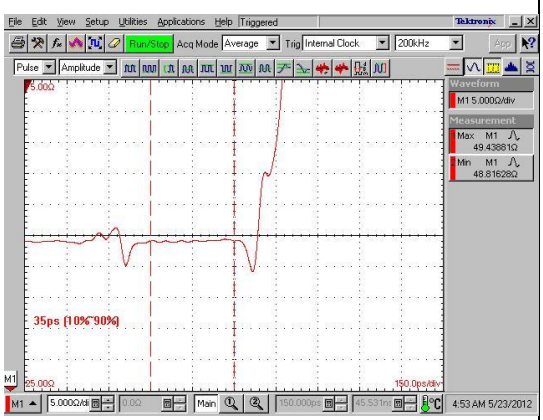

Figure 6-18. ML0 N-Pair

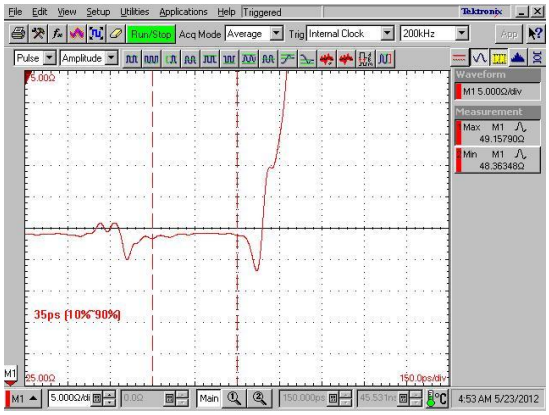

Figure 6-19. ML1 P-Pair

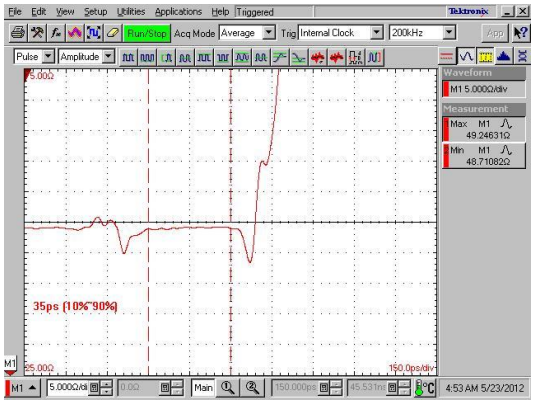

Figure 6-20. ML1 N-Pair

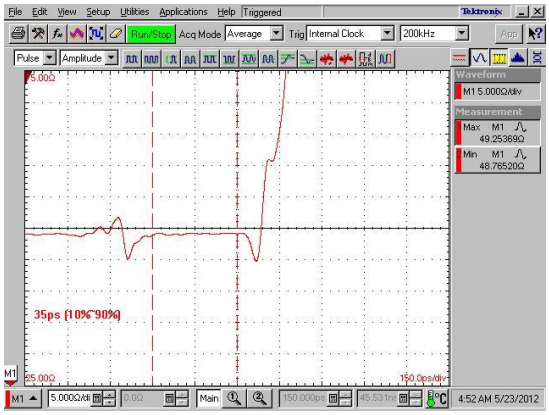

Figure. 6-21. ML2 P-Pair

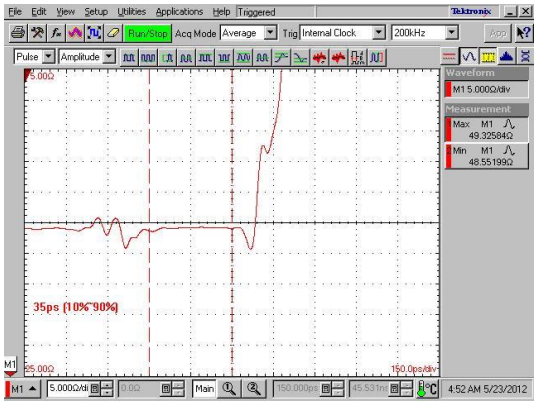

Figure. 6-22. ML2 N-Pair

Figure 6-23. NL3 P-Pair

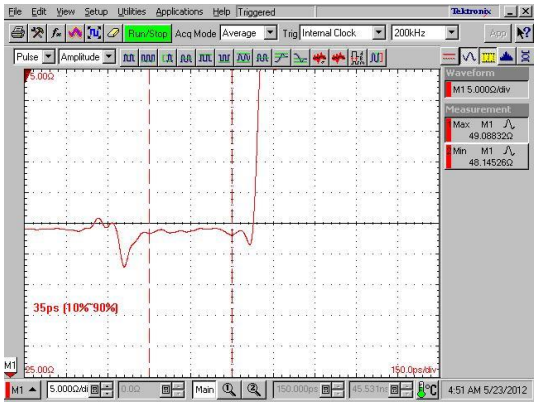

Figure 6-24. ML3 N-Pair

6-1-8. Differential Impedance

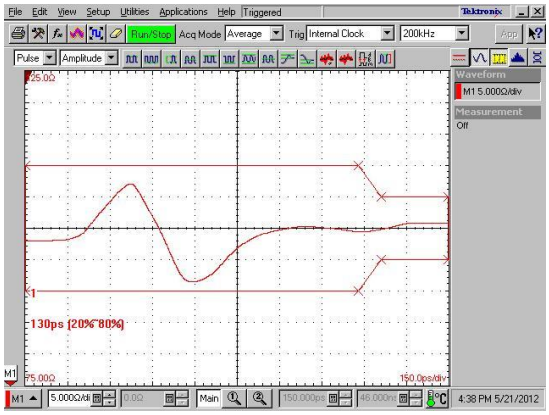

Figure 6-25. AUX Pair

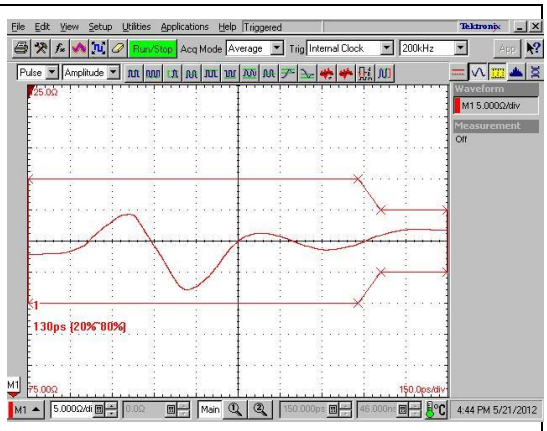

Figure 6-26. ML0 Pair

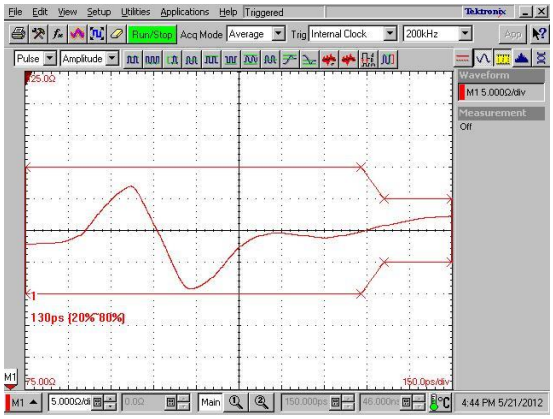

Figure 6-27. ML1 Pair

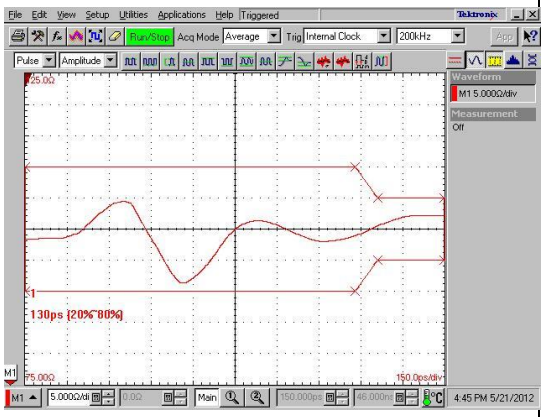

Figure 6-28. ML2 Pair

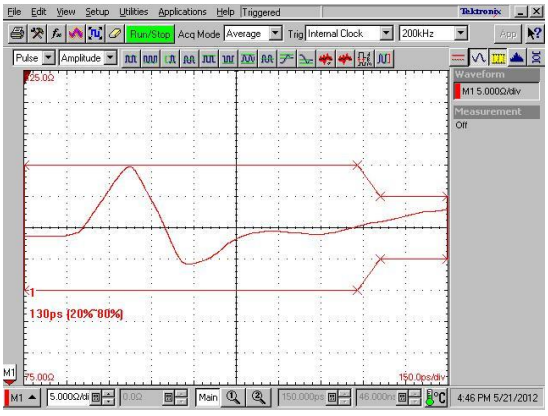

Figure 6-29. ML3 Pair

6-2. DP 1.2 1X,2X and SOL Calibration Board

6-2-1. Eye Diagram

