



ChipConnect Cable Assembly Design Qualification Test Report

1. INTRODUCTION

1.1 Purpose

The purpose of this testing was qualify the TE ChipConnect Cable Assembly against the performance requirements described in the Intel® Internal Faceplate-to-Processor cable assembly specification. Testing was conducted by Intel unless otherwise noted.

1.2 Scope

Qualification was performed using TE 439mm Cable Assembly p/n 2821724-5, Rev 1, using 30AWG 023B2LF023 Rev 1 cable for temperature related stresses and TE 318mm Cable Assembly p/n 2821724-3, Rev 1, using 30AWG 023B2LF007 Rev 3 cable for mechanical related stresses. All shorter length cable assemblies using 30AWG 023B2LF023 cable with similar termination techniques (including LEC54A, LEC54B, and IFP Plug) are qualified by association. Qualification of longer length cables of the same construction may be performed at a later date.

1.3 Conclusion

All cables used in Test Groups 0-10G passed the qualification requirements.

1.4 Test Specimens

Refer to Table 1 for the allocation and attributes of submitted test specimens.

Table 1 – Test Specimens

| Test Set | Qty | Part Number | Test Specimen Attributes |
|----------|-----|------------------|--|
| 0 | 12 | 2821724-3 | ChipConnect Cable Assembly, 1 port, Type B, LE 318mm w/ 30AWG 023B2LF007 Rev 3 cable |
| 1 | 12 | 2821724-5 | ChipConnect Cable Assembly, 1 port, Type B, LE 439mm w/ 30AWG 023B2LF023 Rev 1 cable |
| 2 | 12 | 2821724-5 | ChipConnect Cable Assembly, 1 port, Type B, LE 439mm w/ 30AWG 023B2LF023 Rev 1 cable |
| 4a | 12 | 2821724-3 | ChipConnect Cable Assembly, 1 port, Type B, LE 318mm w/ 30AWG 023B2LF007 Rev 3 cable |
| 4c | 12 | 2821724-3 | ChipConnect Cable Assembly, 1 port, Type B, LE 318mm w/ 30AWG 023B2LF007 Rev 3 cable |
| 5 | 3 | 2288023-1, Rev 7 | PCB, Direct Attach, 85 ohm 30awg |
| 7 | 12 | 2821724-5 | ChipConnect Cable Assembly, 1 port, Type B, LE 439mm w/ 30AWG 023B2LF023 Rev 1 cable |
| 8b | 12 | 2821724-3 | ChipConnect Cable Assembly, 1 port, Type B, LE 318mm w/ 30AWG 023B2LF007 Rev 3 cable |



| | | | |
|----|----|-----------|--|
| 9 | 12 | 2821724-3 | ChipConnect Cable Assembly, 1 port, Type B, LE 318mm w/ 30AWG 023B2LF007 Rev 3 cable |
| 10 | 12 | 2821724-3 | ChipConnect Cable Assembly, 1 port, Type B, LE 318mm w/ 30AWG 023B2LF007 Rev 3 cable |

1.5 Test Sequence

The specimens listed in Table 1 were subjected to testing as outlined in Table 2.

Table 2 – Testing Sequence

| TEST OR EXAMINATION | TEST GROUP (a) | | | | | | | |
|------------------------------|-------------------|--------|--------|--------|--------|-----|--------------|--|
| | 0 | 1 | 2 | 4a | 4c | 5 | 7 | |
| | TEST SEQUENCE (b) | | | | | | | |
| Precondition 4x | | 1 | 1 | 1 | 1 | 1 | 1 | |
| HSIO Test (Freq Domain) | 1,7 | 2,7,11 | 2,7,11 | 2,8,12 | 2,8,12 | | 2,7,11,15,19 | |
| HSIO Test (Time Domain) | 2,8 | 3,8,12 | 3,8,12 | 3,9,13 | 3,9,13 | | 3,8,12,16,20 | |
| Low Level Contact Resistance | 3,6 | 4,6,10 | 4,6,10 | 4,7,11 | 4,7,11 | | 4,6,10,14,18 | |
| Visual Inspection | 5 | | | 6 | 6 | 2,4 | | |
| Durability | 4 | | | | | | | |
| Temperature Life | | 5 | | | | | | |
| Reseat (c) | | 9 | 9 | 10 | 10 | | 9,17 | |
| Temperature Cycle | | | 5 | | | | | |
| Bend Radius | | | | | | | 5(a) | |
| Temp-Humidity | | | | | | | 13 | |
| Unpackaged Vibration | | | | 5 | | | | |
| Unpackaged Shock | | | | | 5 | | | |
| Porosity | | | | | | 3 | | |
| Static Pull – Type 1 | | | | | | | | |
| Static Pull – Type 3 | | | | | | | | |
| Cable Agitation | | | | | | | | |
| Strain Relief | | | | | | | | |
| Final examination of product | 9 | 13 | 13 | 14 | 14 | | 21 | |



NOTE

- (a) Maintain cable in bent condition for the remainder of the test sequence
- (b) Numbers indicate sequence in which tests are performed.
- (c) Only required if initial post stress fails LLCR
- (d) LEC
- (e) IFP Plug

| TEST OR EXAMINATION | TEST GROUP (a) | | | | | | | |
|------------------------------|-------------------|--------|--------------|--|--|--|--|--|
| | 8b | 9 | 10 | | | | | |
| | TEST SEQUENCE (b) | | | | | | | |
| Precondition 4x | 1 | 1 | 1 | | | | | |
| HSIO Test (Freq Domain) | 2,7,11,15,19 | 2,8,12 | 2,7,11,15,19 | | | | | |
| HSIO Test (Freq Domain) | 3,8,12,16,20 | 3,9,13 | 3,8,12,16,20 | | | | | |
| Low Level Contact Resistance | 4,6,10,14,18 | 4,7,11 | 4,6,10,14,18 | | | | | |
| Visual Inspection | | 6 | | | | | | |
| Durability | | | | | | | | |
| Temperature Life | | | | | | | | |
| Reseat (c) | 9,17 | 10 | 9,17 | | | | | |
| Temperature Cycle | | | | | | | | |
| Bend Radius | | | | | | | | |
| Temp-Humidity | | | | | | | | |
| Unpackaged Vibration | | | | | | | | |
| Unpackaged Shock | | | | | | | | |
| Porosity | | | | | | | | |
| Static Pull – Type 1 | 5 | | | | | | | |
| Static Pull – Type 3 | 13 | | | | | | | |
| Cable Agitation | | 5 | | | | | | |
| Strain Relief | | | 5(d),13(e) | | | | | |
| Final examination of product | 21 | 14 | 21 | | | | | |



NOTE

- (a) Maintain cable in bent condition for the remainder of the test sequence
- (b) Numbers indicate sequence in which tests are performed.
- (c) Only required if initial post stress fails LLCR
- (d) LEC
- (e) IFP Plug

1.6 Test Procedure

This test procedure is developed for use with the Aegaeon FAB4 – Enceladus FAB1 and FAB2 – Dione Fab1 board set. The test fixture is designed and built to meet specific criteria described in the Intel® IFP cable measurement procedure. The cable assembly evaluation board set includes:

- Stripline routing on all boards
- Connector/Cable Assembly under test on Aegaeon-Enceladus-Dione board
- Through-Reflect-Load (TRL) calibration kit on Dione board
- Termination of alternate x4 IFP plug on Enceladus-Dione board

A TRL calibration kit is included on the same board that holds the connector used in conjunction with the IFP cable assembly.

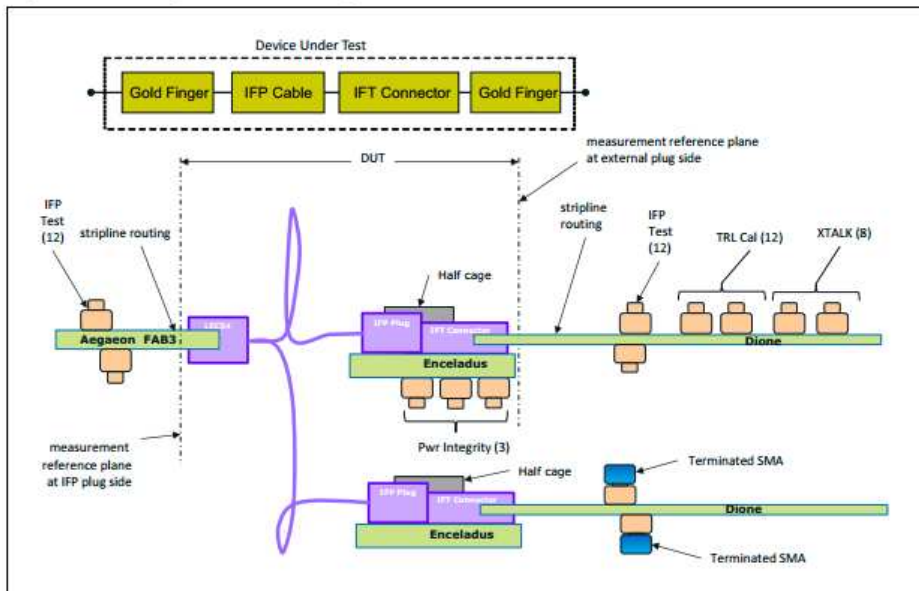


Figure 1 Elements making up IFP cable measurement: Aegaeon gold finger, IFP cable, IFT connector, Dione gold finger (illustration from IFP cable measurement spec, used with Intel permission)

A vector network analyzer setup used to measure S-parameters using an 85 ohm differential reference impedance. Frequency domain measurements are calibrated using TRL. Frequency measurements are processed using Intel® Moon-Miller-Math software.

S-parameter measurements include

Insertion loss

Return loss

TxclCN

RxclCN

Skew

S-parameter measurements are processed using Intel® Moon-Miller-Math software.

A Time Domain Reflectometer is used to measure impedance. Test cables are deskewed prior to measurement. Rise time is calibrated using the Half Through on the Dione board.

Impedance measurements include

LEC54 impedance profile

Raw Cable profile

IFP plug profile

Time domain measurements are processed using Intel® Moon-Miller-Math software.

A low level contact resistance tester is used to measure DC resistance using a Kelvin four point probe method.



2.0 TEST RESULTS SUMMARY

| Test Description | Summary of Requirements | Specification reference | Rcvd/Pass/Fail/Stat | Sample | Results summary | Verification Method | Notes |
|--|-------------------------|-------------------------|---------------------|--------|--|---------------------|--|
| Vendor Documentation | | | | | | | |
| Datasheet | | 405-5453 | Received | | copy of IFP Data Sheet 04-03-17.pdf | | data sheet on the cable |
| Cable Assembly Drawing | | 405-5453 | Received | | C-2821724-S Rev A for Rev 1.0 IFFPA cables, C-2821720-1 Rev A for Rev 1.0 IFFPA cables. | | |
| Raw Wire Drawing inc bend limits | | 405-5453 | Received | | 30 AWG 25G TurboTwinTM Pair | | part # 104-1587 Rev 1 12/15/16 [02382LF023 Spec.pdf] |
| Termination Connectors Drawing | | | Received | | | | |
| Interconnection Compatibility Report | n/a | n/a | | | | | |
| Plating Thickness Report | | 405-5453 | Pass | | | | |
| Porosity Test Report | | 405-5453 | Pass | | | | |
| Electrical Characteristics Report (excel table of HSIO, LLCR characteristics) | | 405-5453 | Received | | | | |
| Mechanical Characteristics Report (insertion/extraction force report) | | 405-5453 | Received | | | | |
| IEC Declaration | | 405-5453 | Complete | | | | |
| GR&R Data | | 405-5453 | Complete | | | | |
| ECN Notification History | n/a | n/a | | | | | |
| Quality Management Plan | | 405-5453 | Received | | | | |
| Production Test Report | | 405-5453 | Pass | | | | |
| Product Reliability Test Report | | 570411 | Pass | | | 567280 | |
| CTF Capability Report | | 405-5453 | Complete | | | | |

