



Glenair, Inc. 1211 Air Way, Glendale, California, 91201

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October 12, 2020

**QUALIFICATION TEST REPORT
FOR
HERMETIC SPEEDMASTER**

REPORT NO. GT-20-268

TEST REPORT
No. GT-20-268
October 12, 2020



Glenair, Inc. 1211 Air Way, Glendale, California, 91201
Tel: (818) 247-6000 Fax: (818) 247-7240

APPROVAL PAGE

Bryan Samowitz
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Date

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Glenair, Inc.

Date

Prepared By: Bryan Samowitz on October 12, 2020

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REVISION HISTORY

REVISION LETTER	DESCRIPTION OF REVISION	DATE	APPROVAL
A	Initial Release	3/24/20	B. Samowitz
B	Corrections & clarifications made	10/12/20	B. Samowitz



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ABSTRACT

Glenair, Inc. conducted testing on the SpeedMaster Hermetic Bulkhead Feedthrough 233-263-H7 in accordance with D38999 group 3 to determine its readiness for market. The testing was conducted per QTP-870 Rev 1. The secondary purpose of this testing was also to fill in gaps in the general SpeedMaster qualification testing.

The Primary subject of the test was 2 samples of 233-263-H7ZL11-1SN-1. The mating connectors were a pair of 233-219-G6ME11-1AN populated with 120" long cable assemblies per 8575-0001-AC-5 on one side and 8575-0001-BC-5 on the other. The cables were secured in place via an M85049/124-11N backshell mounted on a 320HS018M11-2 backshell extender.

After each test the cable links were tested against 10G-BaseT. All samples survived testing and maintained performance.



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SUMMARY OF TESTS

Test/Inspection	QTP-870 Test Requirements	Sample Size per Group	Test Results Pass/Fail
Examination of Product	7.1	2	Pass
Electrical Performance	7.2	2	Pass
Thermal Shock	7.4	2	Pass
Electrical Performance	7.2	2	Pass
Air Leakage	7.5	2	Pass
Insulation Resistance @ Elevated Temperature	7.3.2	2	Pass
Durability	7.8	2	Pass
Coupling and Uncoupling Torque	7.9	2	Pass
Sine Vibration	7.6.1	2	Pass
Electrical Performance	7.2	2	Pass
Random Vibration	7.6.2	2	Pass
Electrical Performance	7.2	2	Pass
Insulation Resistance @ Ambient Temperature	7.3.1	2	Pass
Mechanical Shock	7.7.1	2	Pass
Electrical Performance	7.2	2	Pass

SCOPE

This report documents the results of the testing performed on the El Ochito contacts. The acceptance test criteria referenced in QTP-870, Rev 2, was used to help validate the testing requirements. The tests were performed by Glenair, Inc. and Vertical Laboratories LLC.

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REFERENCE DOCUMENTS

858-100	SpeedMaster Module, Socket Size #22D, 10G Ethernet
858-101	SpeedMaster Module, Pin Size #22D, 10G Ethernet
233-219	Connector, Environmental, SpeedMaster, 10G Connector, MIL-DTL-38999, Series III Type, "SuperNine"
233-263	Receptacle, Bulkhead Feed-Thru, SpeedMaster, 10G Connector, Hermetic, MIL-DTL-38999, Series III Type, "SuperNine"
QTP-870	Qualification testing of Glenair Hermetic SpeedMaster Connector, MIL-DTL-38999, Series III Type

TEST ITEM DESCRIPTION

The test cables will consist of two cables; 8575-0001-AC-5-120, & 8575-0001-BC-5-120. These cables will each be installed into a 233-219-G6ME11-1AN connector and will be secure with a 320HS018M11-2 backshell extender and M85049/124-11N strain relief.

Each 233-263-H7ZL11-1SN-1 will have one AC and one BC cable assembly mated to the appropriate side of it.

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APPENDIX A

GLENAIR, INC. QUALIFICATION TEST PLAN QTP-870 Rev 1



Glenair, Inc. · 1211 Air Way · Glendale, California 91201

Cage Code: 06324	Document Description Qualification Testing of Glenair Hermetic SpeedMaster Connector, MIL-DTL-38999, Series III Type	Document #: QTP-870 Revision: 2 Page 1 of 9
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QTP-870 QUALIFICATION TEST PLAN

Qualification Testing of Glenair Hermetic SpeedMaster Connector, MIL-DTL-38999,
Series III Type

PREPARED BY _____ **DATE** 10/12/20
Bryan Samowitz
Design Engineer
Glenair, Inc.

APPROVED BY _____ **DATE** 10/12/20
Guido Hunziker
VP Research & Development
Glenair, Inc.

Revisions

Rev/Sym	Description of Change	Originator	Date	Approval
1	Preliminary	B. Samowitz	8/29/2019	
2	Corrections & clarifications made	B. Samowitz	10/12/2020	



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Cage Code: 06324	Document Description Qualification Testing of Glenair Hermetic SpeedMaster Connector, MIL-DTL-38999, Series III Type	Document #: QTP-870 Revision: 2 Page 2 of 9
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Cage Code: 06324	Document Description Qualification Testing of Glenair Hermetic SpeedMaster Connector, MIL-DTL-38999, Series III Type	Document #: QTP-870 Revision: 2 Page 3 of 9
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1. Purpose

1.1. This test plan defines the parameters, test methods, test sequence and test samples required to qualify Glenair's Hermetic SpeedMaster SuperNine.