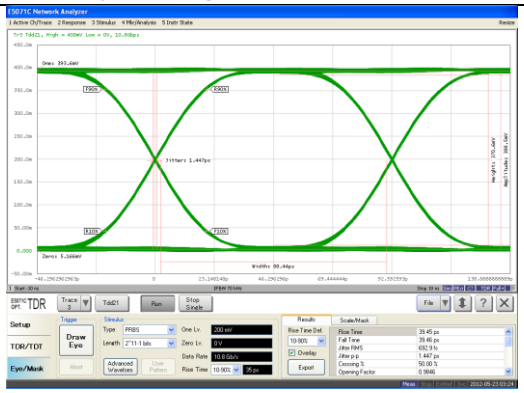

Figure 6-30. 1X Pair

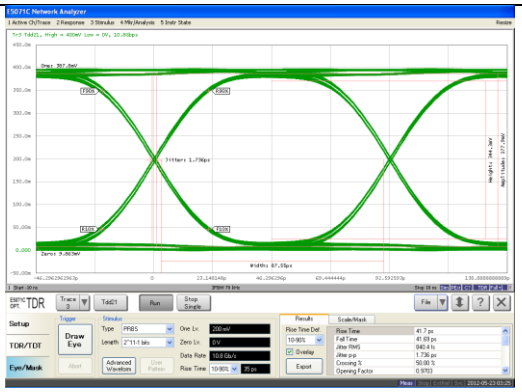

Figure 6-31. 2X Pair

6-2-2. Insertion Loss

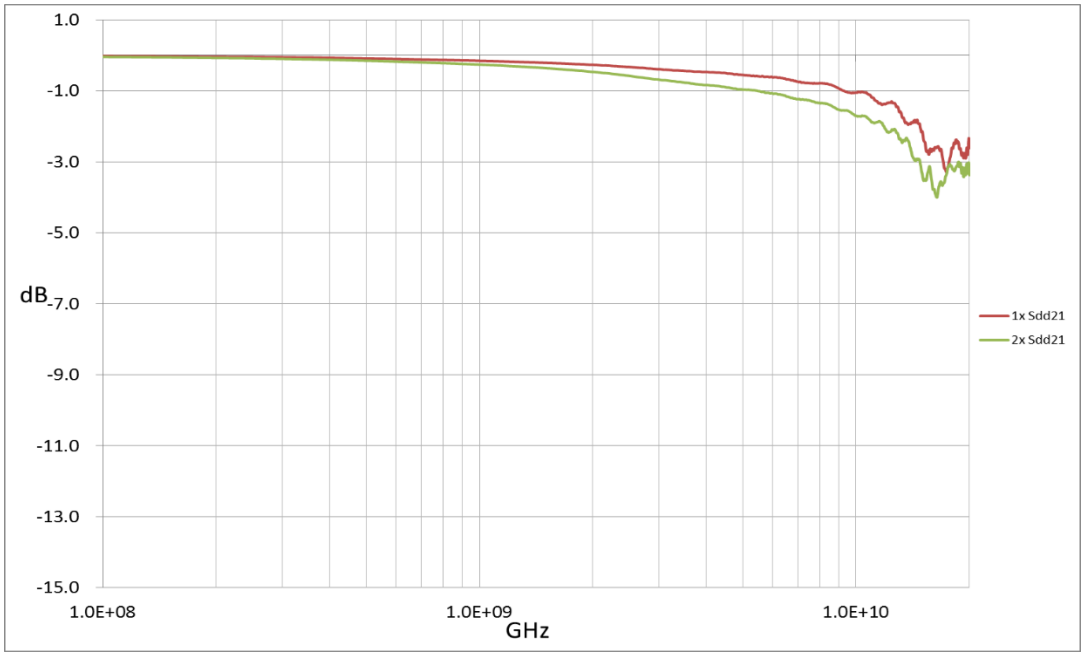

Figure 6-32. Insertion Loss

6-2-3. Return Loss

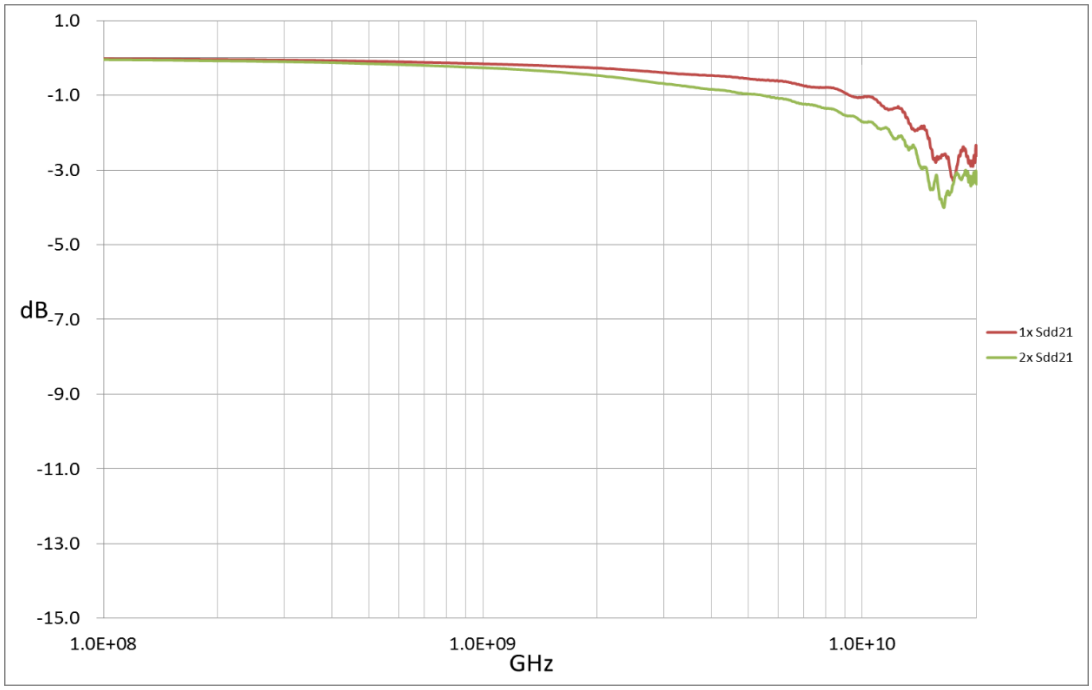

Figure 6-33. Return Loss

6-2-4. Traces Impedance

Test Item		Impedance (Ω)			
DUT / Test Pin		DP 1.2 1X,2X and SOL Calibration Board			
Pair	Pin	Max	Min	Δ	Remark
1X	1	49.06	48.45	0.61	Refer to Fig. 6-34
	2	49.18	48.43	0.73	Refer to Fig. 6-35
2X	1	49.58	48.58	1.00	Refer to Fig. 6-36
	2	49.60	48.45	1.15	Refer to Fig. 6-37
Short	1	48.86	48.25	0.61	Refer to Fig. 6-38
	2	48.79	47.96	0.83	Refer to Fig. 6-39
Open	1	49.54	48.71	0.79	Refer to Fig. 6-40
	2	49.50	48.75	0.75	Refer to Fig. 6-41
Load	1	49.13	48.83	0.30	Refer to Fig. 6-42
	2	49.19	48.52	0.67	Refer to Fig. 6-43