2.0 TEST RESULTS SUMMARY(CON'T)

| Test Description | Summary of Requirements | Specification reference | Row/Pass/Fail/Stat | Sample | Results summary | Verification Method | Notes |
|---|-------------------------|-------------------------|--------------------|--------|------------------------|---------------------|-------|
| Vendor Documentation | | | | | | | |
| Pre-stress Electrical Tests | | | | | | | |
| HSIO | | 570411 | Pass | 24 | 439 mm IFPB | 567280 | |
| LLCR | | 570411 | Pass | 24 | 439 mm IFPB | 567280 | |
| Durability Stress Electrical Tests | | | | | | | |
| HSIO | | 570411 | Pass | 6 | 318 mm IFPB | 567280 | |
| LLCR | | 570411 | Pass | 6 | 318 mm IFPB | 567280 | |
| Temperature Life Stress Electrical Tests | | | | | | | |
| HSIO | | 570411 | Pass | 12 | 439 mm IFPB, 240 hr | 567280 | |
| LLCR | | 570411 | Pass | 12 | 439 mm IFPB, 240 hr | 567280 | |
| Temperature-Humidity Stress Electrical Tests | | | | | | | |
| HSIO | | 570411 | Pass | 12 | 439 mm IFPB | 567280 | |
| LLCR | | 570411 | Pass | 12 | 439 IFPB | 567280 | |
| Temperature Cycle Stress Electrical Tests | | | | | | | |
| HSIO | | 570411 | Pass | 12 | 439 mm IFPB, 500 cycle | 567280 | |
| LLCR | | 570411 | Pass | 12 | 439 mm IFPB, 500 cycle | 567280 | |
| Static Pull Electrical Tests | | | | | | | |
| HSIO | | 570411 | Pass | 6 | 318 mm IFPB | 567280 | |
| LLCR | | 570411 | Pass | 6 | 318 mm IFPB | 567280 | |
| Strain Relief Electrical Tests | | | | | | | |
| HSIO | | 570411 | Pass | 6 | 318 mm IFPB | 567280 | |
| LLCR | | 570411 | Pass | 6 | 318 mm IFPB | 567280 | |
| Cable Agitation Electrical Tests | | | | | | | |
| HSIO | | 570411 | Pass | 6 | 318 mm IFPB | 567280 | |
| LLCR | | 570411 | Pass | 6 | 318 mm IFPB | 567280 | |
| Shock Electrical Tests | | | | | | | |
| HSIO | | 570411 | Pass | 6 | 318 mm IFPB | 567280 | |
| LLCR | | 570411 | Pass | 6 | 318 mm IFPB | 567280 | |
| Vibration Electrical Tests | | | | | | | |
| HSIO | | 570411 | Pass | 6 | 318 mm IFPB | 567280 | |
| LLCR | | 570411 | Pass | 6 | 318 mm IFPB | 567280 | |

* Loss measurements are carried out at 25C and the cable operates at 70C

APPENDIX A- MEASURED RESULTS

The measured S-parameter data for insertion loss, return loss, crosstalk and skew are shown below together with the Intel specification limit lines for Intel® IFFA cables.