1.2. The following Tests will be performed:

- Thermal Shock
- Air Leakage
- Insulation Resistance
- Durability
- Coupling & Uncoupling Torque
- Vibration
- Mechanical Shock
- Dielectric Withstanding Voltage

2. Applicable Documents

2.1. Military and Industry Specifications

MIL-DTL-38999	Contacts, Electrical Connector, General Specification For
EIA-364	Electrical Connector/Socket Test Procedures Including Environmental Classifications
EIA-364-02	Air Leakage Test Procedure for Electrical Connectors
EIA-364-21	Insulation Resistance Test Procedure for Electrical Connectors, Sockets, and Coaxial Contacts
EIA-364-27	Mechanical Shock (Specified Pulse) Test Procedure for electrical Connectors and Sockets
EIA-364-28	Vibration Test Procedure for Electrical Connectors and Sockets
EIA-364-46	Microsecond Discontinuity Test Procedure for Electrical Connectors, Contacts, and Sockets
EIA-364-114	Coupling and Uncoupling Force Test Procedure for electrical Connectors, Sockets, and Applicable Accessories
IEEE 802.3an	Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access method and Physical Layer Specifications



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2.2. Glenair

233-219	Connector, Environmental, SpeedMaster, 10G Connector, MIL-DTL-38999, Series III Type, SuperNine
233-263	Receptacle, Bulkhead Feed-Thru, SpeedMaster, 10G Connector, Hermetic, MIL-DTL-38999, Series III Type, SuperNine
858-100	SpeedMaster Module, Socket, Size #22D, High Speed Ethernet, CAT6A
858-101	SpeedMaster Module, Pin, Size #22D, High Speed Ethernet, CAT6A

3. Test Item Description

The test assemblies will consist of two cables and one connector; 8575-0001-AC-5-120, & 8575-0001-BC-5-120. These cables will each be installed into a 233-219-G6ME11-1AN connector and will be secure with a 320HS018M11-2 backshell extender and M85049/124-11N strain relief.

Each 233-263-H7ZL11-1SN-1 connector will have one AC and one BC cable assembly mated to the appropriate side of it.

The test items will be assembled at Glenair.

4. Test Conditions

4.1. Testing shall be in accordance with the specified procedures, requirements and parameters as contained herein.

4.2. Unless otherwise specified, conditions for conducting the testing shall be as stated below:

Ambient (Room) Temperature: $25 \pm 10^{\circ}\text{C}$ ($77 \pm 18^{\circ}\text{F}$)
Relative Humidity: Room ambient up to 90% relative
Barometric Pressure: Prevailing room conditions

4.3. The test equipment and measuring devices used to verify the electrical contact assembly shall be controlled in accordance with QCDP 010.

4.4. The connector & cable assemblies shall be assembled at Glenair, in accordance with the appropriate Glenair assembly procedure.



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5. Test Site

Glenair, Inc. 1211 Air Way, Glendale, California, 91201

Glenair has option to select third party test lab to perform some of the test specified herein due to capabilities, work load, man power shortage.

6. Test Sequences

Table 1 – Test Sequences

Test	Requirement Paragraph
Examination of Product	7.1
Electrical Performance	7.2
Temperature Cycling	7.4
Electrical Performance	7.2
Air Leakage	7.5
Insulation Resistance @ Elevated Temperature	7.3.2
Durability	7.8
Coupling and Uncoupling Torque	7.9
Sine Vibration	7.6.1
Electrical Performance	7.2
Random Vibration	7.6.2
Electrical Performance	7.2
Insulation Resistance @ Ambient Temperature	7.3.1
Mechanical Shock	7.7
Electrical Performance	7.2



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7. Test Procedures

7.1. Examination of Product

Connector assemblies shall be inspected to ensure that all SpeedMaster cable assemblies are secure and in the correct cavity.

7.1.1. Sample Preparation

- 8575-0001 cable assemblies shall be assembled by Glenair and installed into the 233-219 connectors
- Vertical Laboratories shall assemble the 320HS018 extender and M85049/124 backshell using the proper torque values onto each connector/cable assembly

7.2. Electrical Performance

Mated connector/cable assemblies shall be tested against 10G-BaseT, and the results shall be recorded.

7.3. Insulation Resistance

7.3.1. Insulation Resistance at Ambient Temperature

Insulation resistance shall be tested in accordance with EIA-364-21. The following conditions apply:

- Connectors shall be unmated
- Resistance between any pair of contacts and any contact and the shell shall be 5,000 megaohms minimum.

7.3.2. Insulation resistance at Elevated Temperature

Insulation resistance shall be tested in accordance with EIA-364-21. The following conditions apply:

- Connectors shall be unmated
- Elevated Temperature shall be 200°C +5°C/-0°C
- Soak time shall be 30 minutes
- Resistance between any pair of contacts and the shell shall be 200 megaohms minimum.



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7.4. Thermal Shock

Unmated receptacles shall be subjected to 10 cycles of thermal shock in the following manner:

- Step 1: The receptacle shall be suspended for 10 +1/-0 minutes in the center of a cold water bath with a volume of approximately 1 cubic foot. No dimension of the bath shall be less than 10 inches. The water shall not exceed 4°C.
- Step 2: The receptacle shall be suspended for 10 +1/-0 minutes in the center of a hot water bath with a volume of approximately 1 cubic foot. No dimension of the bath shall be less than 10 inches. The water shall not be less than 90°C.

There shall be no damage detrimental to the operation of the connector afterward.

7.5. Air Leakage

Testing shall be done in accordance with EIA-364-02 for hermetic seal, except the minimum period of measurement shall be 10 seconds. Testing shall be conducted at a pressure differential of 1 atmosphere across the connector.

There shall be no evidence of leakage in excess of .01 micron ft³/h (1e⁻⁷cm³/s).

7.6. Vibration

A test current of 100 milliamperes maximum shall be applied and the mated pair continuously monitored for 1 microsecond discontinuities in accordance with EIA-364-46. There shall be no disengagement of the mated connectors, backing off of the coupling mechanism, evidence of cracking, breaking, or loosening of parts.

Connectors shall be mated with 12 in-lbs of torque. The jam nut of the receptacle shall be locked down with wire in a way that prohibits loosening during testing. Cables shall be clamped at a distance of at least 8 inches from the rear of the backshell. Each wire within a cable link shall be monitored individually.