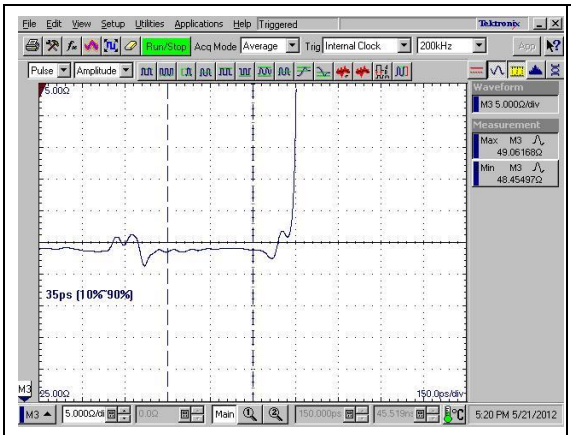

Figure 6-34. 1X _1 Pair

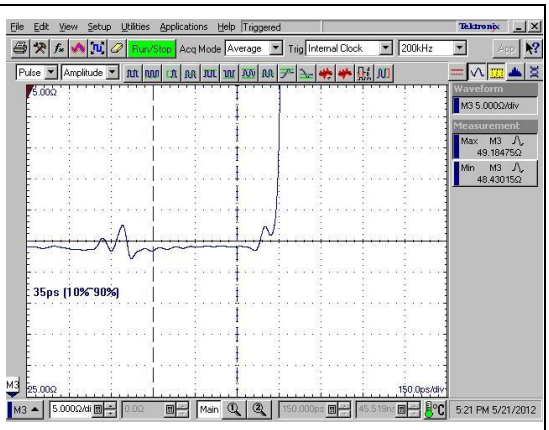

Figure 6-35. 1X _2 Pair

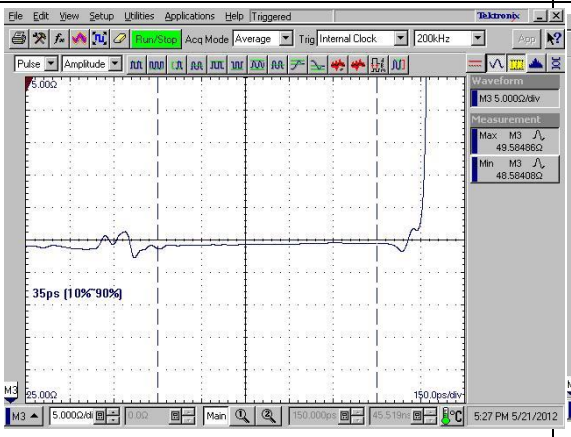

Figure 6-36. 2X _1 Pair

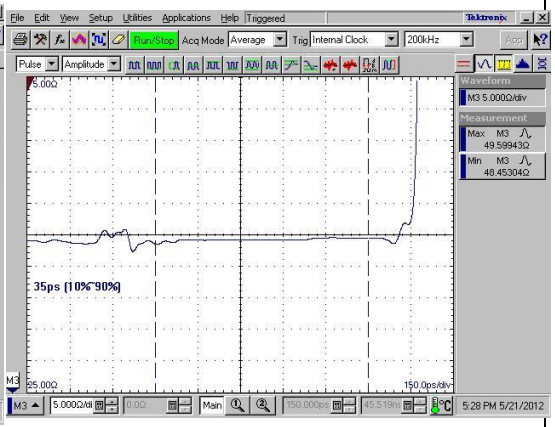

Figure 6-37. 2X _2 Pair

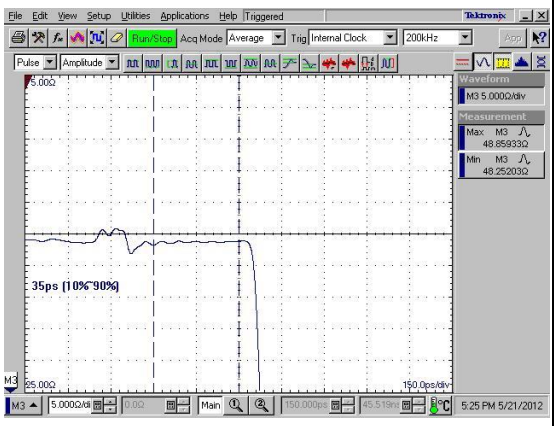

Figure 6-38. Short _1 Pair

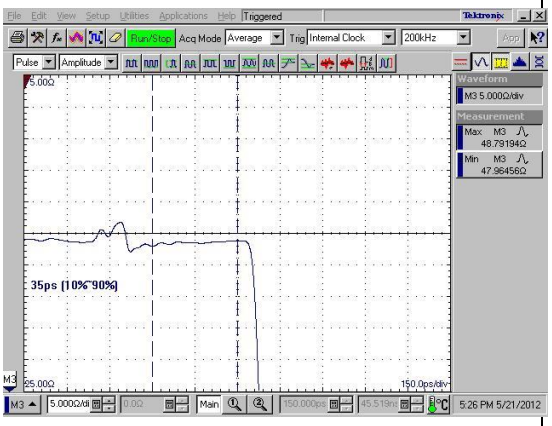

Figure 6-39. Short _2 Pair

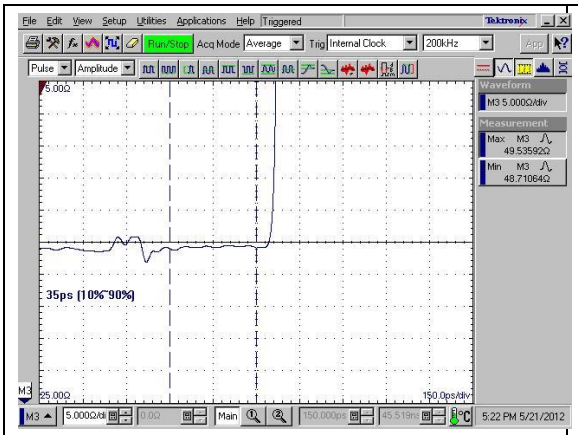

Figure 6-40. Open_1 Pair

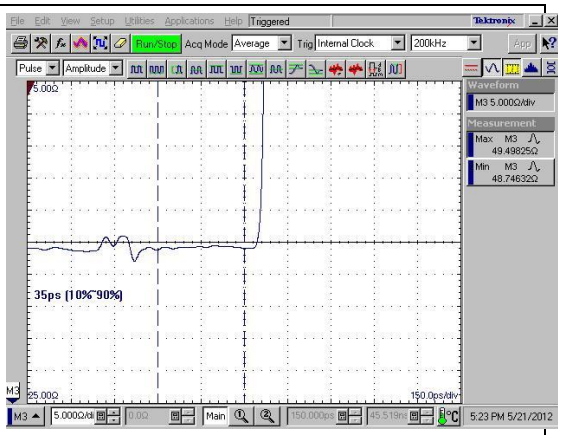

Figure 6-41. Open_2 Pair

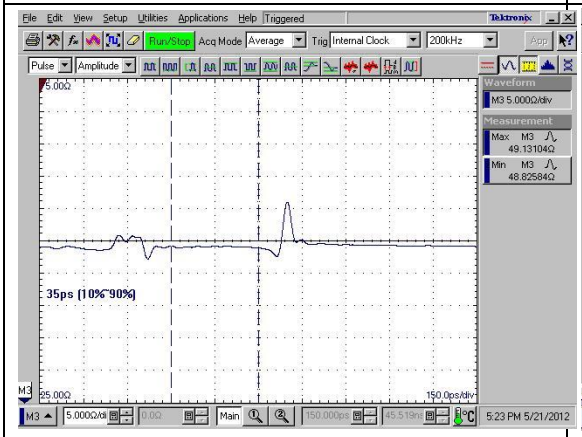

Figure 6-42. Load _1 Pair

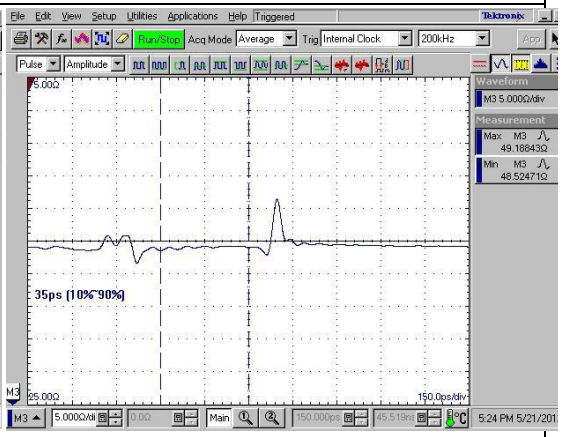

Figure 6-43. Load _2 Pair

6-2-5. Differential Impedance

Test Item	Impedance (Ω)			
DUT / Test Pin	DP 1.2 1X,2X and SOL Calibration Board			
Pair	Max	Min	Δ	Remark
1X	98.46	97.52	0.94	Refer to Fig. 6-44
2X	99.42	98.26	1.16	Refer to Fig. 6-45

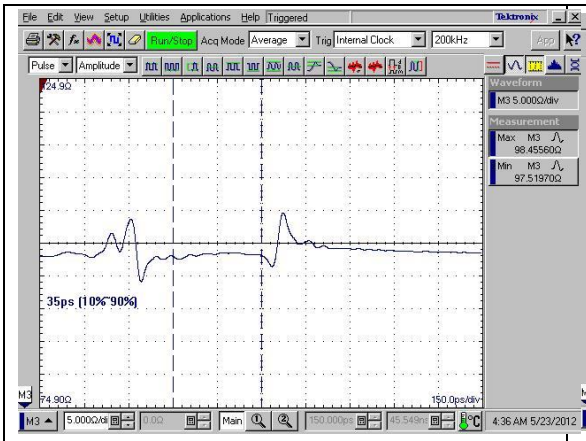

Figure 6-44. 1X Pair

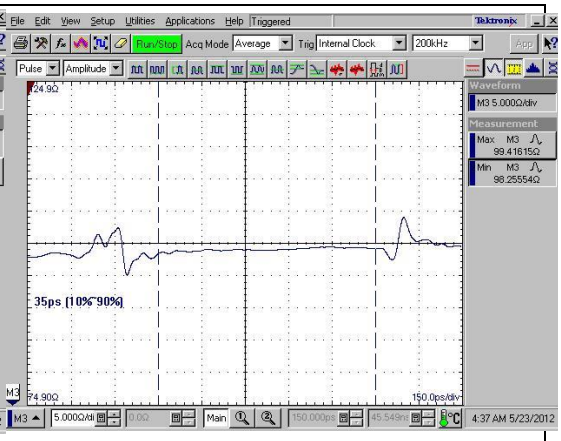

Figure 6-45. 2X Pair

7. Reference materials

7-1. Keysight

(MOI) for DisplayPort1.2b Cable-Connector Assembly Compliance Test
https://www.keysight.com/upload/cmc_upload/All/ENA-TDR_DisplayPort_MOI_rev3.01.pdf

DP 1.2 Test Fixture

User Manual

LUXSHARE ICT

目錄

Product Name	Version	Date	Comments
DP 1.2 Test Fixture Series	01	Jan.16,2019	Initial release

1. 簡介

本文介紹 DP test fixture 的機械規格與電氣規格。

2. 目的

本規範提供了 DP test fixture 的特性規格與測試結果。

3. 操作方式&清潔

3-1. 處理

在每次使用測試治具之前，確保所有連接器都乾淨。

3-2. 目測檢查

在連接之前，一定要仔細檢查所有的測試治具。檢查所有測試治具是否有金屬顆粒，划痕，變形螺紋，凹痕或彎曲，斷裂或中心導體未對齊。不要使用損壞的測試治具。

⚠ 清潔方法

如需清潔，請使用低壓（小於 60 PSI）的壓縮空氣或氮氣與有效的油氣過濾器和冷凝器。如有需要清潔內部，使用沾有異丙醇的清潔布清潔測試治具。清潔後請確認連接器是否為乾燥狀態。請勿使用研磨劑清潔連接器。使用前確保連接器內無殘留物。

3-3. 注意事項

在進行任何連接之前，請查看“注意事項”部分。連接時請遵循以下準則：

- 仔細對齊測試治具
- 輕微進行初步連接
- 確認 SMA 接頭對鎖狀態
- 不要對測試治具施加彎曲力
- 請勿使用磅數過高之扭力板手(5 in-lbs 上)
- 測試治具端請勿旋轉或扭動
- 使用適當尺寸的扭矩板手(取決於 SMA 的規格), 並且不要擰過扭矩扳手的“斷開”點（通常設置為 5 in-lbs）。

3-4. 校正

DP 測試治具是完全無源組件。因此，校準在驅動的測試儀器中必須補償損失。創建 S2P 文件。這些文件將很快用於將測試夾具內的電氣長度和損耗去除到 DP 連接器接口焊盤。

TFD-13P38  Figure 3-1. DP 1.2 Plug Test Fixture	TFD-4C98  Figure 3-2. DP 1.2 1X,2X and SOL Calibration Board
TFD-1601M  Figure 3-3. DP 1.2 AUX Control Board	