Figure A-1 318 mm cable Durability Insertion Loss Pre- and Post-stress

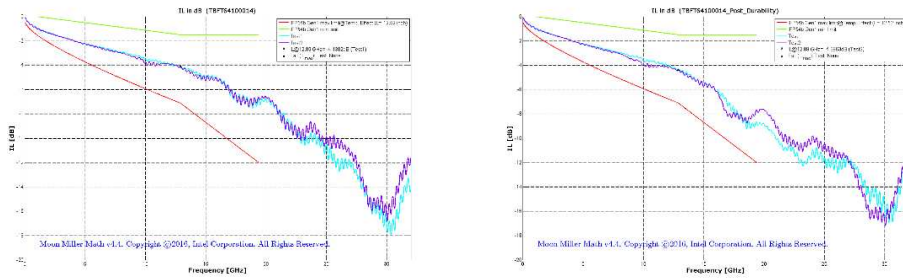


Figure A-2 318 mm Durability Return Loss Pre- and Post-stress

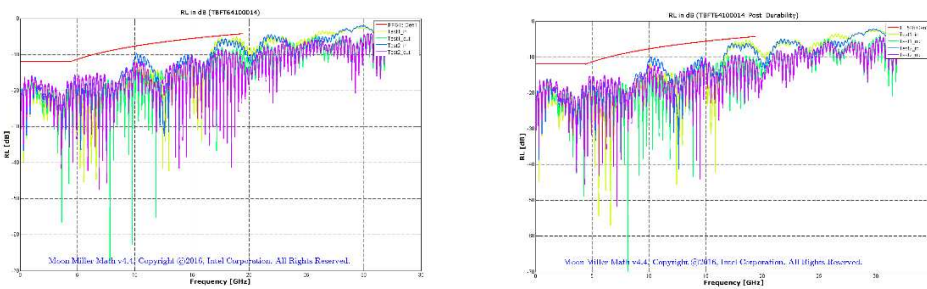


Figure A-3 318 mm Durability Skew Pre- and Post-stress

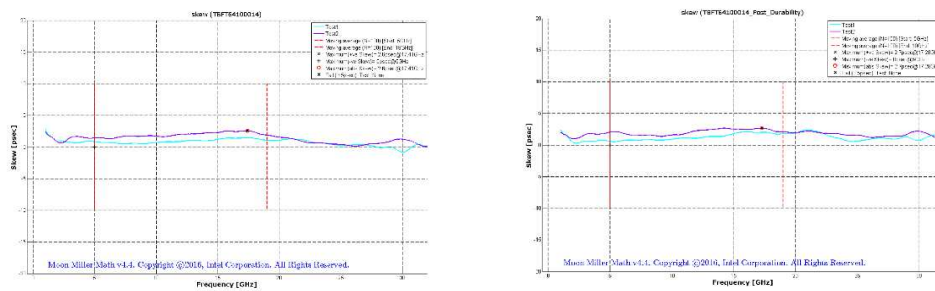


Figure A-4 318 mm Durability TxccICN Pre- and Post-stress

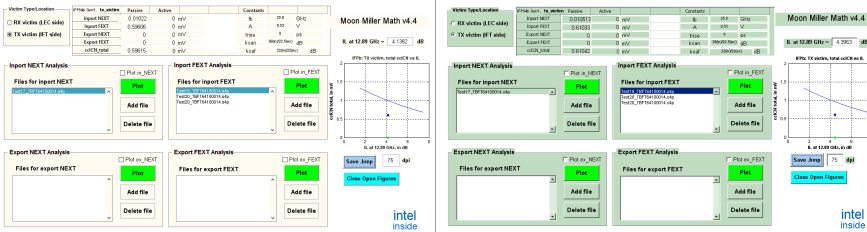


Figure A-5 318 mm Durability RxccICN Pre- and Post-stress

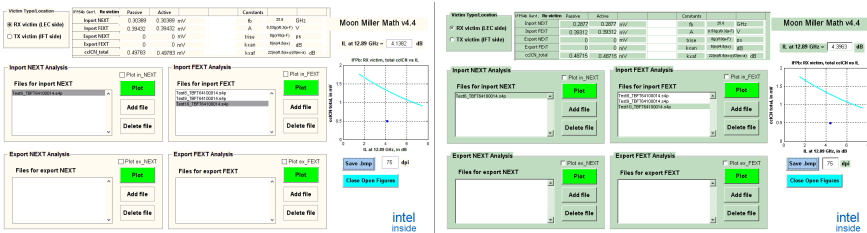


Figure A-6 318 mm Durability LEC Impedance Pre- and Post-stress

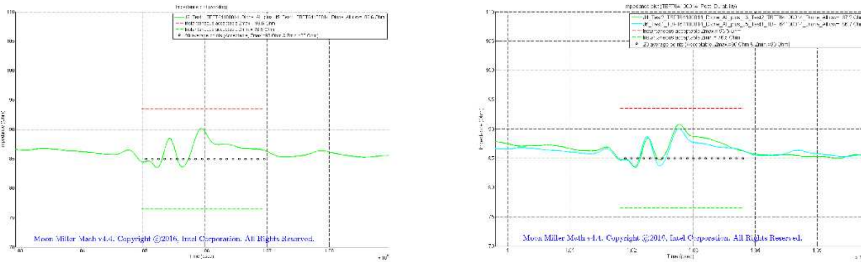


Figure A-7 318 mm Durability Cable Impedance Pre- and Post-Stress

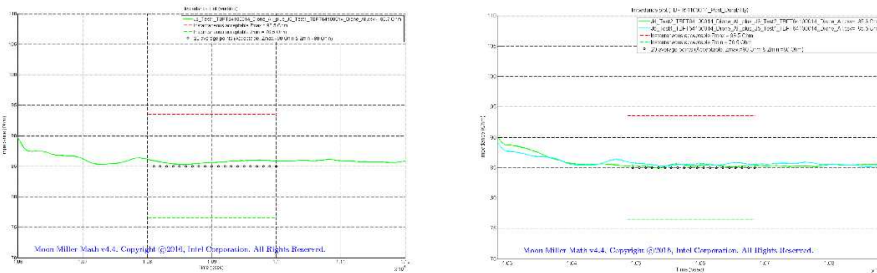


Figure A-8 318 mm Durability IFP Plug Impedance Pre- and Post-stress

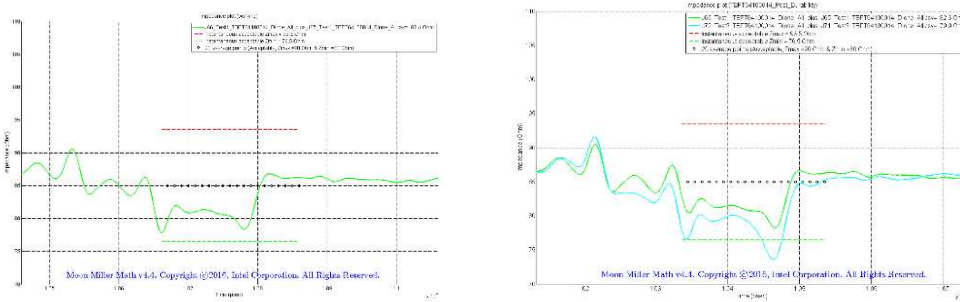


Figure A-9 439 mm cable 240 hr Temp Life Insertion Loss Pre- and Post-stress

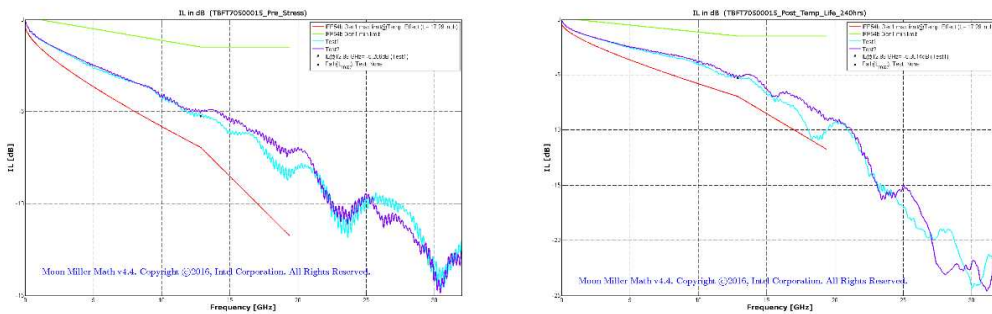


Figure A-10 439 mm cable 240 hr Temp Life Return Loss Pre- and Post-stress

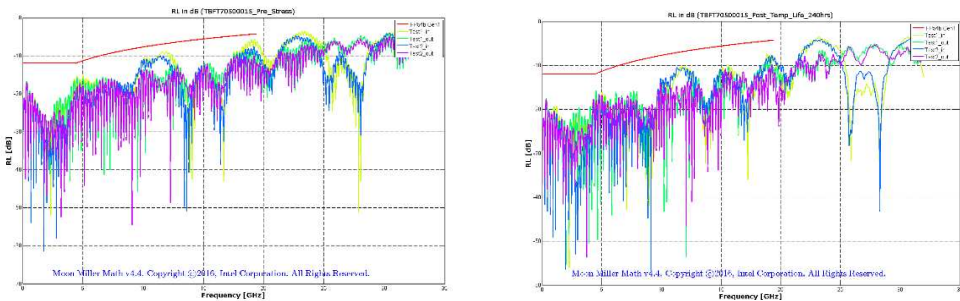


Figure A-11 439 mm cable 240 hr Temp Life Skew Pre- and Post-stress

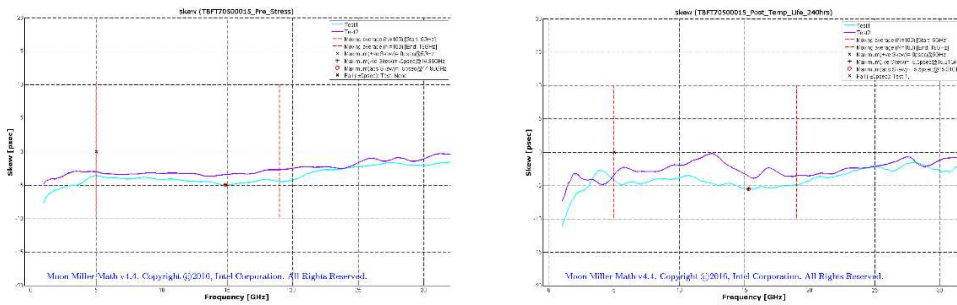


Figure A-12 439 mm 240 hr Temp Life TxccICN Pre- and Post-stress

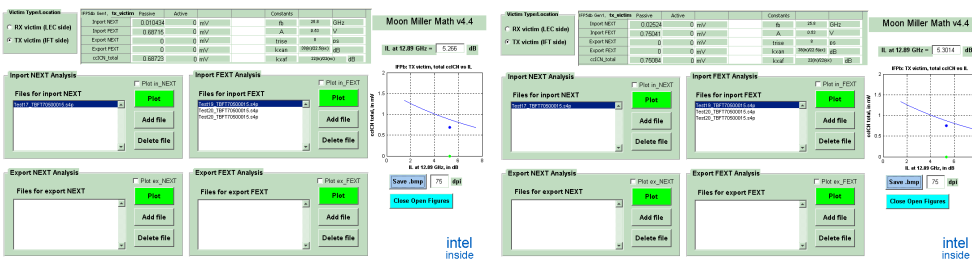


Figure A-13 439 mm 240 hr Temp Life RxccICN Pre- and Post-stress

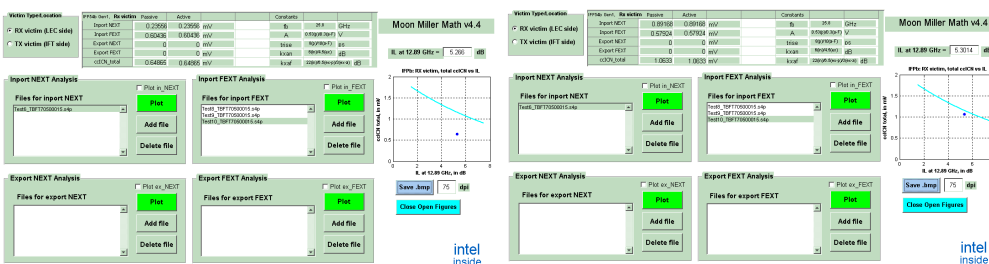


Figure A-14 439 mm 240 hr Temp Life LEC Impedance Pre- and Post-stress

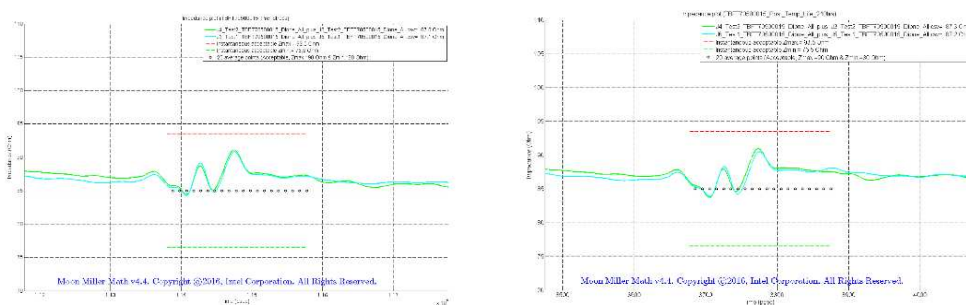


Figure A-15 439 mm 240 hr Temp Life Cable Impedance Pre- and Post-Stress

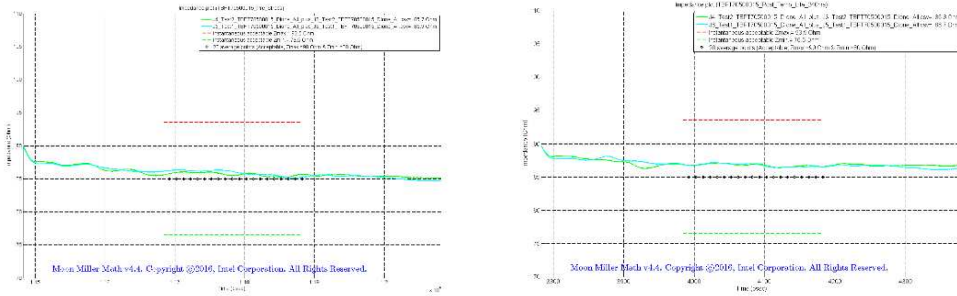


Figure A-16 439 mm 240 hr Temp Life IFP Plug Impedance Pre- and Post-stress