7.6.1. Sine Vibration

One sample set shall be subjected to a simple harmonic motion from 10 to 2,000 Hz in each of three mutually perpendicular axes. The level of vibration shall be a velocity of 254 mm/sec from 10-50 Hz; 1.5 mm double amplitude from 50-140 Hz, and 60 G from 140-2,000 Hz. The entire frequency range from 10-2,000 Hz and back shall be traversed in 20 minutes. The vibration shall be applied for a duration of 4 hours in each of the three mutually perpendicular axes for a total of 12 hours.



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7.6.2. Random Vibration

One sample set shall be tested in accordance with EIA-364-28. The following details are applicable:

- Test condition V – Using the vibration envelope shown in figure 1
- Vibration shall be conducted at ambient temperature
- Duration shall be 8 hours in the axial direction and 8 hours in a perpendicular direction for a total of 16 hours.

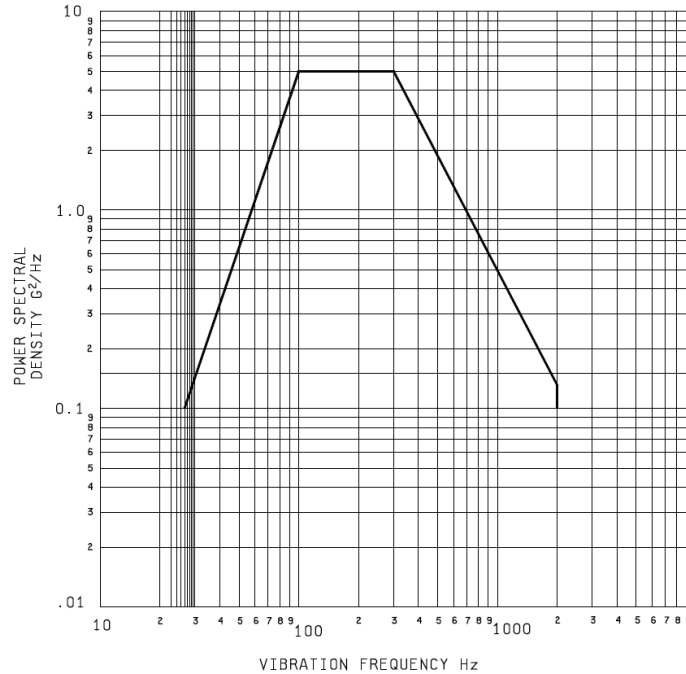


Figure 1 - Random vibration envelope



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7.7. Mechanical Shock

A test current of 100 milliamperes maximum shall be applied and the mated pair continuously monitored for 1 microsecond discontinuities in accordance with EIA-364-46.

There shall be no disengagement of the mated connectors, backing off of the coupling mechanism, evidence of cracking, breaking, or loosening of parts. Each wire within a cable shall be monitored individually.

Connectors shall be mated with 12 in-lbs of torque. The jam nut of the receptacle shall be locked down with wire in a way that prohibits loosening during testing. Cables shall be clamped at a distance of at least 8 inches from the rear of the backshell. Each wire within a cable link shall be monitored individually.

Connectors shall be tested in accordance with EIA-364-27. The pulse shall be an approximate half sine wave of 300 G ±15% magnitude with a duration of 3±1 milliseconds.

7.8. Durability

Each end of the hermetic receptacles shall be subjected to 500 mating cycles at a rate not exceeding 300 cycles per hour. Mating and unmating shall be accomplished such that the plug and receptacle are completely separated during each cycle.

Samples shall show no defects detrimental to operation after testing.

7.9. Coupling Torque

Mated connectors shall be tested in accordance with EIA-364-114, except mated pairs shall be fully coupled within 5 seconds maximum, and shall be fully uncoupled within 5 seconds minimum. Values measured shall meet those specified in table 2.

Table 2 - Coupling torque criteria

Shell Size	Max. Engagement (in-lb.)	Min. Disengagement (in-lb.)
11	12	2

8. Test Report:

Upon completion of testing, the results shall be submitted to Glenair

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APPENDIX B

Vertical Laboratories LLC
Test Report
19315D1BMV4

QTP-870 Test Data Sheet

QTP-870 Testing
19315D1BMV4
Version 4
10/12/2020

Prepared By:	<u>Brian Morales</u> Test Engineer	
Reviewed By:	<u>Mehrdad Mostoufi</u> Test Engineer	<u>10/12/2020</u> Date
Approved By:	<u>Kane Liang</u> Quality Manager	<u>10/12/2020</u> Date



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QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Version History		

Version	Date	Comments	Prepared By	Reviewed By	Approved By
1	3/5/2020	Initial Release	Brian Morales	Mehrdad Mostoufi	Kane Liang
2	3/9/2020	Correct SN for AC Assembly on pg. 6.	Brian Morales	Mehrdad Mostoufi	Kane Liang
3	3/23/2020	Correct Part Name on Pg.11	Brian Morales	Mehrdad Mostoufi	Kane Liang
4	10/12/2020	Correct calibration dates, Test Parameters per customer notes.	Brian Morales	Mehrdad Mostoufi	Kane Liang



QTP-870 Test Data Sheet

Doc. No.

19315D1BMV4

Version

4

Sheet Name

Test Deviations

Deviation No.	Test Name	Description
-	-	-



QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Test Summary		

Job Name	QTP-870 Testing
Job No.	19315
Client	Glenair
Contact Name	Bryan Samowitz
Telephone No.	818-247-6000
Email	Bsamowitz@glenair.com
Part Name	Hermetic SpeedMaster Connector
Part No.	233-263-H7ZL11-1SN-1
Serial No.	001, 002
Controlling Document	QTP-870 Rev.1