4. 測試設備

Item	Product Model	Name	Manufacturer
01	E5071C-TDR	300KHz~20GHz ENA Network Analyzer	Keysight
02	N4433A	200KHz~20GHz Electronic Calibration Module	Keysight
03	TDS8300+80E04	TDR with TDR and TDT module	Tektronix

5. 測試條件

(Reference DisplayPort 1.2 specification)

Test Fixture	Part No.	S/N
DP 1.2 Plug Test Fixture	TFD-13P38	001
DP 1.2 1X,2X and SOL Calibration Board	TFD-4C98	001

Test Item:	Condition	Requirement
Eye Diagram	35ps (10% - 90%)	Eye Height :75% ISI Jitter: 5% Rise/Fall Time (10-90): 50ps
Differential Insertion Loss	300KHz～10GHz	5GHz@-3dB
Differential Return Loss	300KHz～10GHz	N/A
Differential Near-End Crosstalk	300KHz～10GHz	N/A
Differential Far-End Crosstalk	300KHz～10GHz	N/A
Intra-Pair Skew	50ps (20%~80%)	<5ps
Traces Impedance	35ps (10% - 90%)	50 Ω ± 5%
Differential Impedance	130ps (20% - 80%) 35ps (10% - 90%)	100 Ω ± 10%

6. 測試結果

6-1. DP 1.2 Test Fixture

6-1-1. Eye Diagram

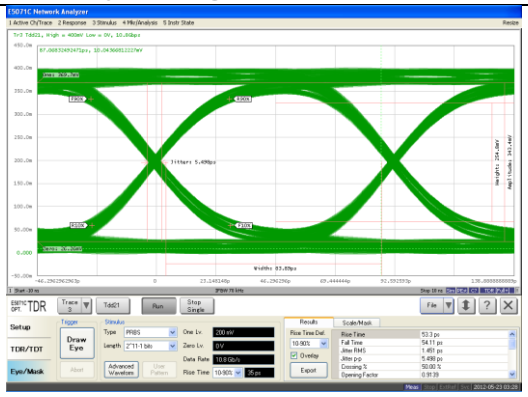

Figure 6-1. AUX Pair

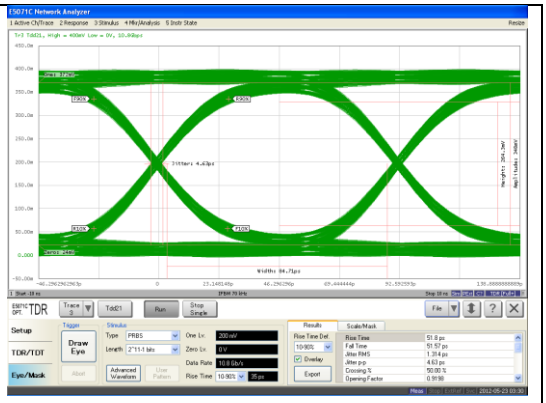

Figure 6-2. ML0 Pair

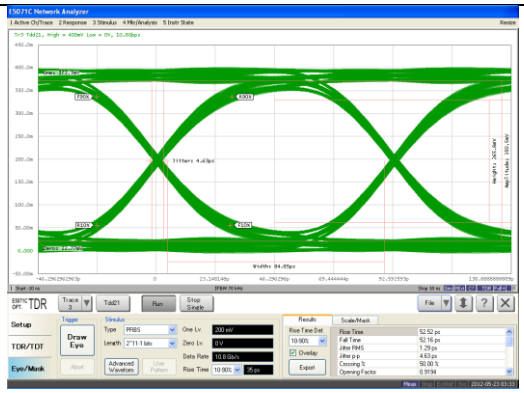

Figure 6-3. ML1 Pair

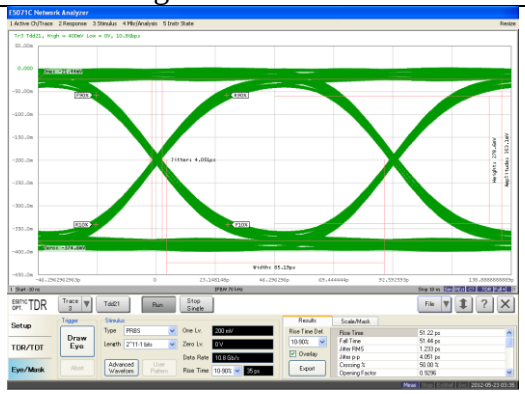

Figure 6-4. ML2 Pair

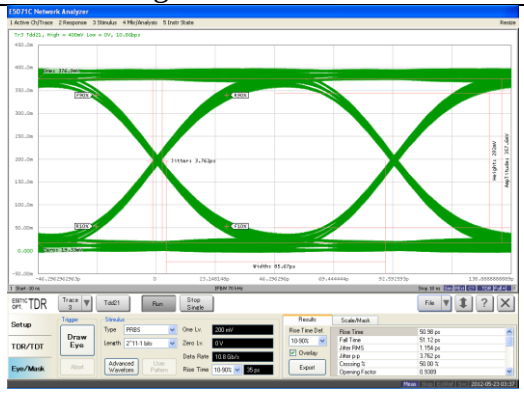

Figure 6-5. ML3 Pair

6-1-2. Differential Intra-Pair Skew

DUT / Test Pair	DP 1.2 Plug Test Fixture	
	Result (ps)	Remark
AUX	2.68	Refer to Fig. 6-6
ML0	2.89	Refer to Fig.6-7
ML1	2.53	Refer to Fig. 6-8
ML2	1.98	Refer to Fig. 6-9
ML3	3.14	Refer to Fig. 6-10