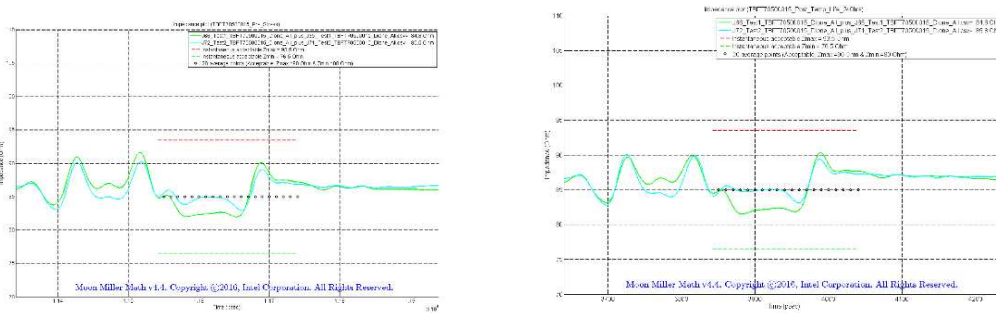


Figure A-17 439 mm cable 500 Temp Cycle Insertion Loss Pre- and Post-stress

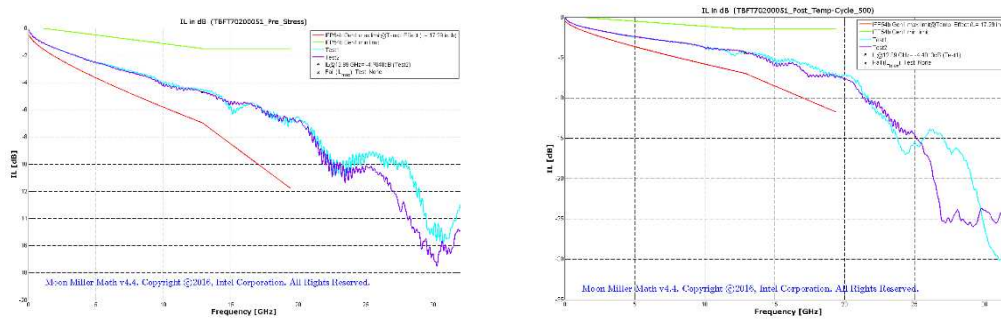


Figure A-18 439 mm cable 500 Temp Cycle Return Loss Pre- and Post-stress

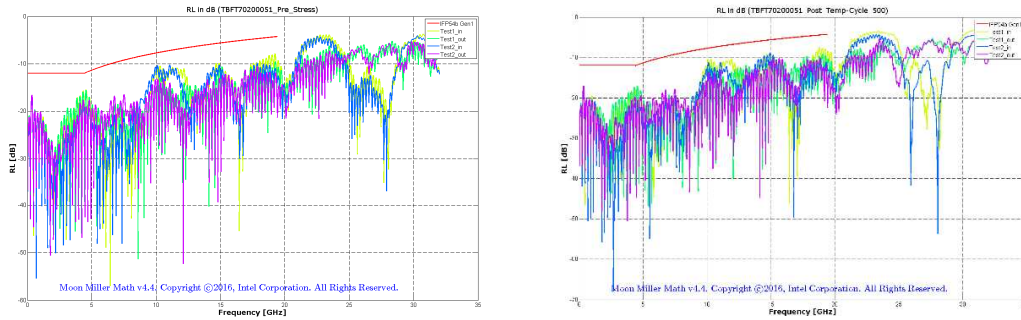


Figure A-19 439 mm cable 500 Temp Cycle Skew Pre- and Post-stress

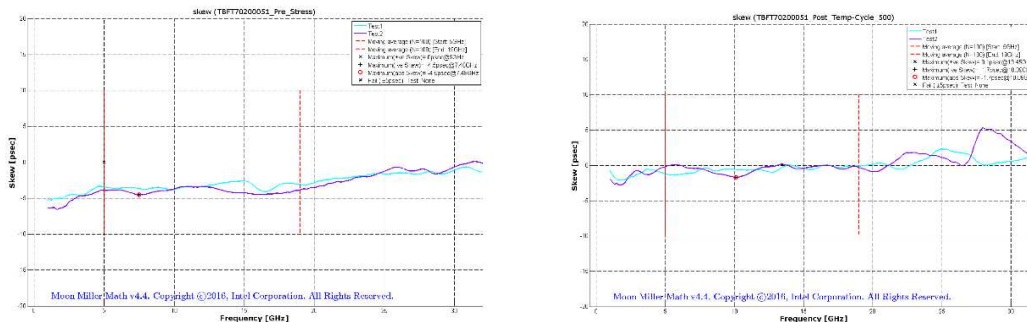


Figure A-20 439 mm 500 Temp Cycle TxccICN Pre- and Post-stress

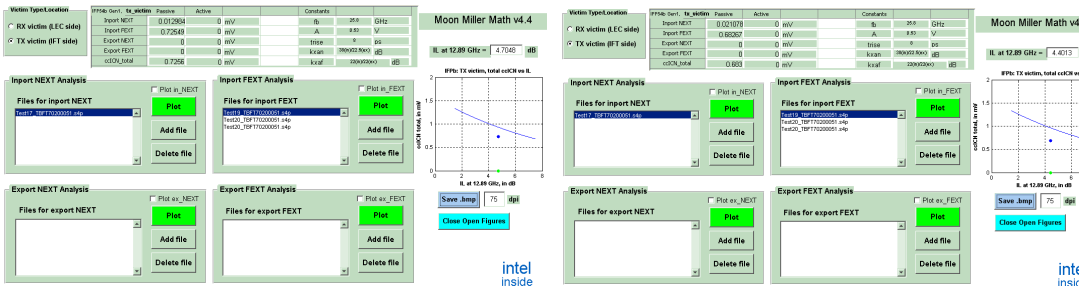


Figure A-21 439 mm 500 Temp Cycle RxccICN Pre- and Post-stress

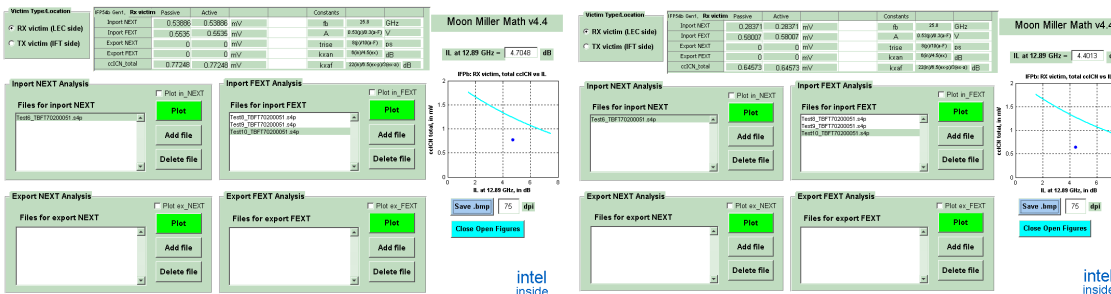


Figure A-22 439 mm 500 Temp Cycle LEC Impedance Pre- and Post-stress

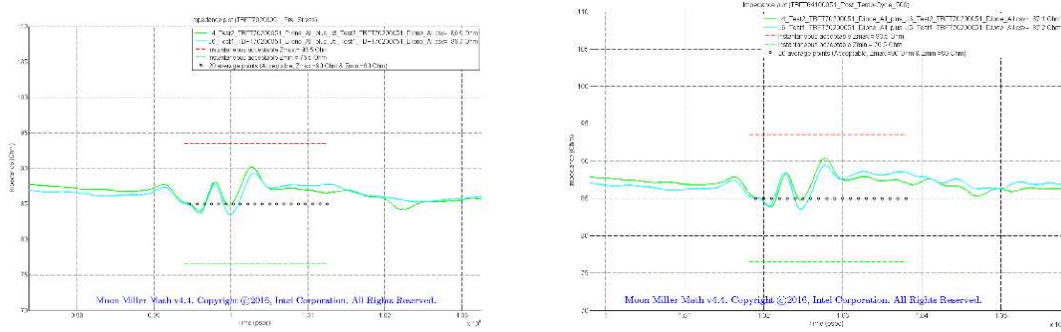


Figure A-23 439 mm 500 Temp Cycle Cable Impedance Pre- and Post-Stress

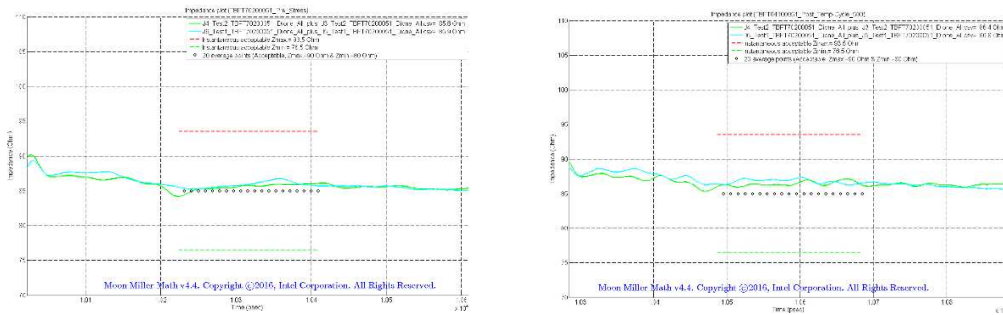


Figure A-24 439 mm 500 Temp Cycle IFP Plug Impedance Pre- and Post-stress

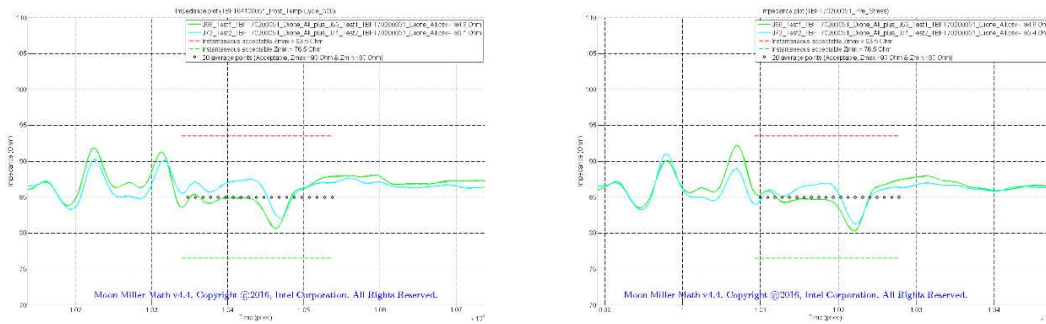


Figure A-25 318 mm cable Vibration Insertion Loss Pre- and Post-stress

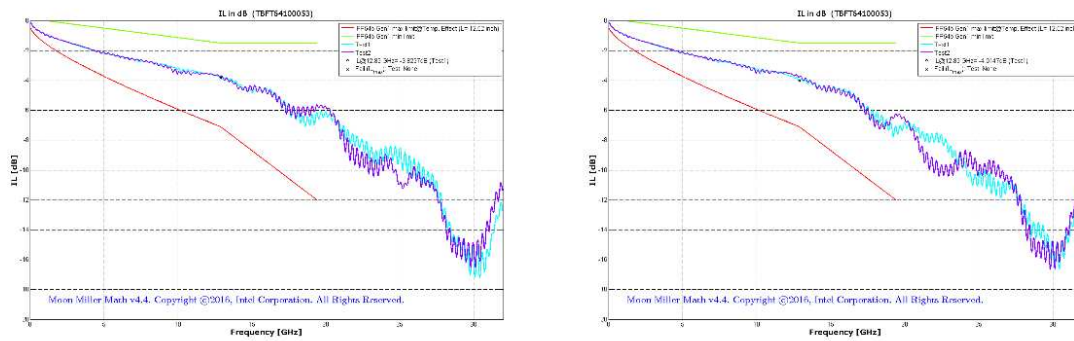


Figure A-26 318 mm cable Vibration Return Loss Pre- and Post-stress

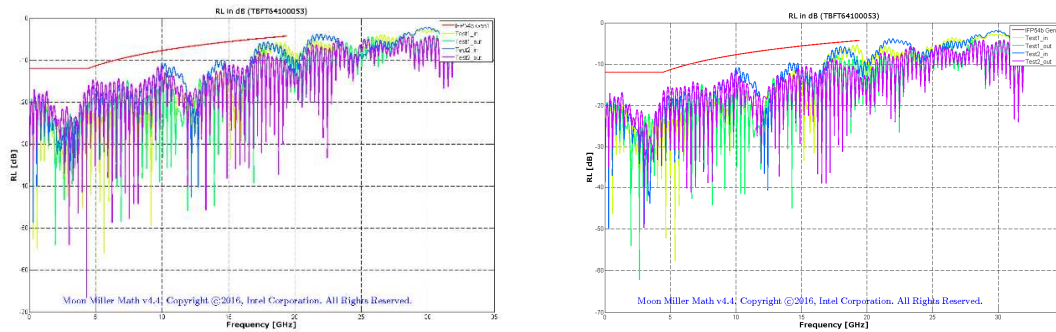


Figure A-27 318 mm cable Vibration Skew Pre- and Post-stress

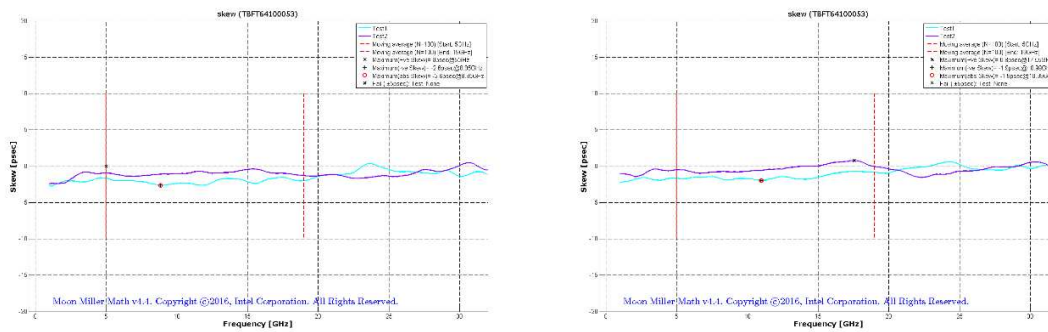


Figure A-28 318 mm Vibration TxccICN Pre- and Post-stress

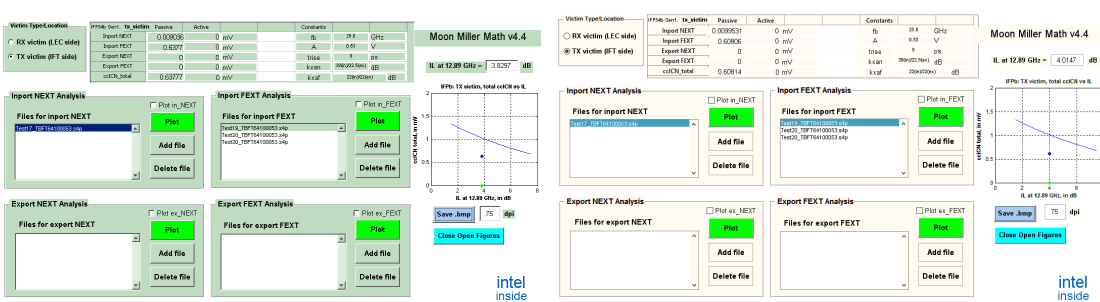


Figure A-29 318 mm Vibration RxccICN Pre- and Post-stress

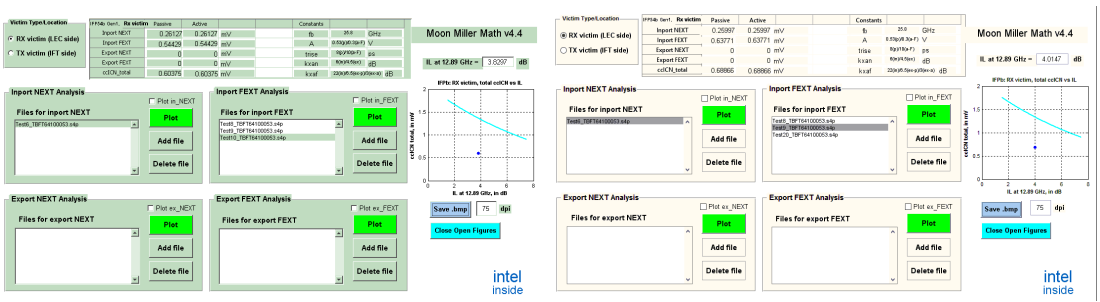


Figure A-30 318 mm Vibration LEC Impedance Pre- and Post-stress

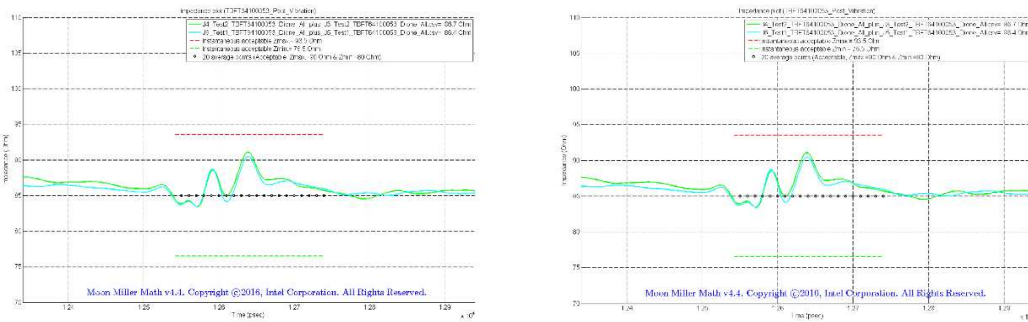


Figure A-31 318 mm Vibration Cable Impedance Pre- and Post-Stress