Test Name	Serial No.	Start Date	End Date	Pass	Fail	Record
Electrical Performance	001, 002	12/26/2019	2/26/2020	X	-	-
Thermal Shock	001, 002	1/8/2020	1/8/2020	X	-	-
Air Leakage	001, 002	1/9/2020	1/9/2020	X	-	-
IR at Elevated Temperature	001, 002	1/14/2020	1/16/2020	X	-	-
Durability	001, 002	1/20/2020	1/21/2020	X	-	-
Coupling and Uncoupling Torque	001, 002	1/21/2020	1/21/2020	X	-	-
Sine Vibration	001	1/27/2020	1/30/2020	X	-	-
Random Vibration	002	2/3/2020	2/5/2020	X	-	-
IR at Ambient	001, 002	2/6/2020	2/6/2020	X	-	-
Mechanical Shock	001, 002	2/25/2020	2/26/2020	X	-	-

Test Summary
<p>Testing was performed on two Hermetic Speed Master Connectors (001 & 002) in accordance with QTP-870 Rev.1, " Qualification Testing of Glenair Hermetic SpeedMaster Connector, MIL-DTL-38999, Series III Type". Each connector was tested in various tests in a sequential order. At the completion of testing, no visual damage was noted and both connectors passed their Electrical Performance test.</p>



QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Test Equipment List		

ID No.	Equipment Name	Manufacturer	Model No.	Cal. Date	Cal. Due
AC018	Accelerometer	Dytran	3056D1	12/18/19	12/18/20
CE021	Temperature Chamber	ESPEC	PL-4FPH	11/15/19	11/30/20
CE024	Vibration Controller	Vibration Research	VR9500	01/14/20	01/13/21
CE031	Environmental Chamber	Sun Electronic Systems	EC13HA	-	
EM004	True RMS Multimeter	Fluke	287	03/22/19	03/31/20
EM012	HiPot Tester	Associated Research Inc	3770	02/18/19	02/29/20
EM020	Digital Contact Monitor	Mertronics	DCM1012	06/07/19	06/30/20
PV001	Leak Standard	Wilson Scientific Glass	GGK3264301	04/04/19	04/30/20
PV016	Absolute Pressure Gauge	US Vacuum	USCG - 100	03/19/19	03/31/20
TC026	Temperature Sensor R700	Dickson	R700	05/20/19	05/31/20
AC013	Charge Amplifier	Dytran	4751B3	01/29/20	01/31/21
AC031	Charge Mode Accel	Dytran	3030C1	01/29/20	01/31/21
FX001	6" Cube Fixture	-	-	-	-
FX042	Fixture Plate	-	-	-	-
FX041	Head Plate for SK05	-	-	-	-
SK01	Electrodynamic Shaker	Ling Electronics	A-395	-	-
SK05	Electrodynamic Shaker	LDS	V8-440	-	-
ST01	Drop Shock Tester	Lansmont	P-15	-	-
LD01	Helium Leak Tester	Varian	956	-	-
CE005	Environmental Chamber	Tenny	TJR	12/28/19	12/31/20
TC002	Digital Thermometer	Fluke	51 II	09/05/19	09/30/20



QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Test Sample Identification		

Date Received	12/26/2019
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Pre-test sample conditions
<p>Received two 233-263-H7ZL11-1SN-1 connectors along with AC and BC cable assemblies mated to each side of the connectors. No visual damage was noted.</p>

Part Name	Test Group	Part No.	Serial No.
Hermetic SpeedMaster Connector	-	233-263-H7ZL11-1SN-1	001
			002

Cable Assemblies				
Assembly	Cable #	Connector #	Backshell Extender #	Strain Relief #
AC	8575-0001-AC-5-120	233-219-G6ME11-1AN	320HS018M11-2	M85049/124-11N
BC	8575-0001-BC-5-120			



QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Test Parameters		

Test Name	Insulation Resistance at Elevated Temperature
Specification	EIA-364-21E
Method / Procedure	-
Figure / Table	-

Test Requirements
<p>Hermetic Speed Master Connector samples shall be tested in accordance with EIA-364-21E, “Insulation Resistance Test Procedure for Electrical Connectors, Sockets and Coaxial Contacts.” The intent of this testing is to measure the insulation resistance by applying 500 vDC between the closest adjacent contacts and between connector shell and the closest adjacent contact or both. For these test specimens, the following are specified: 500 volts, 100v/s ramp rate, 120s dwell time between each contact, 200MΩ minimum resistance, Environment Temperature: 200°C. All samples capable of withstanding these conditions are considered to be a pass.</p>

Test Name	Thermal Shock
Specification	QTP-870 Rev.1
Method / Procedure	-
Figure / Table	-

Test Requirements
<p>Hermetic Speed Master Connector samples shall be tested in accordance with QTP-870 Rev.1. Unmated receptacles shall be subjected to 10 cycles of thermal shock in the following manner:</p> <p>Step 1: The receptacle shall be suspended for 10 +1/-0 minutes in the center of a cold water bath with a volume of approximately 1 cubic foot. No dimension of the bath shall be less than 10 inches. The water shall not exceed 4°C.</p> <p>Step 2: The receptacle shall be suspended for 10 +1/-0 minutes in the center of a hot water bath with a volume of approximately 1 cubic foot. No dimension of the bath shall be less than 10 inches. The water shall not be less than 90°C.</p> <p>There shall be no damage detrimental to the operation of the connector afterward.</p>



QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Test Parameters		

Test Name	Random Vibration
Specification	EIA-364-28F
Method / Procedure	Test Condition V
Figure / Table	Figure 1

Test Requirements

Random vibration shall be performed on Hermetic Speed Master Connector in accordance with EIA-364-28F, Test Condition V (49 Grms). For this test, vibration shall be conducted at ambient temperature for a test duration of 8 hours in the axial direction and 8 hours in a perpendicular direction for a total test time of 16 hours.

A test current of 100 milliamperes maximum shall be applied and the mated pair continuously monitored for 1 microsecond discontinuities in accordance with EIA-364-46C. There shall be no disengagement of the mated connectors, backing off of the coupling mechanism, evidence of cracking, breaking, or loosening of parts.

All samples capable of withstanding these conditions are considered to be a pass.