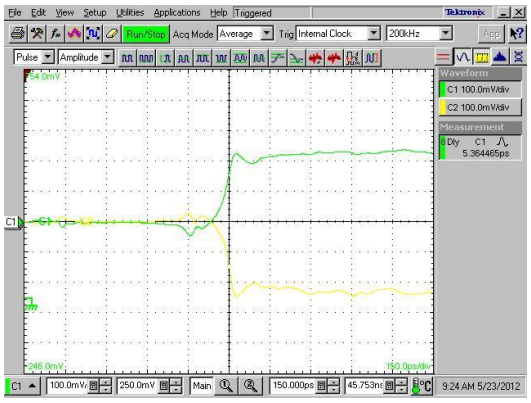

Figure 6-6. AUX Pair

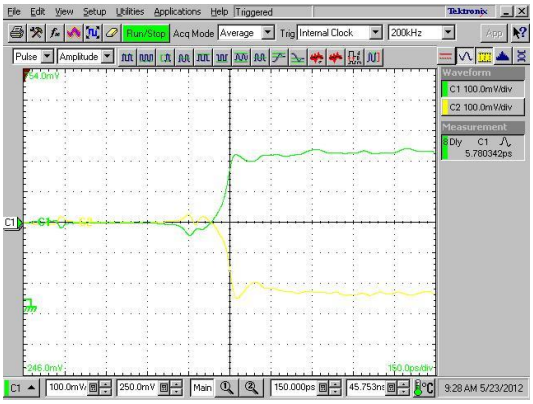

Figure 6-7. ML0 Pair

Figure 6-8. ML1 Pair

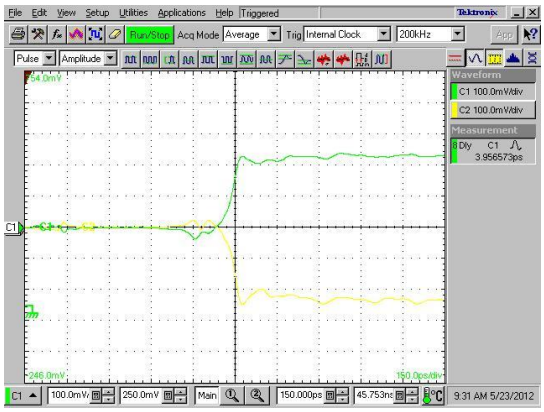

Figure 6-9. ML2 Pair

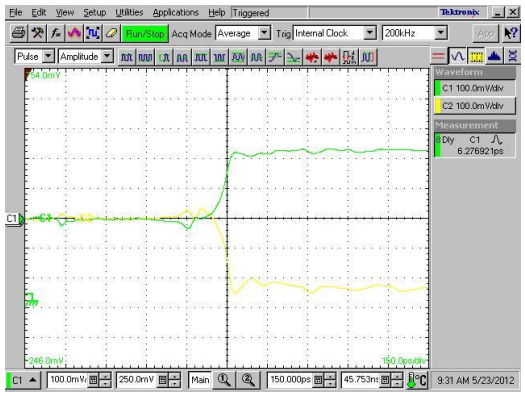

Figure 6-10. ML3 Pair

6-1-3. Far-End Crosstalk

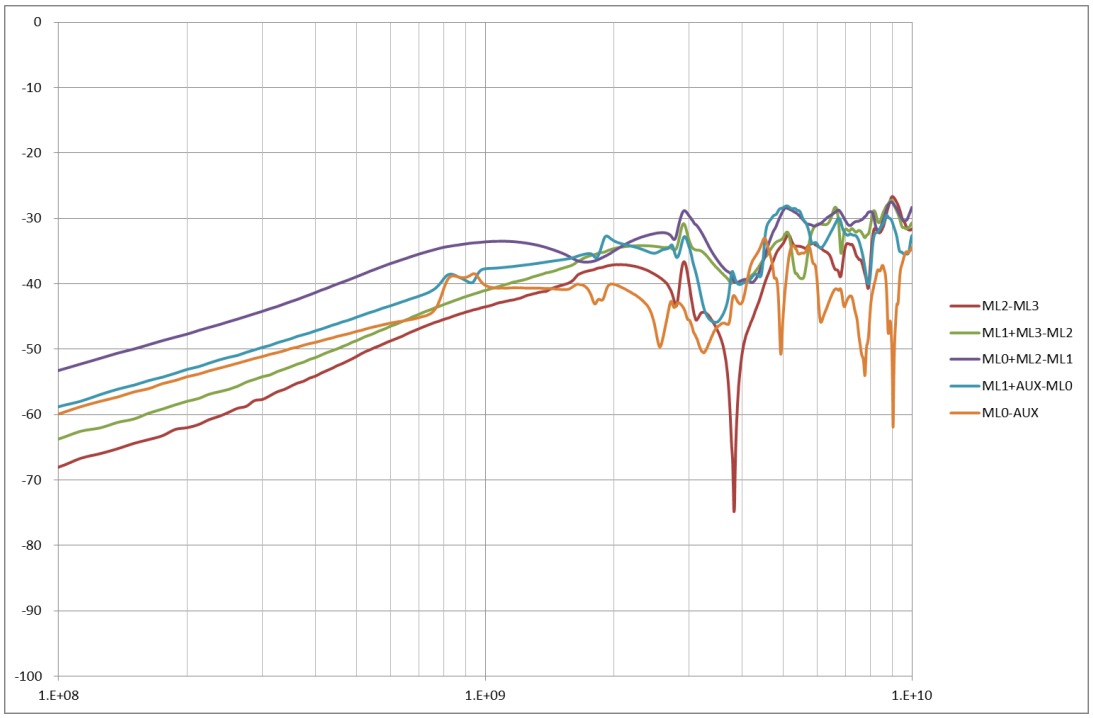

Figure 6-11. FEXT

6-1-4. Near-End Crosstalk

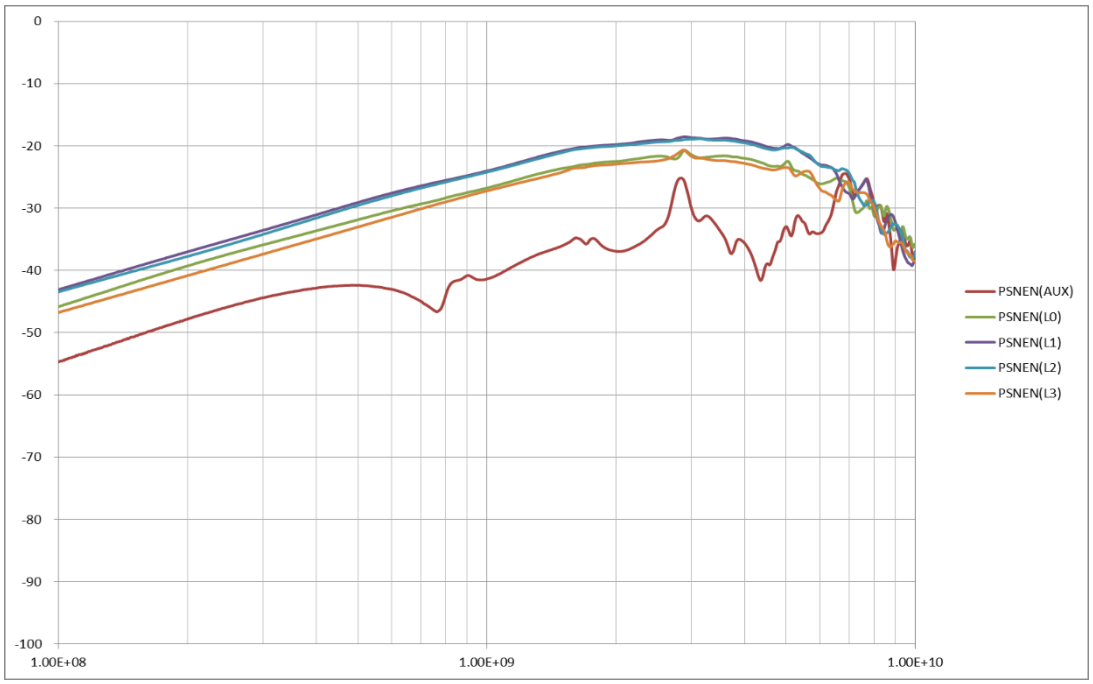

Figure 6-12. NEXT

6-1-5. Insertion Loss

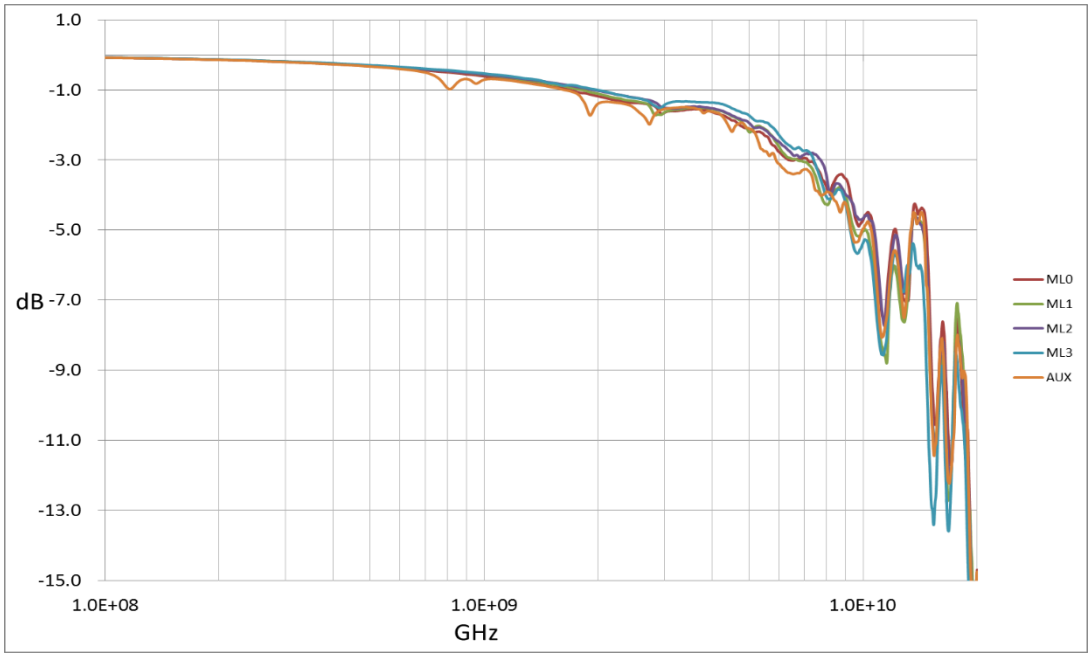

Figure 6-13. Insertion Loss

6-1-6. Return Loss

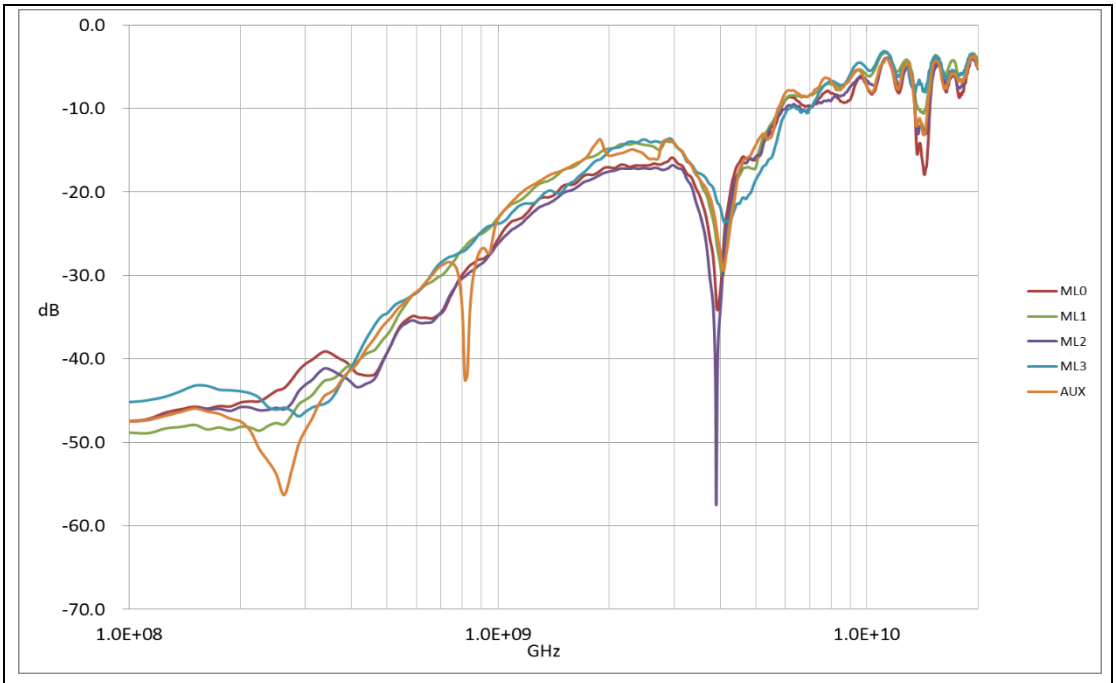

Figure 6-14. Return Loss

6-1-7. Traces Impedance

Test Item		Impedance (Ω)			
DUT / Test Pin		DP 1.2 Plug Test Fixture			
Pair	Pin	Max	Min	Δ	Remark
AUX	P-Pair	48.67	48.00	0.67	Refer to Fig. 6-15
	N-Pair	48.84	48.14	0.70	Refer to Fig. 6-16
ML0	P-Pair	49.28	48.73	0.55	Refer to Fig. 6-17
	N-Pair	49.44	48.82	0.62	Refer to Fig. 6-18
ML1	P-Pair	49.16	48.36	0.80	Refer to Fig. 6-19
	N-Pair	49.25	48.71	0.54	Refer to Fig. 6-20
ML2	P-Pair	49.25	48.77	0.48	Refer to Fig. 6-21
	N-Pair	49.33	48.55	0.78	Refer to Fig. 6-22
ML3	P-Pair	49.12	48.46	0.66	Refer to Fig. 6-23
	N-Pair	49.09	48.15	0.94	Refer to Fig. 6-24