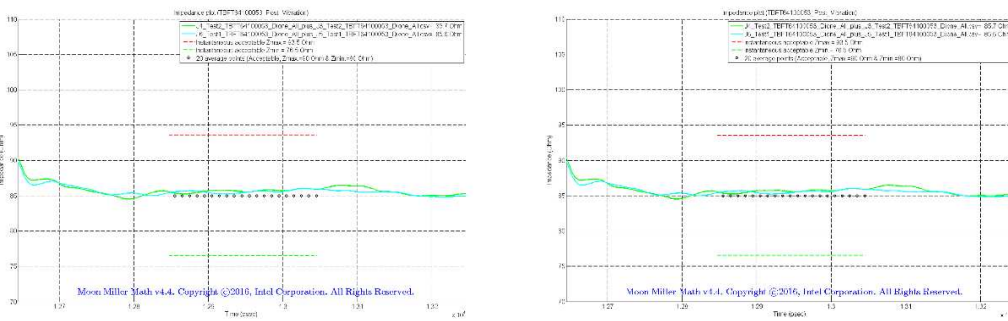


Figure A-32 318 mm Vibration IFP Plug Impedance Pre- and Post-stress

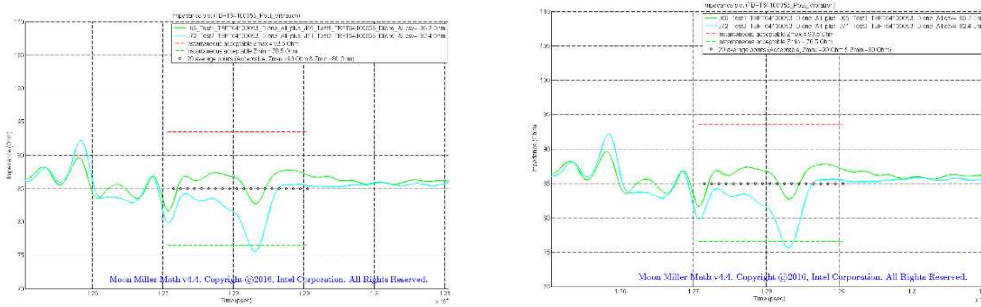


Figure A-33 318 mm Shock Insertion Loss Pre- and Post-stress

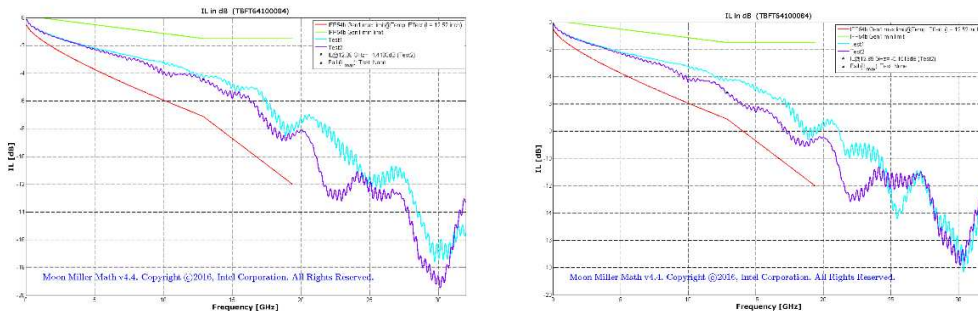


Figure A-34 318 mm Shock Return Loss Pre- and Post-stress

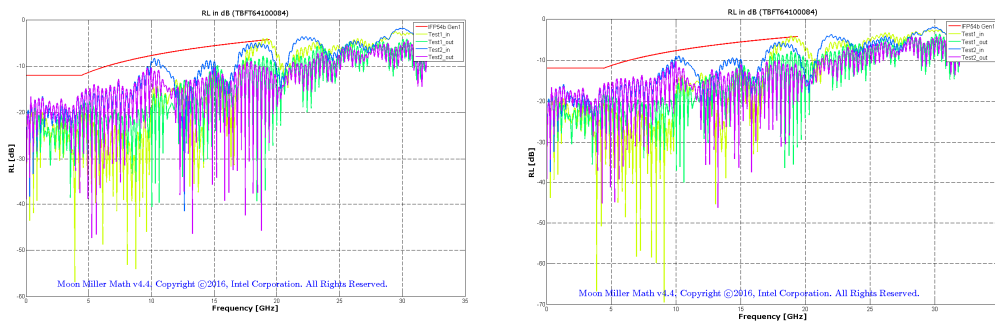


Figure A-35 318 mm Shock Skew Pre- and Post-stress

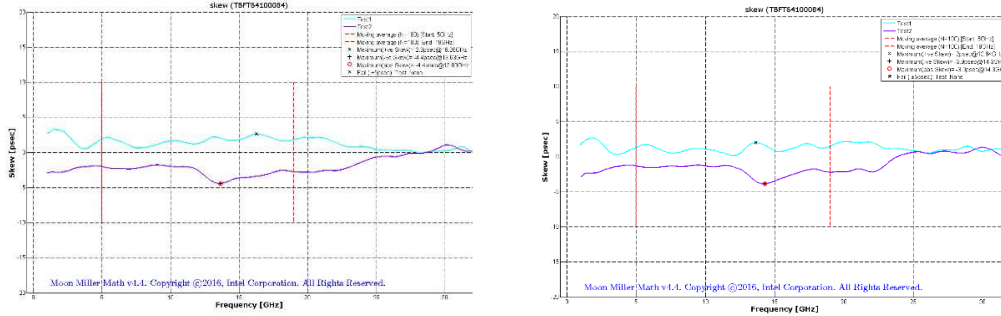


Figure A-36 318 mm Shock TxccICN Pre- and Post-stress

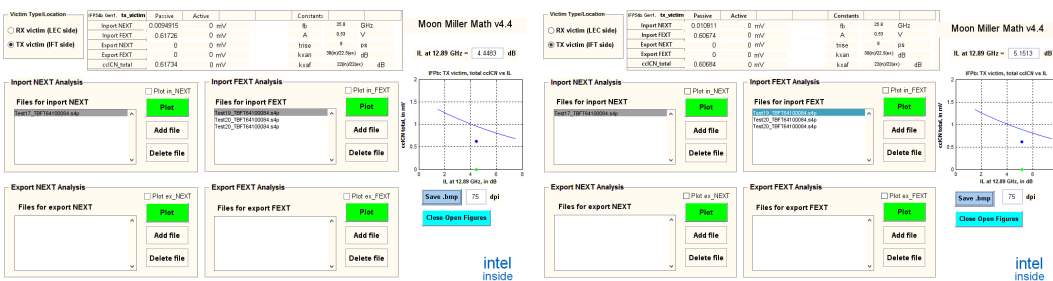


Figure A-37 318 mm Shock RxcICN Pre- and Post-stress

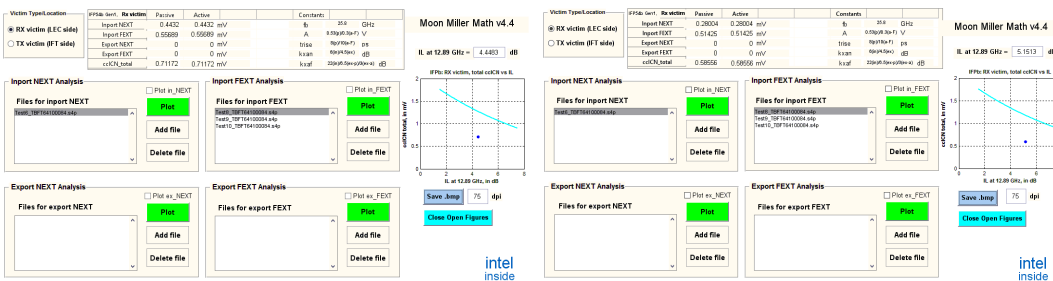


Figure A-38 318 mm Shock LEC Impedance Pre- and Post-stress

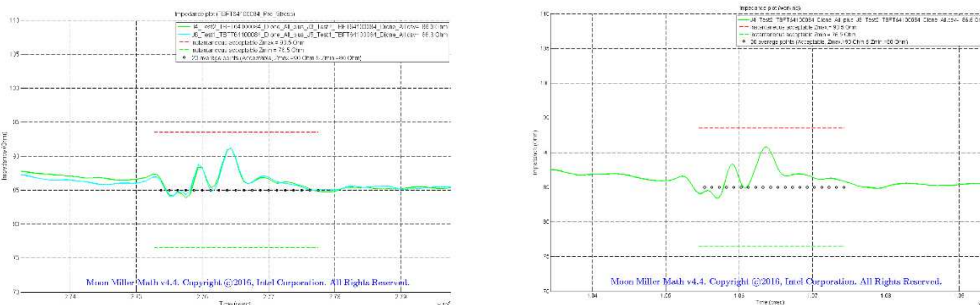


Figure A-39 318 mm Shock Cable Impedance Pre- and Post-Stress

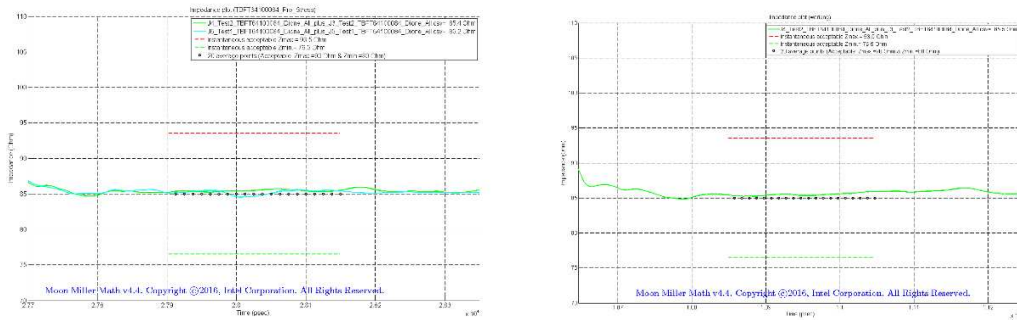


Figure A-40 318 mm Shock IFP Plug Impedance Pre- and Post-stress

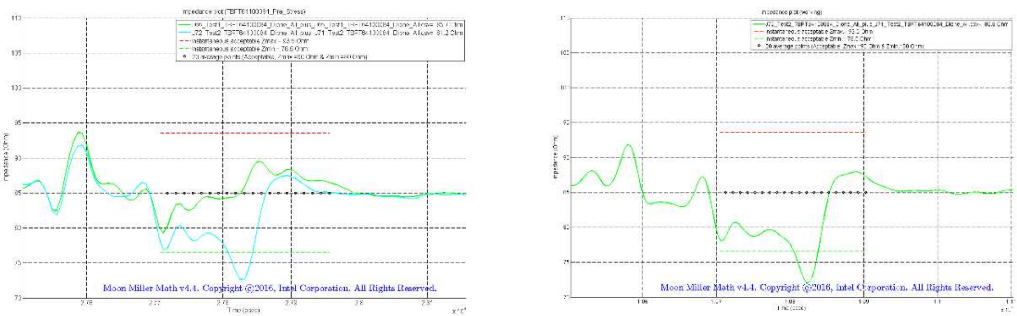


Figure A-41 439 mm Bend+464 hr 77°C/60%RH Temp-Humidity Insertion Loss Pre-, Post-stress

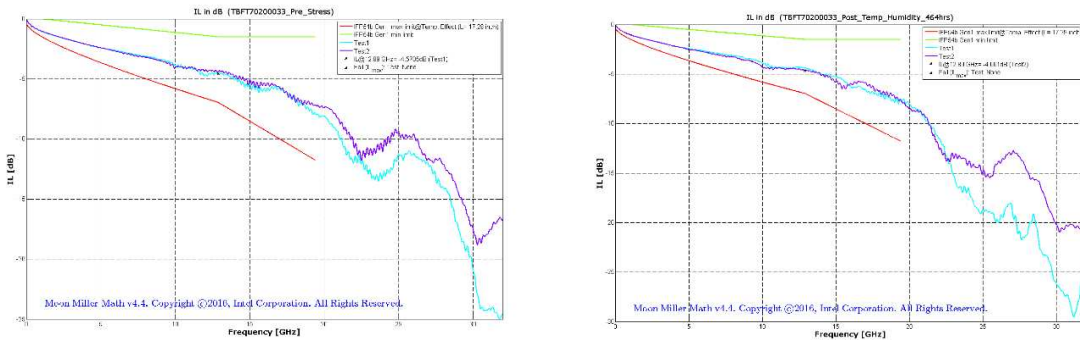


Figure A-42 439 mm Bend+464 hr 77°C/60%RH Temp-Humidity Return Loss Pre-, Post-stress

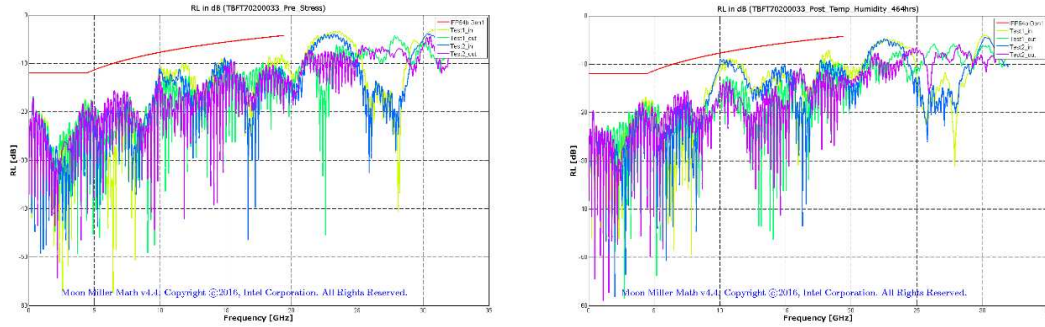


Figure A-43 439 mm Bend+464 hr 77°C/60%RH Temp-Humidity Skew Pre-, Post-stress

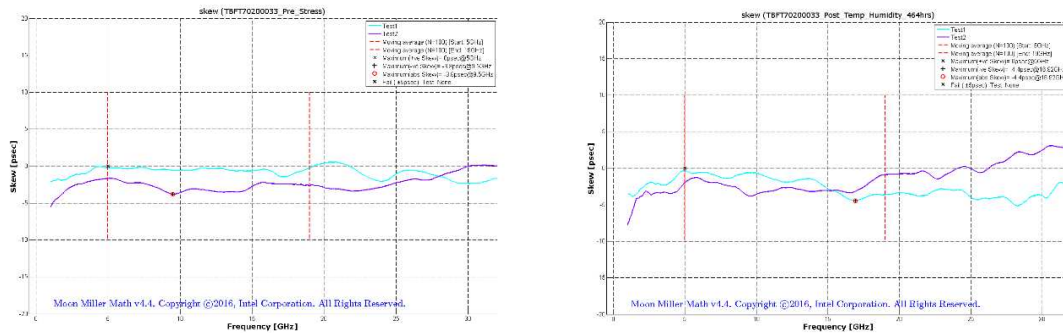


Figure A-44 439 mm Bend+464 hr 77°C/60%RH Temp-Humidity TxclCN Pre-, Post-stress

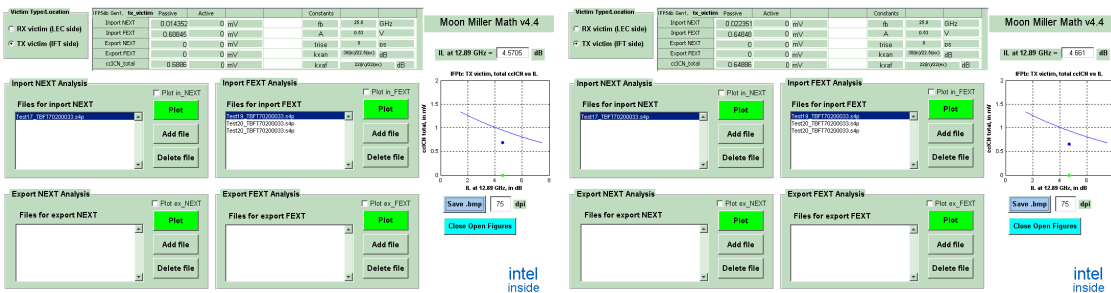


Figure A-45 439 mm Bend+464 hr 77°C/60%RH Temp-Humidity RxcclCN Pre-, Post-stress

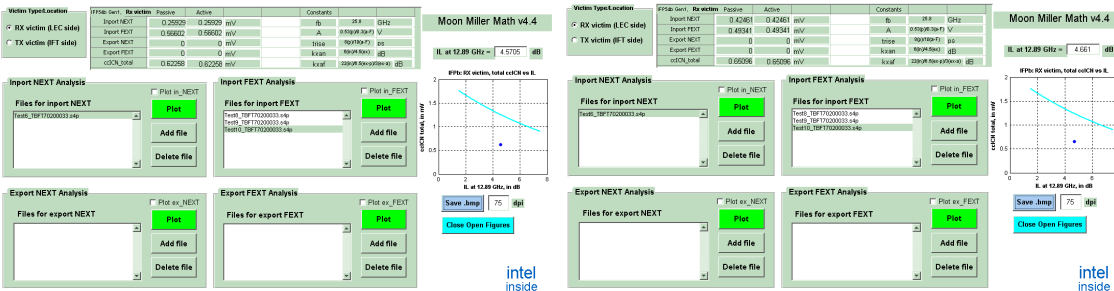


Figure A-46 439 mm Bend+464 hr 77°C/60%RH Temp-Humidity LEC Impedance Pre-, Post-stress