Test Name	Sine Vibration
Specification	QTP-870 Rev.1
Method / Procedure	-
Figure / Table	-

Test Requirements

Sine vibration shall be performed on Hermetic Speed Master Connector in accordance with QTP-870 Rev.1. One test sample set shall be subjected to a simple harmonic motion from 10 to 2,000 Hz in each of three mutually perpendicular axes. The level of vibration shall be a velocity of 254 mm/sec from 10-50 Hz; 1.5 mm double amplitude from 50-140 Hz, and 60 G from 140-2,000 Hz. The entire frequency range from 10-2,000 Hz and back shall be traversed in 20 minutes. The vibration shall be applied for a duration of 4 hours in each of the three mutually perpendicular axes for a total of 12 hours.

A test current of 100 milliamperes maximum shall be applied and the mated pair continuously monitored for 1 microsecond discontinuities in accordance with EIA-364-46C. There shall be no disengagement of the mated connectors, backing off of the coupling mechanism, evidence of cracking, breaking, or loosening of parts.

All samples capable of withstanding these conditions are considered to be a pass.



QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Test Parameters		

Test Name	Mechanical Shock
Specification	EIA-364-27C
Method / Procedure	-
Figure / Table	-

Test Requirements
<p>Mechanical shock testing shall be performed on Hermetic Speed Master Connector in accordance with EIA-364-27C. For this test each sample shall be subjected to a 300 g, 3 ms half-sine shock pulse were applied to both the positive and negative direction for the three mutually perpendicular axes.</p> <p>A test current of 100 milliamperes maximum shall be applied and the mated pair continuously monitored for 1 microsecond discontinuities in accordance with EIA-364-46C. There shall be no disengagement of the mated connectors, backing off of the coupling mechanism, evidence of cracking, breaking, or loosening of parts.</p> <p>All samples capable of withstanding these conditions are considered to be a pass.</p>

Test Name	Coupling/Decoupling Torque
Specification	EIA-364-114
Method / Procedure	-
Figure / Table	-

Test Requirements
<p>Mated connectors shall be tested in accordance with test procedure EIA 364-114, except mated pairs shall be fully coupled in no less than 5 seconds and shall be fully uncoupled in no less than 5 seconds. Full coupling is achieved when the red band is covered by the plug coupling ring. The coupling torque for mating and the uncoupling torque for unmating shall meet the requirements below:</p> <p>Coupling torque for mating: < 12 in-lb Decoupling Torque for unmating: > 2 in-lb</p> <p>All samples capable of withstanding these conditions are considered to be a pass.</p>



QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Test Parameters		

Test Name	Mating Durability
Specification	TIA-455-21A
Method / Procedure	-
Figure / Table	-

Test Requirements

Test articles shall be submitted testing in accordance with TIA-455-21A for 500 mating cycles. Cycles to be completed no faster than 10 seconds at a steady speed with a 3 second dwell at full mated/unmated condition. Cycling was conducted by hand only with no mechanized assistance and observations for damage were done. Samples shall show no defects detrimental to operation after testing. Any sample able to withstand these conditions shall be considered a pass.



QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Test Parameters		

Test Name	Electrical Performance Test
Specification	10GBase-T per IEEE 802.3an
Method / Procedure	-
Figure / Table	-

Test Requirements
<p>Hermetic Speed Master Connector samples shall be tested in accordance with TIA-568-C.2, "Balance Twisted-Pair Telecommunications Cabling and Components Standards". The intent of this is to ensure that the SpeedMaster continues to perform as designed. The calibrated Fluke Cable Analyzer Module tests and calculates these measurements and displays a pass/fail result.</p>

Test Name	Insulation Resistance at Ambient Temperature
Specification	EIA-364-21E
Method / Procedure	-
Figure / Table	-

Test Requirements
<p>Hermetic Speed Master Connector samples shall be tested in accordance with EIA-364-21E, "Insulation Resistance Test Procedure for Electrical Connectors, Sockets and Coaxial Contacts." The intent of this testing is to measure the insulation resistance by applying 500 vDC between the closest adjacent contacts and between connector shell and the closest adjacent contact or both. For these test specimens, the following are specified: 500 volts, 100v/s ramp rate, 120s dwell time between each contact, 5000MΩ minimum resistance. All samples capable of withstanding these conditions are considered to be a pass.</p>



QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
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Sheet Name	Test Parameters
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Test Name	Air Leakage
Specification	EIA-364-02D
Method / Procedure	-
Figure / Table	-

Test Requirements

Hermetic Speed Master Connector samples shall be tested in accordance with EIA-364-02D for hermetic seal, except the minimum period of measurement shall be 10 seconds.

Leak detection shall be performed by applying vacuum to one side of the test sample while maintaining atmospheric pressure on the other. Tracer gas (helium) shall be applied to the high-pressure side of the device under test by both of the following methods:

1. Direct application to any potential leak path
2. Encompassing the part in a bag and filling the bag with the tracer gas

In the second method the filled bag is allowed to encompass the part for a period of 10 seconds prior to recording any value for leak.

There shall be no evidence of leakage in excess of 1×10^{-7} ccHe/s.

All samples capable of withstanding these conditions are considered to be a pass.



QTP-870 Test Data Sheet

Doc. No.

19315D1BMV4

Version

4

Sheet Name

Engineering Notes

Date	Ambient	Time	Notes
12/26/2019		-	Received, labeled and photographed test samples, 001 & 002.
		-	Perform Electrical Performance Test on both units.
			Test complete. Test Result: Pass
			Note: During initial testing it was noticed that 2 out 3 backshell plug adapters were not functioning correctly.
			Customer picked adapters up for rework.
			Adapters returned in functioning order. Apply Loctite and torque down backshell assembly.
1/8/2020	Average Conditions: 22°C 33%RH	-	Thermal shock testing will be performed between a stainless steel container with circulating heaters and an ice bath in chamber CE021.
			Prior to starting the thermal shock test, the temperatures in each container was verified with TC02.
		1412	Perform Thermal Shock test.
		1738	Test complete. No visual damage noted.
			Upon completion, the unit was left suspended in ambient conditions to dry overnight.
1/09/2020		-	Perform Electrical Performance Test on both units.
			Test complete. Test Result: Pass
		1000	Airleakage testing will be performed on Helium Leak Tester LD01.
		-	Perform Airleakage test on both units.
			Test Complete. Test Result: Pass