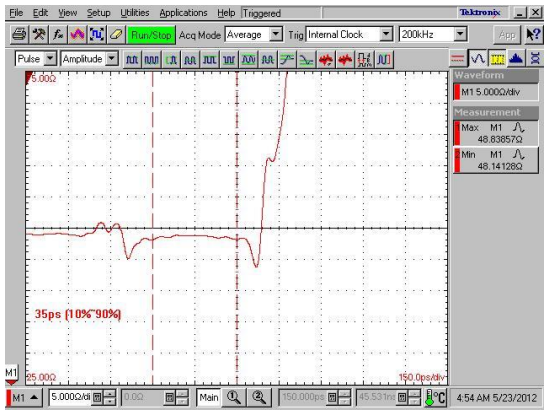

Figure 6-15. AUX P-Pair

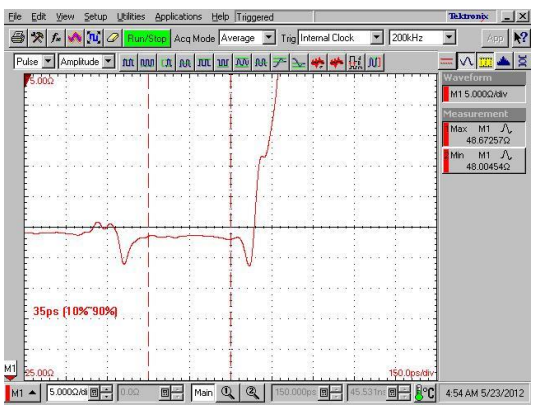

Figure 6-16. AUX N-Pair

Figure 6-17. ML0 P-Pair

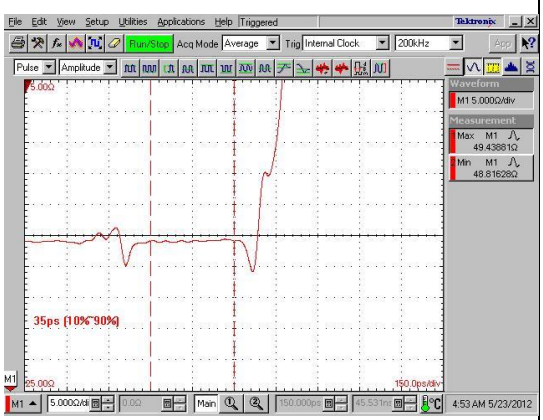

Figure 6-18. ML0 N-Pair

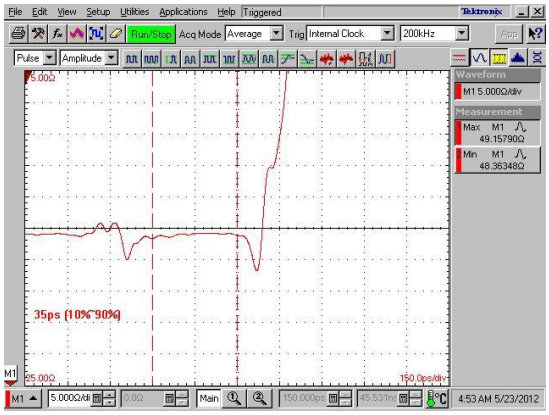

Figure 6-19. ML1 P-Pair

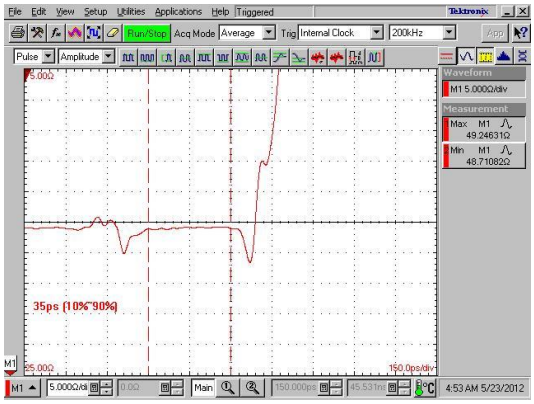

Figure 6-20. ML1 N-Pair

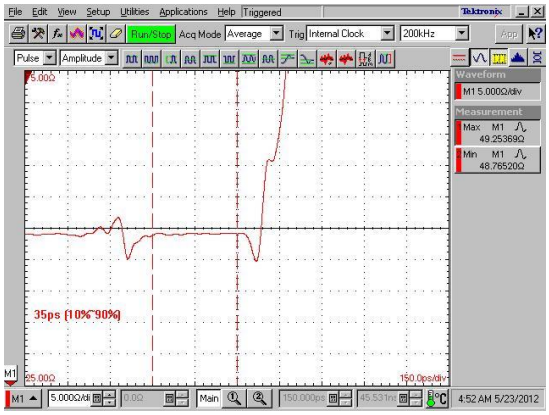

Figure. 6-21. ML2 P-Pair

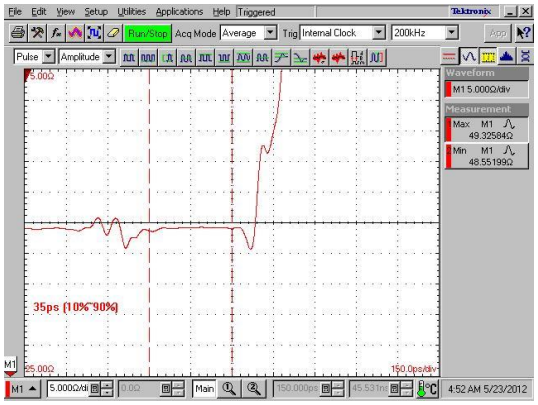

Figure. 6-22. ML2 N-Pair

Figure 6-23. NL3 P-Pair

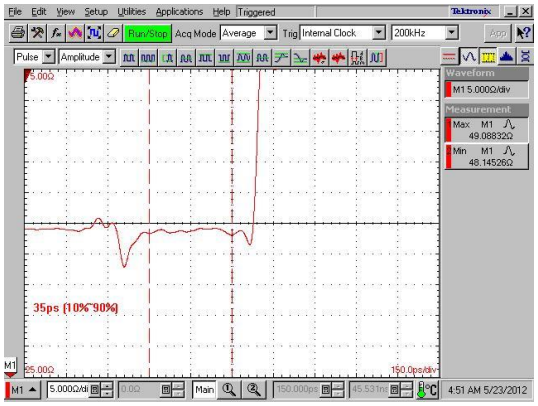

Figure 6-24. ML3 N-Pair

6-1-8. Differential Impedance

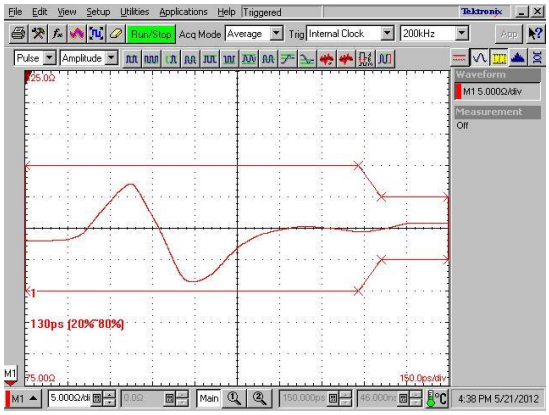

Figure 6-25. AUX Pair

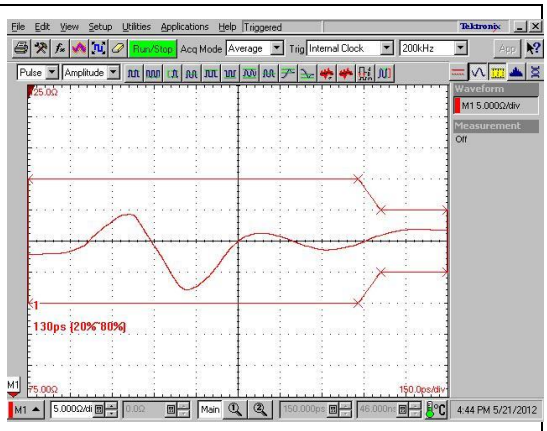

Figure 6-26. ML0 Pair

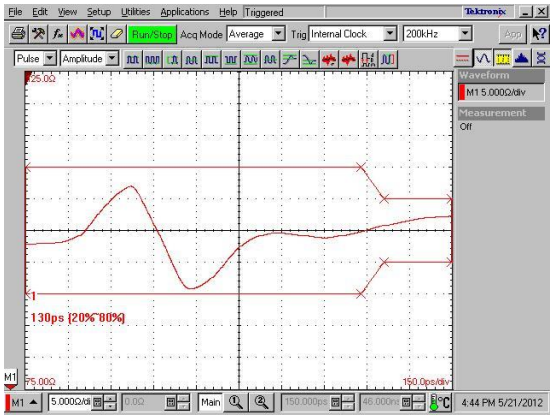

Figure 6-27. ML1 Pair

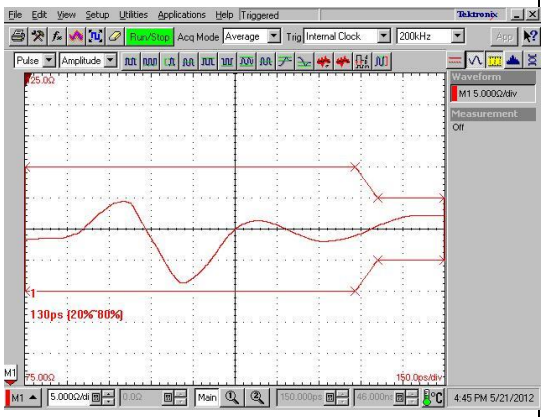

Figure 6-28. ML2 Pair

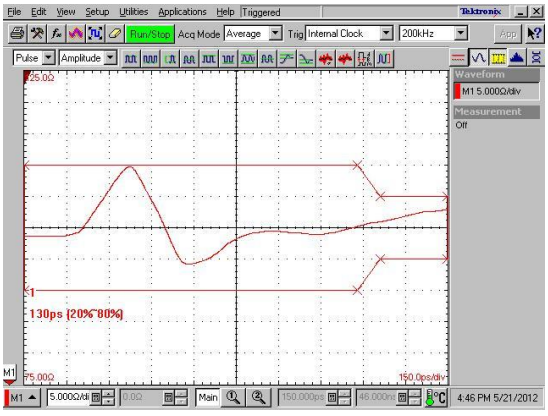