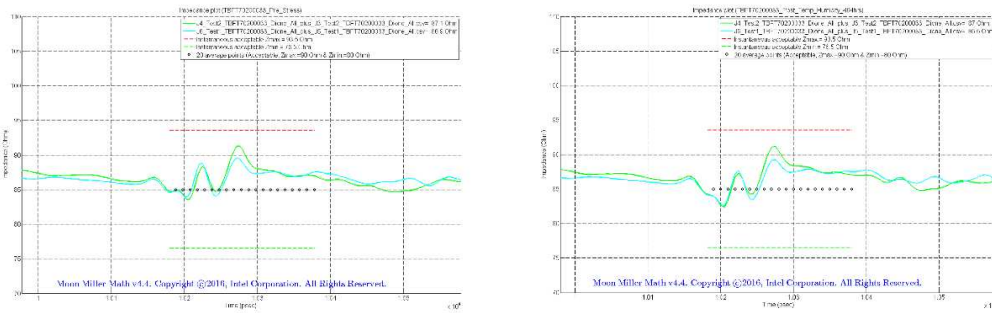


Figure A-47 439 mm Bend+464 hr 77°C/60%RH Temp-Humidity Cable Impedance Pre-, Post-stress

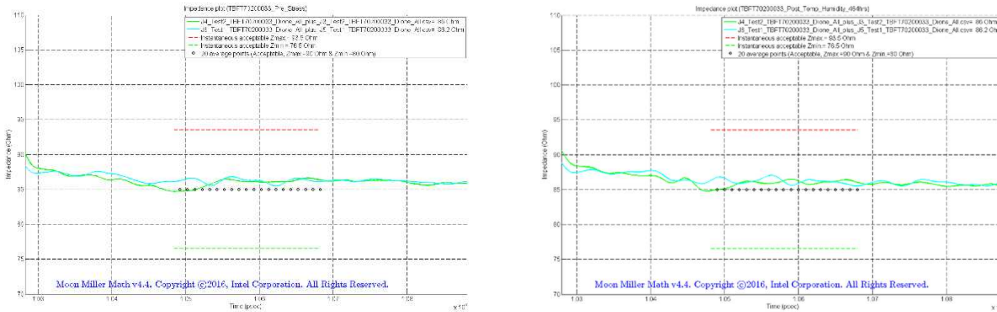


Figure A-48 439 mm Bend+464 hr 77°C/60%RH Temp-Humidity Plug Impedance Pre-, Post-stress