Test Operator

Brian Morales



QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Engineering Notes		

Date	Ambient	Time	Notes		
1/14/2020	Average Conditions: 22°C 33%RH	-	Insulation Resistance at Temperature will be performed in chamber CE030 and tested with EM012 HiPot tester.		
		-	Place units into the chamber and begin heating the units to 200°C. Test Abort. The chamber was not able to reach the temperature desired.		
		1/16/2020			Insulation Resistance at Temperature will be performed in chamber CE005 and tested with EM012 HiPot tester.
					Place units into the chamber and begin heating the units to 200°C.
			0931	Begin 30 minute Dwell.	
			1001	Perform Insulation Resistance Test at 200°C.	
1237			Test Complete. Test Result: Pass. A slight discoloration of the dielectric material was noted.		
1/17/2020				Perform Electrical Performance Test on both units. Test complete. Test Result: Pass	
1/20/2020				Mating Durability will be conducted using a Size 11 handle to better grip the connector head.	
		0900	Begin Mating Durability on both units.		
		1/21/2020	1200	Test Complete. No visual wear nor damage noted.	
1330			Perform Coupling and Uncoupling torque. Test complete. Test Result: Pass		
1/27/2020	-		Sine Vibration will be conducted on shaker SK01 on vibration cube FX002. The unit will be mounted to FX042 and monitored with accelerometer AC035. Perform Bare Fixture. Vibration profile approved to proceed to testing.		

Test Operator	Brian Morales / Sam Lam
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QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Engineering Notes		

Date	Ambient	Time	Notes
1/28/2020	Average Conditions: 22°C 33%RH	-	Mount unit 001 onto fixture plate and torque the backnut to
			45in-lbs. Mate connectors and torque to 12 in-lbs. Mount
			assembly to the Fixture cube in the Z axis and torque to 30 ft-lbs.
			Lock wire the jam nut to 3/8-16 bolt retaining the fixture.
		0957	Perform Sine Vibration on unit 001.
			Control Minus Test Abort.
			Replace accelerometer cable and continue testing.
1650		Test paused for the evening. Elapsed Test Time: 02:53:04	
		Resume Test.	
1/29/2020		0909	Test complete. Test Duration: 04:00:00. No visual damage nor
			discontinuities detected.
		-	Rotate the unit to Y axis.
		1003	Perform Sine Vibration on unit 001.
	1435	Test complete. Test Duration: 04:00:00. No visual damage nor	
		discontinuities detected.	
	-	Rotate the unit to X axis.	
1/30/2020	1449	Perform Sine Vibration on unit 001.	
	1742	Test paused for the evening. Elapsed Test Time: 02:52:01	
	0801	Resume Test.	
	0910	Test complete. Test Duration: 04:00:00. No visual damage nor	
		discontinuities detected.	
	-	Sine Vibration testing complete.	

Test Operator	Brian Morales
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QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Engineering Notes		

Date	Ambient	Time	Notes
1/30/2020	Average Conditions: 22°C 33%RH	-	Perform Electrical Performance Test on unit 001.
			Test complete. Test Result: Pass
2/3/2020		-	Random vibration will be performed on unit 002 on shaker SK05 with headplate FX041 and Cube Fixture FX001.
			The unit will be mounted to FX042 and monitored by AC035.
		-	Mount unit 002 onto fixture plate and torque the backnut to 45in-lbs. Mate connectors and torque to 12 in-lbs. Mount assembly to the Fixture cube in the Z axis and torque to 30 ft-lbs.
			Lock wire the jam nut to 3/8-16 bolt retaining the fixture.
		1159	Perform Random Vibration on unit 002.
		1700	Test paused for the evening. Elapsed Test Time: 06:01:28
			Resume Test.
		1009	Test complete. Test Duration: 08:00:00. No visual damage nor discontinuities detected.
2/4/2020			Rotate the unit to Y axis.
		0908	Perform Random Vibration on unit 002.
	1708	Test complete. Test Duration: 08:00:00. No visual damage nor discontinuities detected.	
2/5/2020	-	Perform Electrical Performance Test on unit 002.	
		Test complete. Test Result: Pass	

Test Operator	Brian Morales
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QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Engineering Notes		

Date	Ambient	Time	Notes
2/6/2020	Average Conditions: 22°C 33%RH	1118	Perform IR test on units 001 & 002 at ambient.
			Test complete. Test Result: Pass
		-	Shock Testing will be performed on unit 001 & 002 on shock
			tester ST01 with Cube Fixture FX001. The unit will be mounted
			to FX042 and monitored by AC013 & AC031.
2/25/2020		0930	Begin initializing 300G 3ms Shock Pulse.
		1552	Perform Shock test on unit 001.
		1651	Test complete. Unit was shocked in all three axis in the positive
			and negative direction completing a total of 18 shock pulses.
2/26/2020		0919	Perform Shock test on unit 002.
	1020	Test complete. Unit was shocked in all three axis in the positive	
		and negative direction completing a total of 18 shock pulses.	
	-	Perform final Electrical Performance Test.	
		Test complete. Test Result: Pass	
	-	All testing complete on all units. Upon completion of testing, no	
		visual damage nor electrical degradation was noted.	