Figure 6-29. ML3 Pair

6-2. DP 1.2 1X,2X and SOL Calibration Board

6-2-1. Eye Diagram

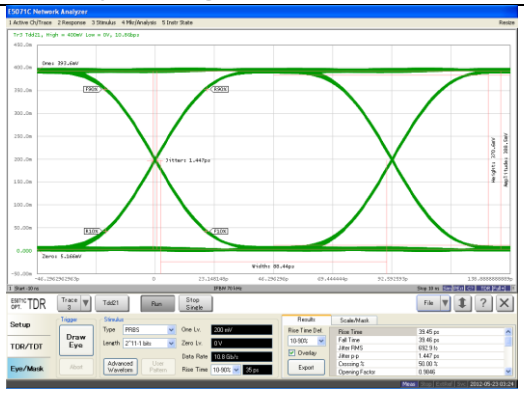

Figure 6-30. 1X Pair

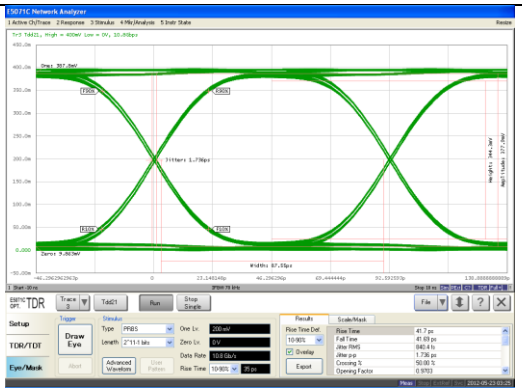

Figure 6-31. 2X Pair

6-2-2. Insertion Loss

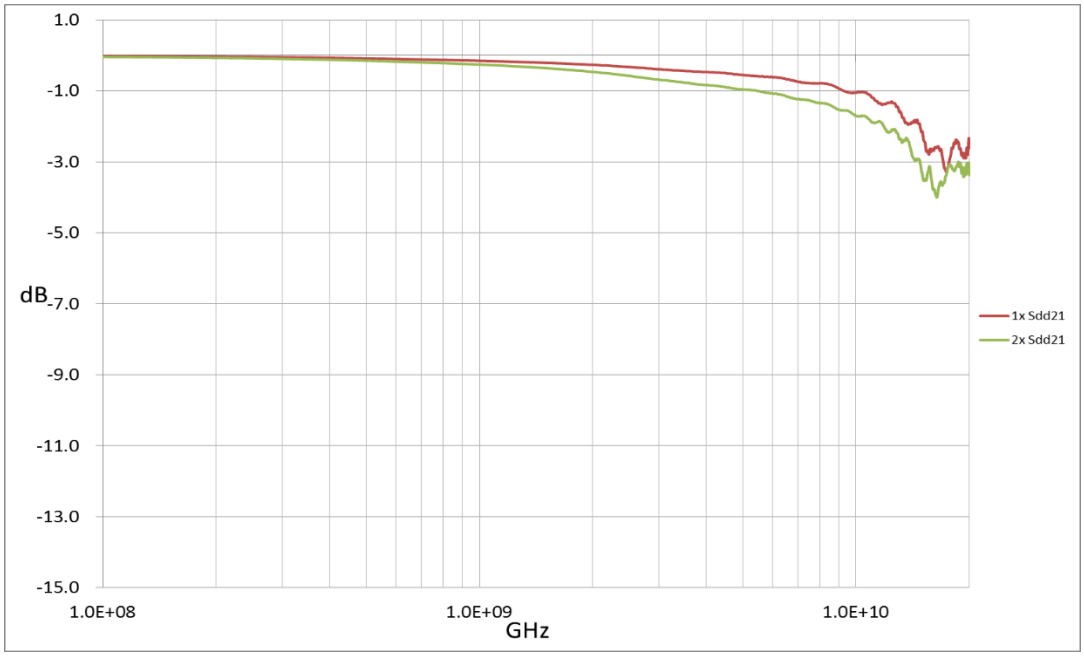

Figure 6-32. Insertion Loss

6-2-3. Return Loss

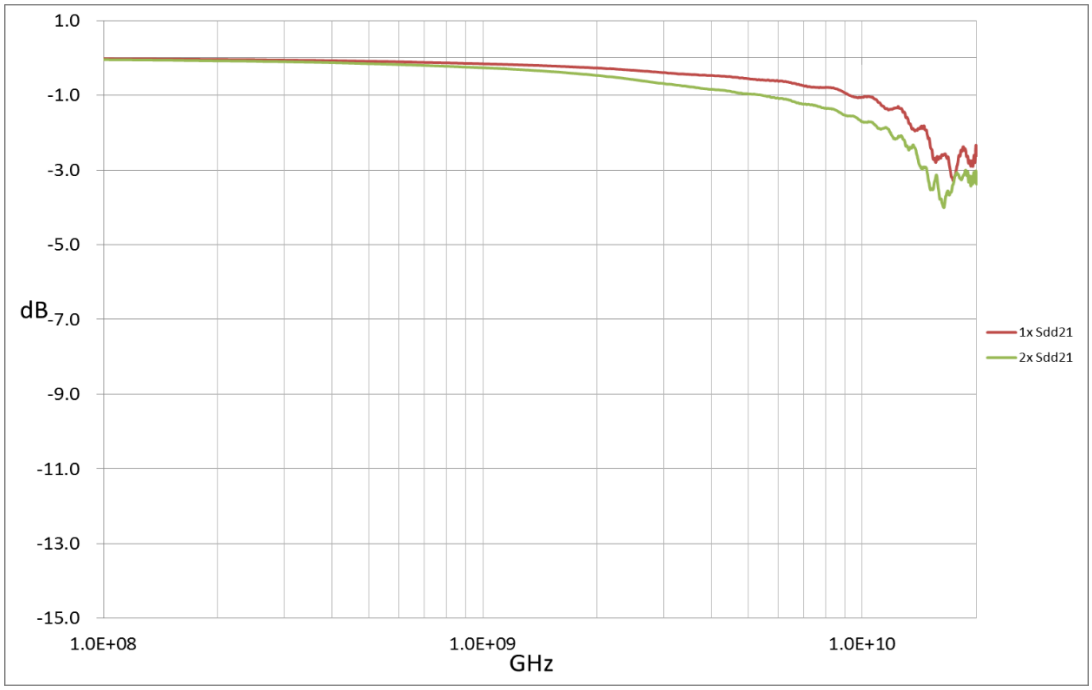

Figure 6-33. Return Loss

6-2-4. Traces Impedance

Test Item		Impedance (Ω)			
DUT / Test Pin		DP 1.2 1X,2X and SOL Calibration Board			
Pair	Pin	Max	Min	Δ	Remark
1X	1	49.06	48.45	0.61	Refer to Fig. 6-34
	2	49.18	48.43	0.73	Refer to Fig. 6-35
2X	1	49.58	48.58	1.00	Refer to Fig. 6-36
	2	49.60	48.45	1.15	Refer to Fig. 6-37
Short	1	48.86	48.25	0.61	Refer to Fig. 6-38
	2	48.79	47.96	0.83	Refer to Fig. 6-39
Open	1	49.54	48.71	0.79	Refer to Fig. 6-40
	2	49.50	48.75	0.75	Refer to Fig. 6-41
Load	1	49.13	48.83	0.30	Refer to Fig. 6-42
	2	49.19	48.52	0.67	Refer to Fig. 6-43