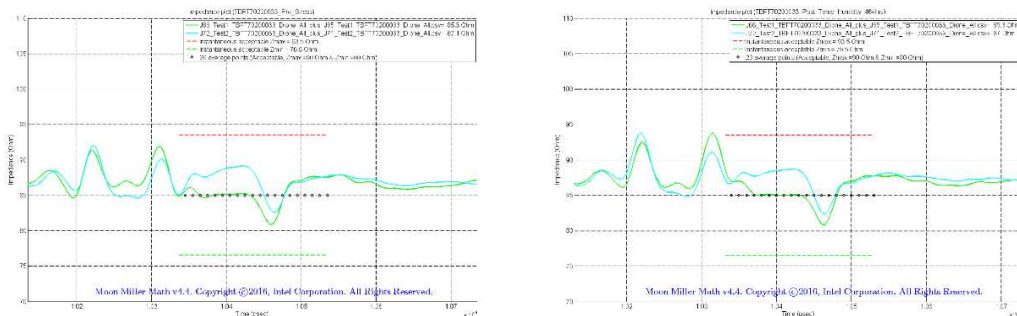


Figure A-49 318 mm cable Static Pull Insertion Loss Pre- and Post-stress

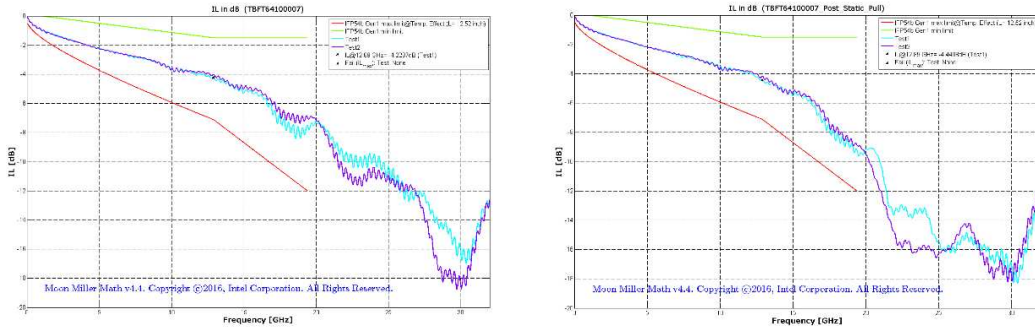


Figure A-50 318 mm cable Static Pull Return Loss Pre- and Post-stress

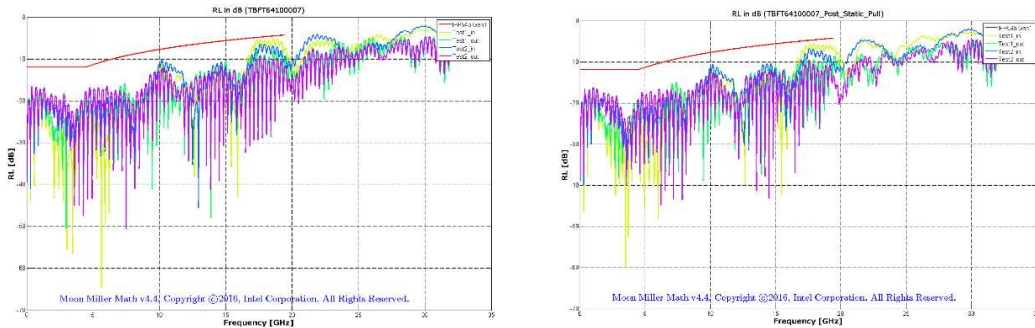


Figure A-51 318 mm cable Static Pull Skew Pre- and Post-stress

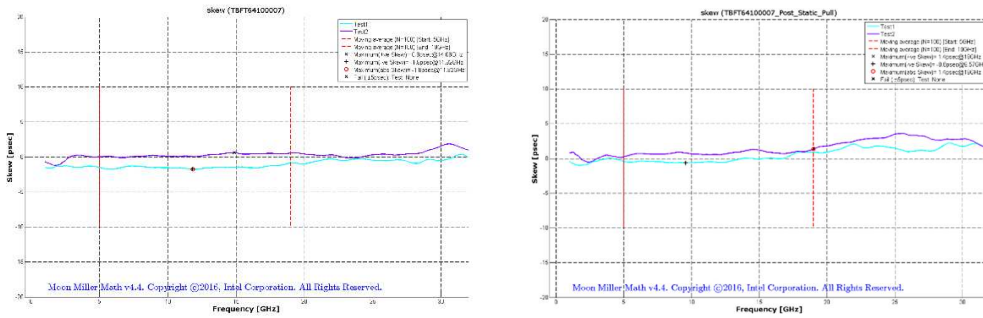


Figure A-52 318 mm Static Pull TxccICN Pre- and Post-stress

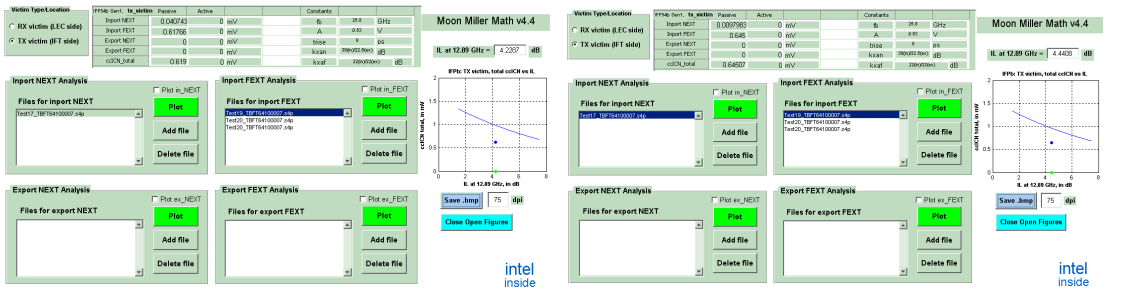


Figure A-53 318 mm Static Pull RxccICN Pre- and Post-stress

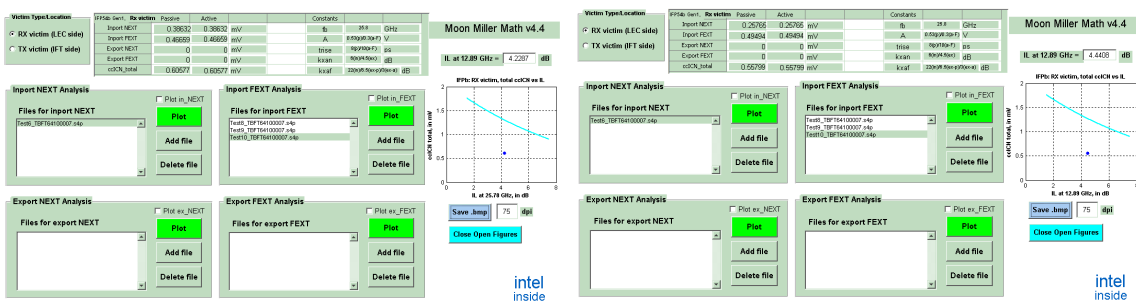


Figure A-54 318 mm Static Pull LEC Impedance Pre- and Post-stress

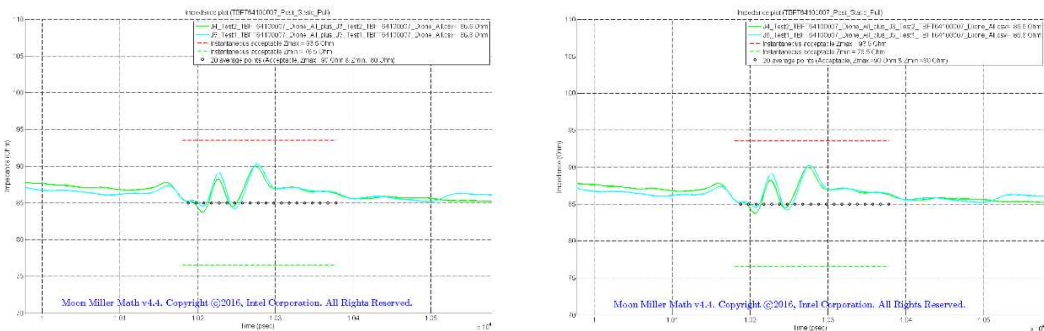


Figure A-55 318 mm Static Pull Cable Impedance Pre- and Post-Stress

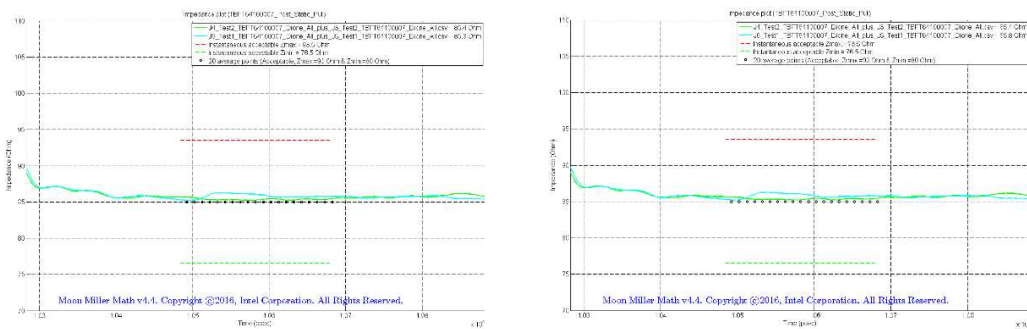


Figure A-56 318 mm Static Pull IFP Plug Impedance Pre- and Post-stress

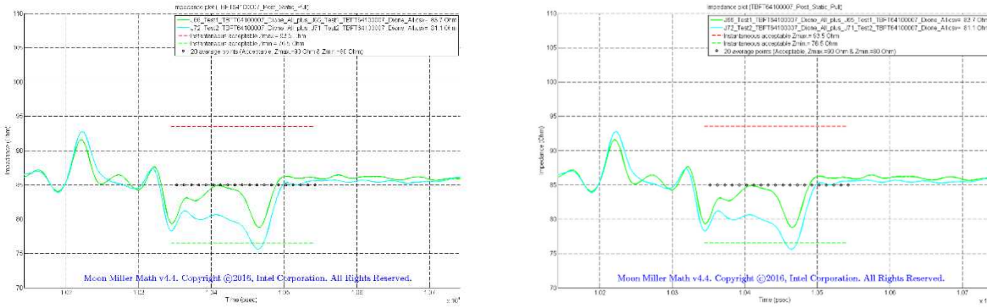


Figure A-57 318 mm Cable Agitation Insertion Loss Pre- and Post-stress

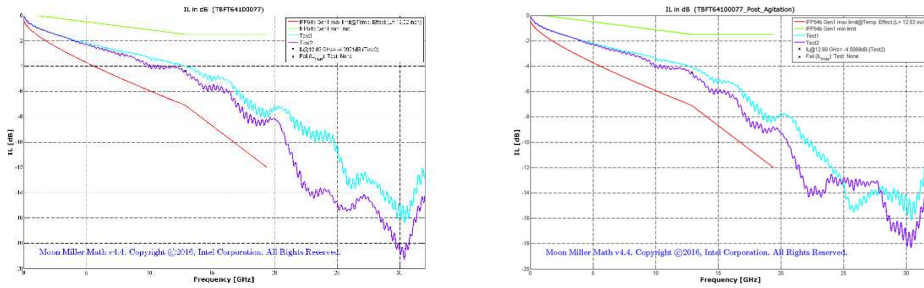


Figure A-58 318 mm Cable Agitation Return Loss Pre- and Post-stress

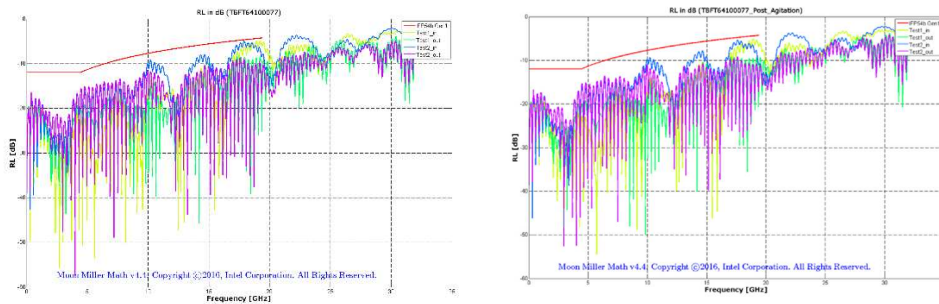


Figure A-59 318 mm Cable Agitation Skew Pre- and Post-stress

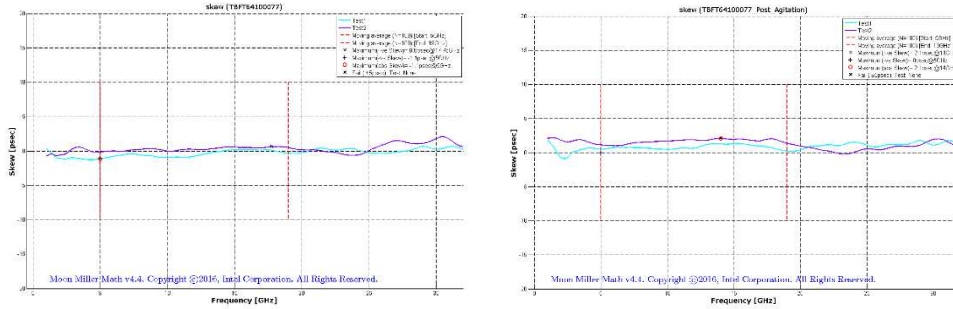


Figure A-60 318 mm Cable Agitation TxccICN Pre- and Post-stress

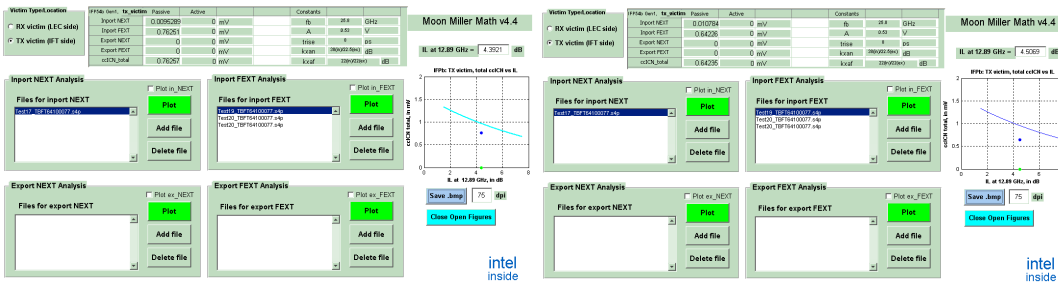


Figure A-61 318 mm Cable Agitation RxcclCN Pre- and Post-stress

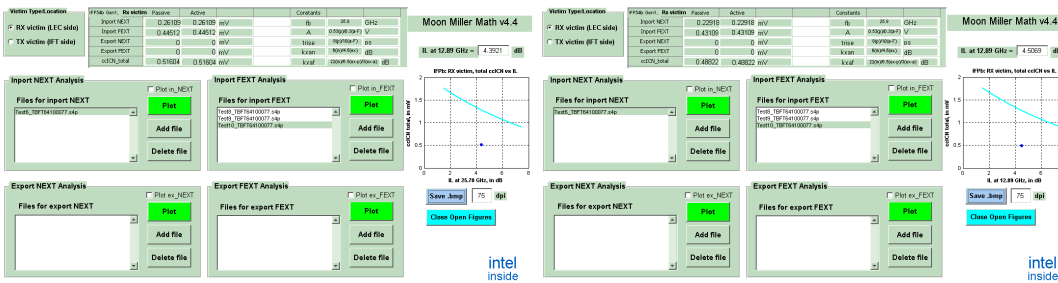


Figure A-62 318 mm Cable Agitation LEC Impedance Pre- and Post-stress

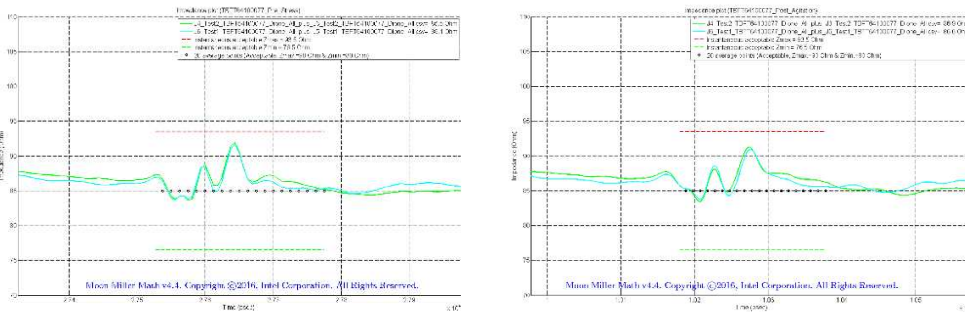


Figure A-63 318 mm Cable Agitation Cable Impedance Pre- and Post-Stress

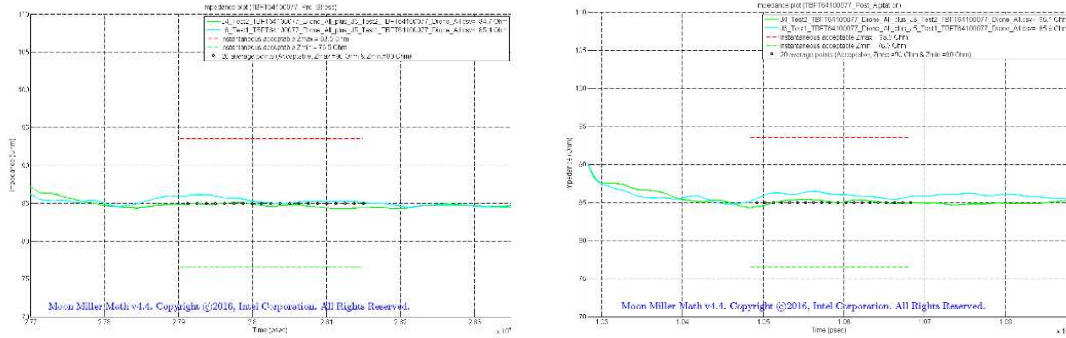


Figure A-64 318 mm Cable Agitation IFP Plug Impedance Pre- and Post-stress

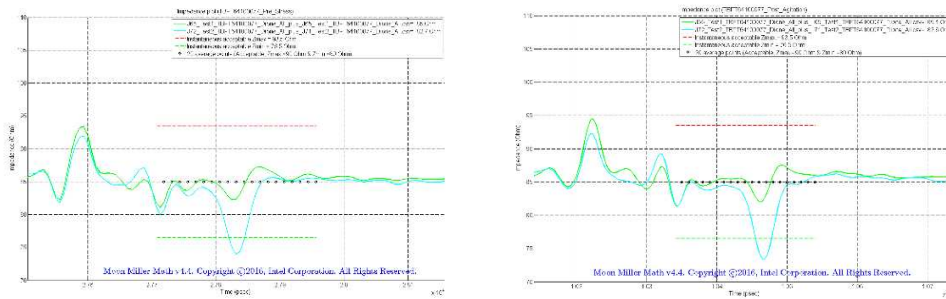


Figure A-65 318 mm Strain relief Insertion Loss Pre- and Post-stress

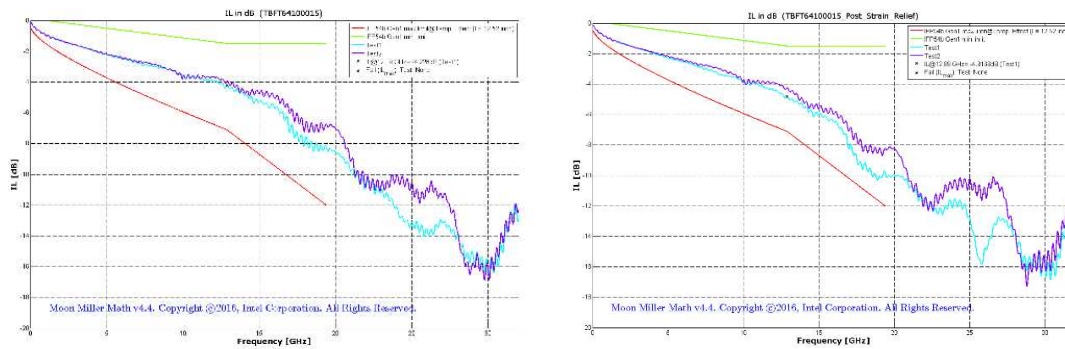


Figure A-66 318 mm Strain relief Return Loss Pre- and Post-stress

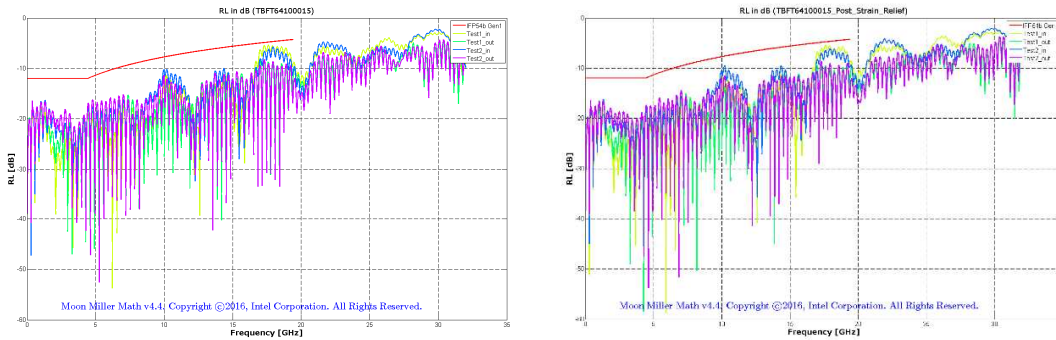


Figure A-67 318 mm Strain relief Skew Pre- and Post-stress

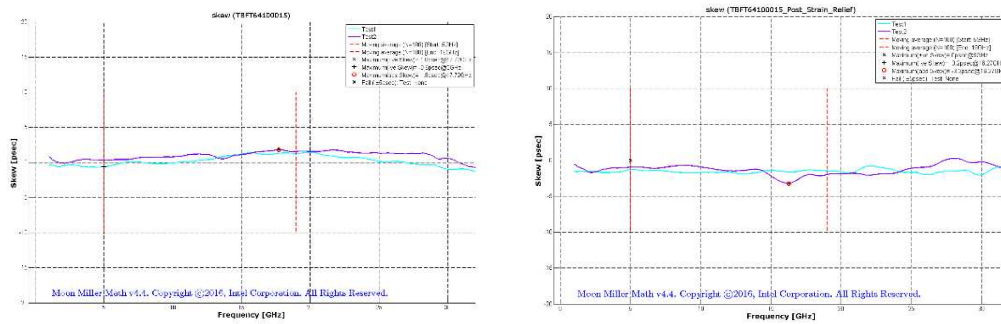


Figure A-68 318 mm Strain relief TxccICN Pre- and Post-stress

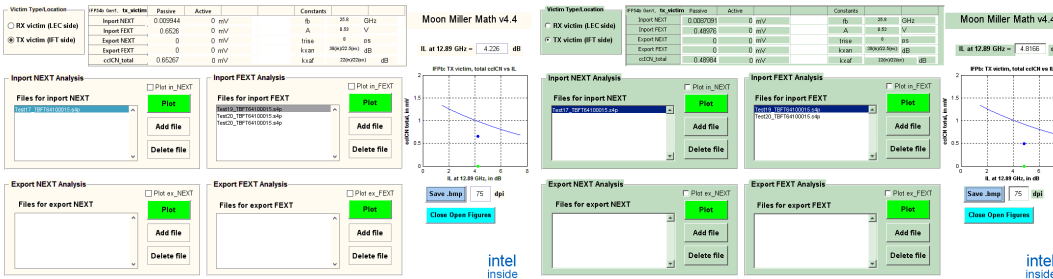


Figure A-69 318 mm Strain relief RxccICN Pre- and Post-stress

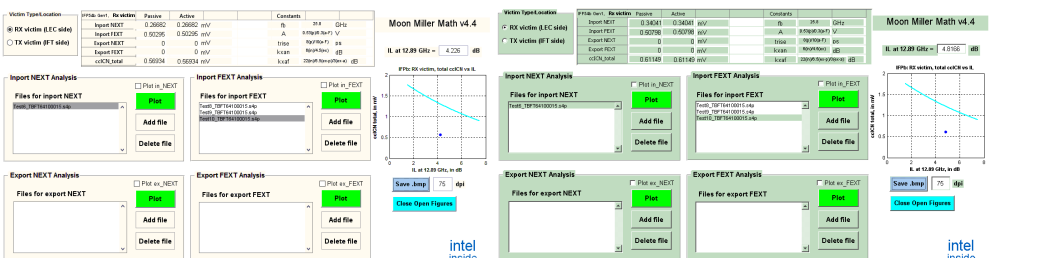


Figure A-70 318 mm Strain relief LEC Impedance Pre- and Post-stress

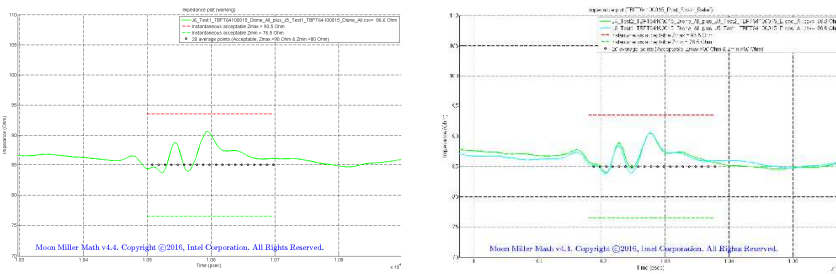


Figure A-71 318 mm Strain relief Cable Impedance Pre- and Post-Stress

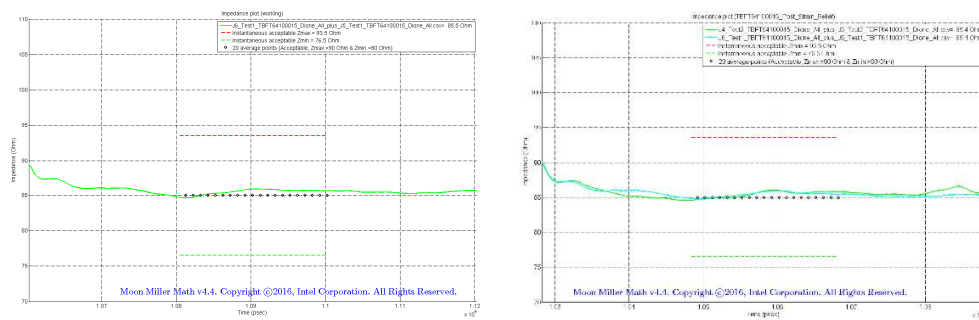
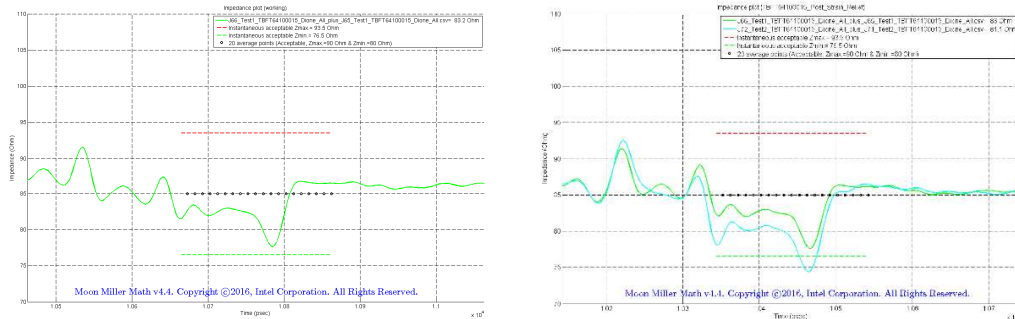


Figure A-72 318 mm Strain relief IFP Plug Impedance Pre- and Post-stress



**APPENDIX B – POST STRESS PASS/FAIL RESULTS:****Group 0 Durability**

| Serial No | IL | Skew | ZO_LEC_Cable_Plug | RXccICNTxccICNRL | LLCR |
|--------------|----|------|-------------------|------------------|------|
| TBFT64100012 | P | P | P | P# | P |
| TBFT64100013 | P | P | P | P# | P |
| TBFT64100014 | P | P | P | P# | P |
| TBFT64100017 | P | P | P | P | P |
| TBFT64100019 | P | P | P | P# | P |
| TBFT64100025 | P | P | P | P# | P |

Pass – pre-stress channel performance not measured, post-stress low IFP plug shows characteristics typical of *Pass parts

Group 1 Temperature Life 240 Hrs

| Serial No | IL | Skew | ZO_LEC_Cable_Plug | RXccICNTxccICNRL | LLCR |
|--------------|----|------|-------------------|------------------|------|
| TBFT70500003 | P | P | P | P | P |
| TBFT70500004 | P | P | P | P | P |
| TBFT70500007 | P | P | P | P | P |
| TBFT70500009 | P | P | P | P | P |
| TBFT70500015 | P | P | P | P | P |
| TBFT70500027 | P | P | P | P | P |
| TBFT70500028 | P | P | P | P | P |
| TBFT70500030 | P | P | P | P | P |
| TBFT70500031 | P | P | P | P | P |
| TBFT70500033 | P | P | P | P | P |
| TBFT70500035 | P | P | P | P | P |
| TBFT70500036 | P | P | P | P | P |



Group 2 Temperature Cycle 500 cycles

| Serial No | IL | Skew | ZO_LEC_Cable_Plug | | | RXccICNTxccICNRL | | LLCR |
|--------------|----|------|-------------------|---|---|------------------|---|------|
| TBFT70500034 | P | P | P | P | P | P | P | P |
| TBFT70500035 | P | P | P | P | P | P | P | P |
| TBFT70500036 | P | P | P | P | P | P | P | P |
| TBFT70500037 | P | P | P | P | P | P | P | P |
| TBFT70500038 | P | P | P | P | P | P | P | P |
| TBFT70500039 | P | P | P | P | P | P | P | P |
| TBFT70500040 | P | P | P | P | P | P | P | P |
| TBFT70500041 | P | P | P | P | P | P | P | P |
| TBFT70500043 | P | P | P | P | P | P | P | P |
| TBFT70500048 | P | P | P | P | P | P | P | P |
| TBFT70500051 | P | P | P | P | P | P | P | P |
| TBFT70500055 | P | P | P | P | P | P | P | P |

Group4A Vibration

| Serial No | IL | Skew | ZO_LEC_Cable_Plug | | | RXccICNTxccICN | | RL | LLCR |
|--------------|----|------|-------------------|---|----|----------------|---|----|------|
| TBFT64100048 | P | P | P | P | P* | P | P | P | |
| TBFT64100050 | P | P | P | P | P* | P | P | P | |
| TBTF64100053 | P | P | P | P | P* | P | P | P | |
| TBTF64100057 | P | P | P | P | P* | P | P | P | |
| TBTF64100058 | P | P | P | P | P* | P | P | P | |
| TBFT64100081 | P | P | P | P | P* | P | P | P | |

* Pass – no change pre- vs post-stress, low IFP plug impedance pre- and post-stress

Group4B Shock

| Serial No | IL | Skew | ZO_LEC_Cable_Plug | | | RXccICNTxccICN | | RL | LLCR |
|--------------|----|------|-------------------|---|----|----------------|---|----|------|
| TBFT64100031 | P | P | P | P | P* | P | P | P | |
| TBFT64100034 | P | P | P | P | P* | P | P | P | |
| TBFT64100035 | P | P | P | P | P* | P | P | P | |
| TBFT64100040 | P | P | P | P | P* | P | P | P | |
| TBFT64100049 | P | P | P | P | P* | P | P | P | |
| TBFT64100084 | P | P | P | P | P* | P | P | P | |

* Pass – no change pre- vs post-stress, low IFP plug impedance pre- and post-stress

Group3 Cable bend (25 mm) + Group 7 408 hr Temp-Humidity (77°C/60%RH)

| Serial No | IL | Skew | ZO_LEC_Cable_Plug | | | RXccICNTxccICNRL | | LLCR |
|--------------|----|------|-------------------|---|---|------------------|---|------|
| TBFT70200031 | P | P | P | P | P | P | P | P |
| TBFT70200032 | P | P | P | P | P | P | P | P |
| TBFT70200033 | P | P | P | P | P | P | P | P |
| TBFT70200042 | P | P | P | P | P | P | P | P |
| TBFT70200044 | P | P | P | P | P | P | P | P |
| TBFT70200045 | P | P | P | P | P | P | P | P |
| TBFT70200046 | P | P | P | P | P | P | P | P |
| TBFT70200047 | P | P | P | P | P | P | P | P |
| TBFT70200049 | P | P | P | P | P | P | P | P |
| TBFT70200050 | P | P | P | P | P | P | P | P |
| TBFT70200052 | P | P | P | P | P | P | P | P |
| TBFT70200053 | P | P | P | P | P | P | P | P |

**Group 8B Static Pull (Type 1)**

| Serial No | IL | Skew | ZO_LEC_Cable_Plug | | | RXccICNTxccICN | | RL | LLCR |
|--------------|----|------|-------------------|---|----|----------------|---|----|------|
| TBFT64100002 | P | P | P | P | P | P | P | P | |
| TBFT64100007 | P | P | P | P | P* | P | P | P | |
| TBFT64100010 | P | P | P | P | P | P | P | P | |
| TBFT64100016 | P | P | P | P | P | P | P | P | |
| TBFT64100020 | P | P | P | P | P | P | P | P | |
| TBFT64100064 | P | P | P | P | P | P | P | P | |

* Pass – no change pre- vs post-stress, low IFP plug impedance pre- and post-stress

Group 9 Cable Agitation

| Serial No | IL | Skew | ZO_LEC_Cable_Plug | | | RXccICNTxccICNRL | | LLCR |
|--------------|----|------|-------------------|---|----|------------------|---|------|
| TBFT64100069 | P | P | P | P | P* | P | P | P |
| TBFT64100071 | P | P | P | P | P* | P | P | P |
| TBFT64100074 | P | P | P | P | P* | P | P | P |
| TBFT64100077 | P | P | P | P | P* | P | P | P |
| TBFT64100082 | P | P | P | P | P* | P | P | P |
| TBFT64100087 | P | P | P | P | P* | P | P | P |

* Pass – no change pre- vs post-stress, low IFP plug impedance pre- and post-stress

**Group 10 Strain Relief**

| Serial No | IL | Skew | ZO_LEC_Cable_Plug | | | RXccICNTxcccICN | | RL | LLCR |
|--------------|----|------|-------------------|---|----|-----------------|---|----|------|
| TBFT64100001 | P | P | P | P | P* | P | P | P | |
| TBFT64100004 | P | P | P | P | P | P | P | P | |
| TBFT64100015 | P | P | P | P | P# | P | P | P | |
| TBFT64100021 | P | P | P | P | P | P | P | P | |
| TBFT64100023 | P | P | P | P | P* | P | P | P | |
| TBFT64100024 | P | P | P | P | P* | P | P | P | |

* Pass – no change pre- vs post-stress, low IFP plug impedance pre- and post-stress

Pass – pre-stress channel performance not measured, post-stress low IFP plug shows characteristics typical of *Pass parts