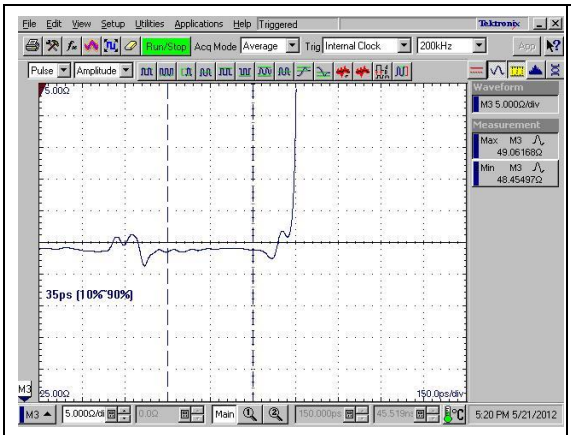

Figure 6-34. 1X _1 Pair

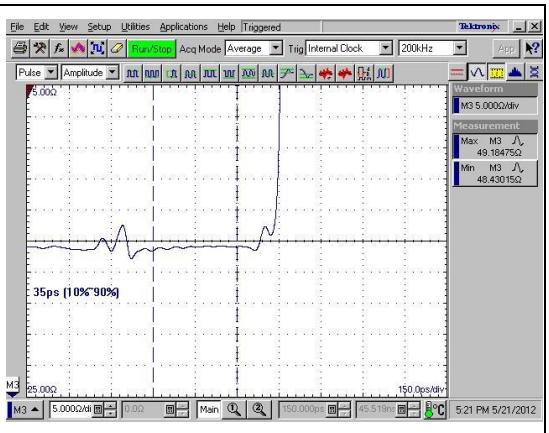

Figure 6-35. 1X _2 Pair

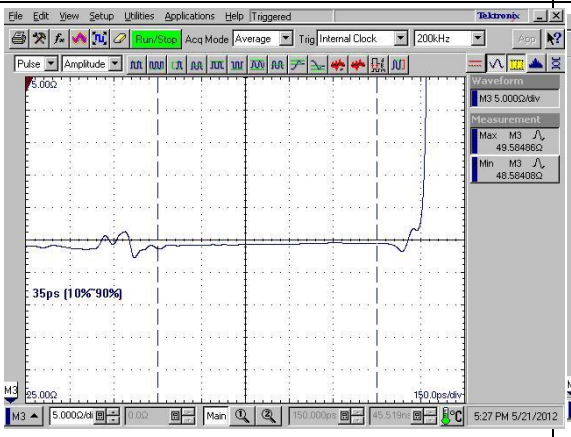

Figure 6-36. 2X _1 Pair

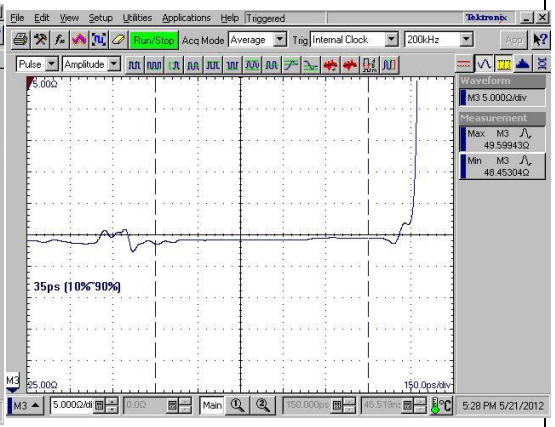

Figure 6-37. 2X _2 Pair

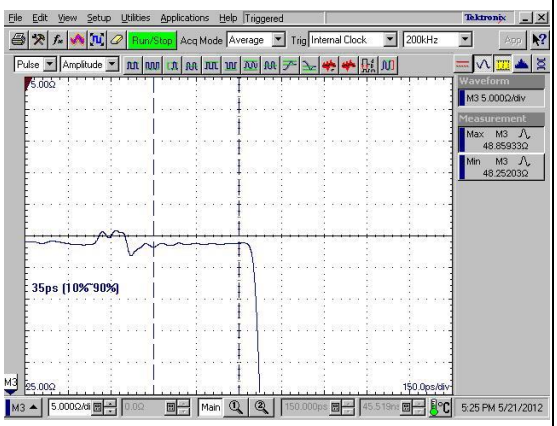

Figure 6-38. Short _1 Pair

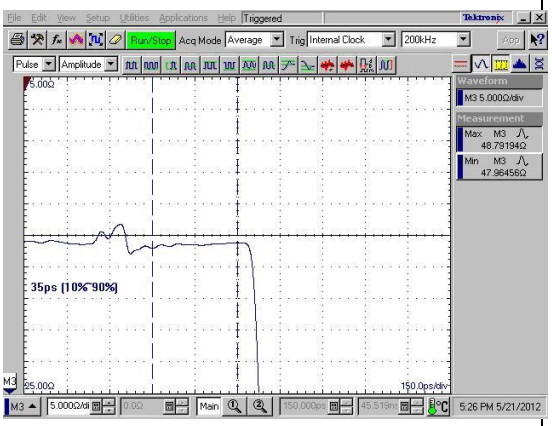

Figure 6-39. Short _2 Pair

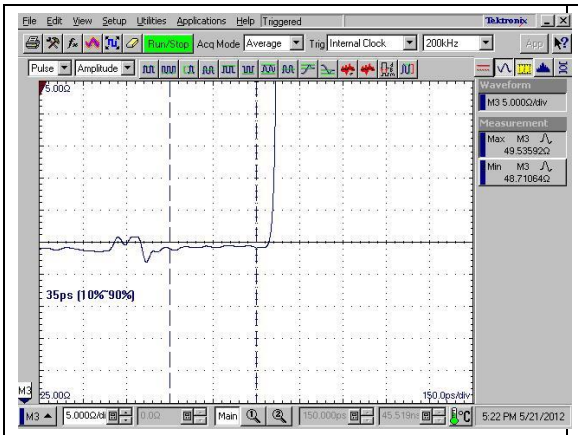

Figure 6-40. Open_1 Pair

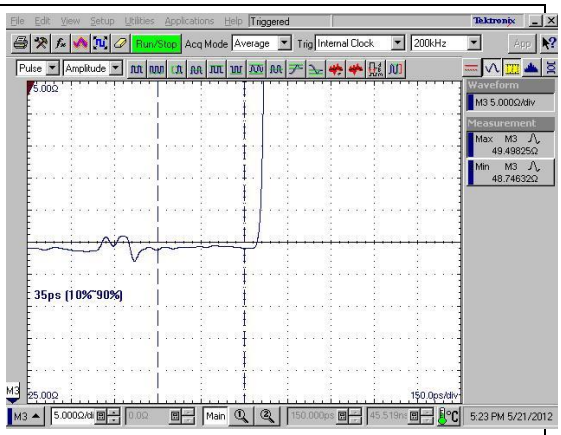

Figure 6-41. Open_2 Pair

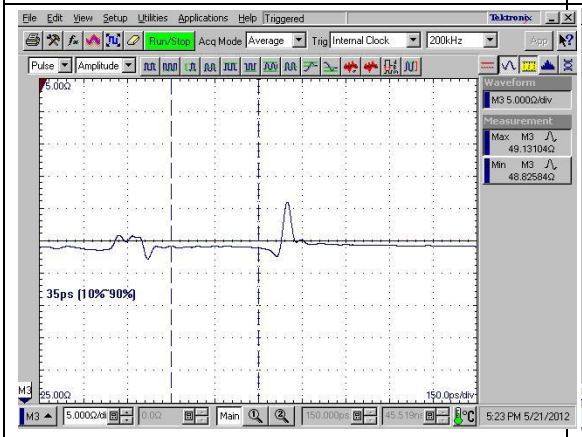

Figure 6-42. Load _1 Pair

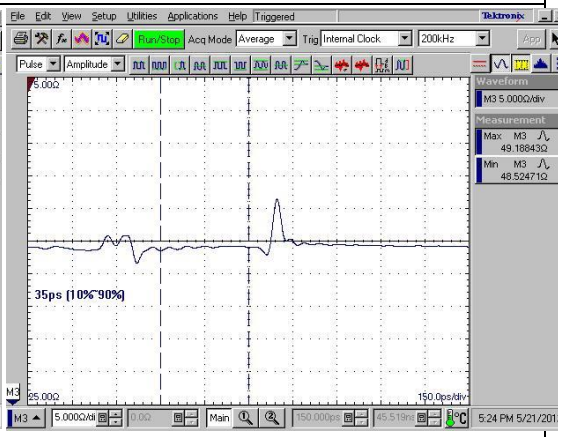

Figure 6-43. Load _2 Pair

6-2-5. Differential Impedance

Test Item	Impedance (Ω)			
DUT / Test Pin	DP 1.2 1X,2X and SOL Calibration Board			
Pair	Max	Min	Δ	Remark
1X	98.46	97.52	0.94	Refer to Fig. 6-44
2X	99.42	98.26	1.16	Refer to Fig. 6-45

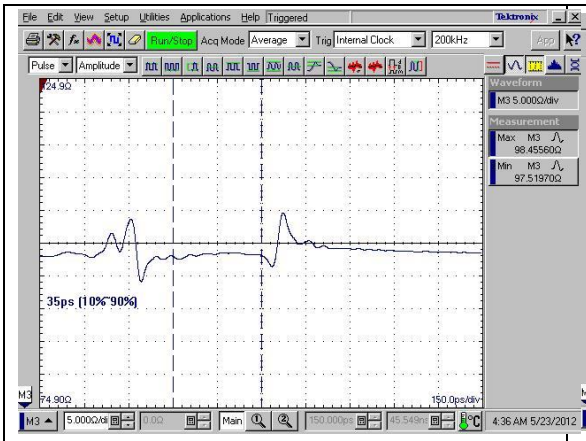

Figure 6-44. 1X Pair

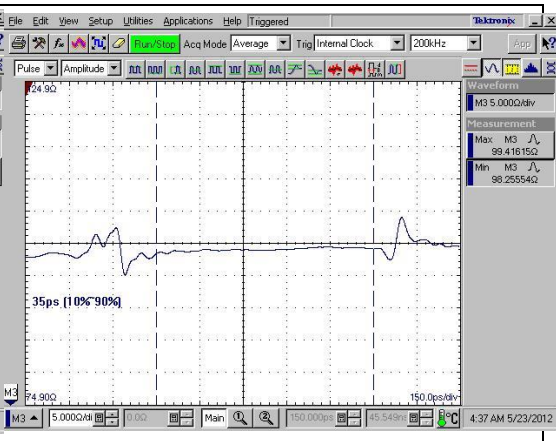

Figure 6-45. 2X Pair

7. 參考資料

7-1. Keysight

(MOI) for DisplayPort1.2b Cable-Connector Assembly Compliance Test
https://www.keysight.com/upload/cmc_upload/All/ENA-TDR_DisplayPort_MOI_rev3.01.pdf