Test Operator	Brian Morales
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QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Test Data		

Test Results

Test Type	SN	Pass / Fail
Initial Electrical Performance Test	001, 002	Pass
Temperature Cycling	001, 002	-
Post Temperature Cycling Electrical Performance Test	001, 002	Pass
Air Leakage	001, 002	Pass
Insulation Resistance @ Elevated Temperature	001, 002	Pass
Durability	001, 002	Pass
Coupling and Uncoupling Torque	001, 002	Pass
Sine Vibration	001	Pass
Post Sine Electrical Performance Test	001	Pass
Random Vibration	002	Pass
Post Random Vibration Electrical Performance Test	002	Pass
Insulation Resistance @ Ambient Temperature	001, 002	Pass
Shock Test	001, 002	Pass
Post Shock Electrical Performance Test	001, 002	Pass

Coupling and Uncoupling Torque Test Results

Serial Number	Assembly	Coupling Torque (in-lbs)	Uncoupling Torque (in-lbs)
001	AC	8	5
	BC	10	3
002	AC	10	4
	BC	8	3



QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Test Data		

Typical IR @ Ambient Passing Test Results

Vertical Laboratories Datafile		Test Parameters		
Job Code	19315	Test Type	IR	
Serial Number	001, 002	Test Level	500	V
Operator	Brian Morales	Test Limit HI	0	MΩ
Equipment ID	EM012	Test Limit LO	5000	MΩ
		Ramp Up	5	s
		Dwell	120	s
		Ramp Down	2	s

SN	Type	Pass/Fail	Test Level	Test Value	Duration	Active Pin	Ground Pin
001, 002	IR	Pass	500V	>10GΩ	120s	Pin1	Pin2
001, 002	IR	Pass	500V	>10GΩ	120s	Pin1	Pin3
001, 002	IR	Pass	500V	>10GΩ	120s	Pin1	Pin4
001, 002	IR	Pass	500V	>10GΩ	120s	Pin1	Pin5
001, 002	IR	Pass	500V	>10GΩ	120s	Pin1	Pin6
001, 002	IR	Pass	500V	>10GΩ	120s	Pin1	Pin7
001, 002	IR	Pass	500V	>10GΩ	120s	Pin1	Pin8
001, 002	IR	Pass	500V	>10GΩ	120s	Pin1	Shell
001, 002	IR	Pass	500V	>10GΩ	120s	Pin2	Pin3
001, 002	IR	Pass	500V	>10GΩ	120s	Pin2	Pin4
001, 002	IR	Pass	500V	>10GΩ	120s	Pin2	Pin5
001, 002	IR	Pass	500V	>10GΩ	120s	Pin2	Pin6
001, 002	IR	Pass	500V	>10GΩ	120s	Pin2	Pin7
001, 002	IR	Pass	500V	>10GΩ	120s	Pin2	Pin8
001, 002	IR	Pass	500V	>10GΩ	120s	Pin2	Shell
001, 002	IR	Pass	500V	>10GΩ	120s	Pin3	Pin4
001, 002	IR	Pass	500V	>10GΩ	120s	Pin3	Pin5
001, 002	IR	Pass	500V	>10GΩ	120s	Pin3	Pin6
001, 002	IR	Pass	500V	>10GΩ	120s	Pin3	Pin7
001, 002	IR	Pass	500V	>10GΩ	120s	Pin3	Pin8
001, 002	IR	Pass	500V	>10GΩ	120s	Pin3	Shell



QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Test Data		

SN	Type	Pass/Fail	Test Level	Test Value	Duration	Active Pin	Ground Pin
001,002	IR	Pass	500V	>10GΩ	120s	Pin4	Pin5
001,002	IR	Pass	500V	>10GΩ	120s	Pin4	Pin6
001,002	IR	Pass	500V	>10GΩ	120s	Pin4	Pin7
001,002	IR	Pass	500V	>10GΩ	120s	Pin4	Pin8
001,002	IR	Pass	500V	>10GΩ	120s	Pin4	Shell
001,002	IR	Pass	500V	>10GΩ	120s	Pin5	Pin6
001,002	IR	Pass	500V	>10GΩ	120s	Pin5	Pin7
001,002	IR	Pass	500V	>10GΩ	120s	Pin5	Pin8
001,002	IR	Pass	500V	>10GΩ	120s	Pin5	Shell
001,002	IR	Pass	500V	>10GΩ	120s	Pin6	Pin7
001,002	IR	Pass	500V	>10GΩ	120s	Pin6	Pin8
001,002	IR	Pass	500V	>10GΩ	120s	Pin6	Shell
001,002	IR	Pass	500V	>10GΩ	120s	Pin7	Pin8
001,002	IR	Pass	500V	>10GΩ	120s	Pin7	Shell
001,002	IR	Pass	500V	>10GΩ	120s	Pin8	Shell



QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Test Data		

IR @ 200°C Passing Test Results

Vertical Laboratories Datafile		Test Parameters		
Job Code	19315	Test Type	IR	
Serial Number	001, 002	Test Level	500	V
Operator	Brian Morales	Test Limit HI	0	MΩ
Equipment ID	EM012	Test Limit LO	200	MΩ
		Ramp Up	5	s
		Dwell	120	s
		Ramp Down	5	s

SN	Type	Pass/Fail	Test Level	Test Value	Duration	Active Pin	Ground Pin
001	IR	Pass	500V	>10G	120s	Pin1	Pin2
001	IR	Pass	500V	>10G	120s	Pin1	Pin3
001	IR	Pass	500V	>10G	120s	Pin1	Pin4
001	IR	Pass	500V	>10G	120s	Pin1	Pin5
001	IR	Pass	500V	>10G	120s	Pin1	Pin6
001	IR	Pass	500V	>10G	120s	Pin1	Pin7
001	IR	Pass	500V	>10G	120s	Pin1	Pin8
001	IR	Pass	500V	8031M	120s	Pin1	Shell
001	IR	Pass	500V	>10G	120s	Pin2	Pin3
001	IR	Pass	500V	>10G	120s	Pin2	Pin4
001	IR	Pass	500V	>10G	120s	Pin2	Pin5
001	IR	Pass	500V	>10G	120s	Pin2	Pin6
001	IR	Pass	500V	>10G	120s	Pin2	Pin7
001	IR	Pass	500V	>10G	120s	Pin2	Pin8
001	IR	Pass	500V	7814M	120s	Pin2	Shell
001	IR	Pass	500V	>10G	120s	Pin3	Pin4
001	IR	Pass	500V	>10G	120s	Pin3	Pin5
001	IR	Pass	500V	>10G	120s	Pin3	Pin6
001	IR	Pass	500V	>10G	120s	Pin3	Pin7
001	IR	Pass	500V	>10G	120s	Pin3	Pin8
001	IR	Pass	500V	>10G	120s	Pin3	Shell



QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Test Data		

SN	Type	Pass/Fail	Test Level	Test Value	Duration	Active Pin	Ground Pin
001	IR	Pass	500V	6884M	120s	Pin4	Pin5
001	IR	Pass	500V	>10G	120s	Pin4	Pin6
001	IR	Pass	500V	>10G	120s	Pin4	Pin7
001	IR	Pass	500V	>10G	120s	Pin4	Pin8
001	IR	Pass	500V	5507M	120s	Pin4	Shell
001	IR	Pass	500V	>10G	120s	Pin5	Pin6
001	IR	Pass	500V	>10G	120s	Pin5	Pin7
001	IR	Pass	500V	>10G	120s	Pin5	Pin8
001	IR	Pass	500V	6803M	120s	Pin5	Shell
001	IR	Pass	500V	>10G	120s	Pin6	Pin7
001	IR	Pass	500V	>10G	120s	Pin6	Pin8
001	IR	Pass	500V	8503M	120s	Pin6	Shell
001	IR	Pass	500V	>10G	120s	Pin7	Pin8
001	IR	Pass	500V	8144M	120s	Pin7	Shell
001	IR	Pass	500V	6217M	120s	Pin8	Shell
002	IR	Pass	500V	>10G	120s	Pin1	Pin2
002	IR	Pass	500V	>10G	120s	Pin1	Pin3
002	IR	Pass	500V	>10G	120s	Pin1	Pin4
002	IR	Pass	500V	>10G	120s	Pin1	Pin5
002	IR	Pass	500V	>10G	120s	Pin1	Pin6
002	IR	Pass	500V	>10G	120s	Pin1	Pin7
002	IR	Pass	500V	>10G	120s	Pin1	Pin8
002	IR	Pass	500V	7509M	120s	Pin1	Shell
002	IR	Pass	500V	>10G	120s	Pin2	Pin3
002	IR	Pass	500V	>10G	120s	Pin2	Pin4
002	IR	Pass	500V	>10G	120s	Pin2	Pin5
002	IR	Pass	500V	>10G	120s	Pin2	Pin6
002	IR	Pass	500V	>10G	120s	Pin2	Pin7
002	IR	Pass	500V	>10G	120s	Pin2	Pin8
002	IR	Pass	500V	7608M	120s	Pin2	Shell

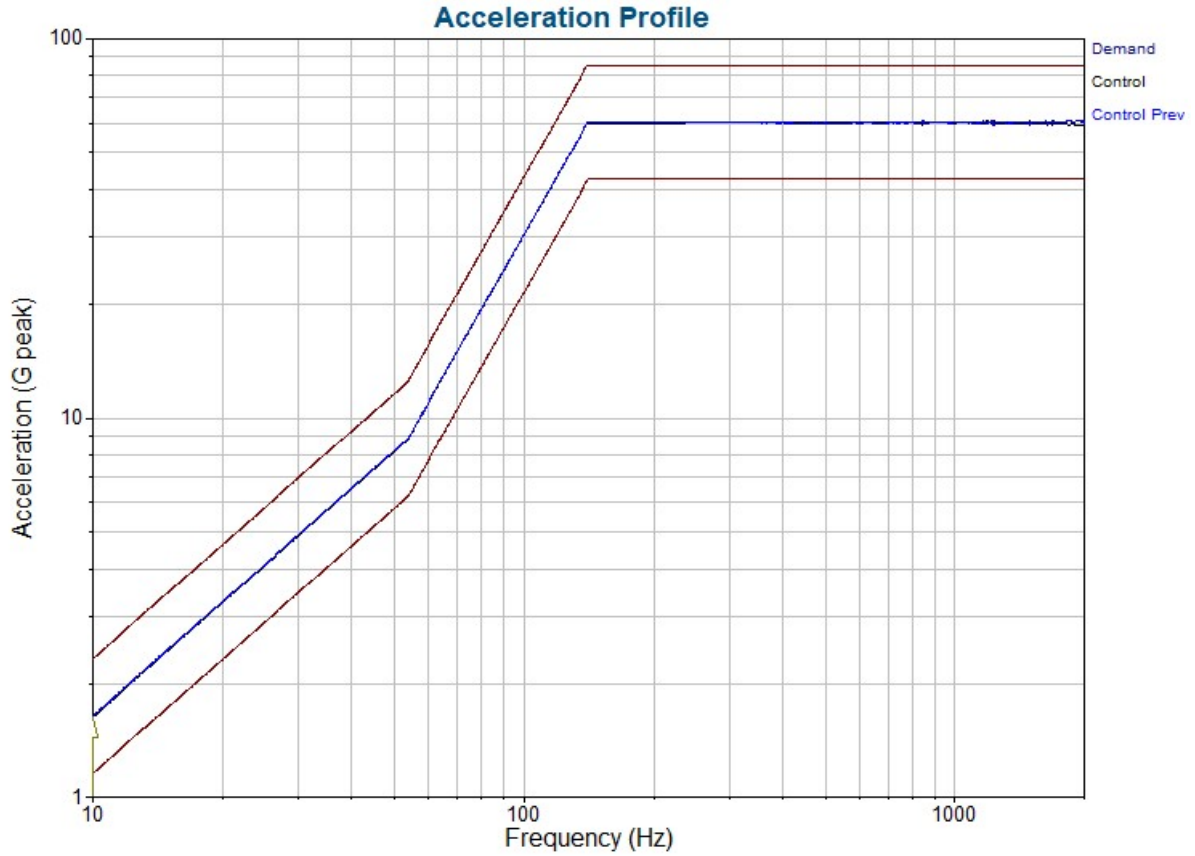


QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Test Data		

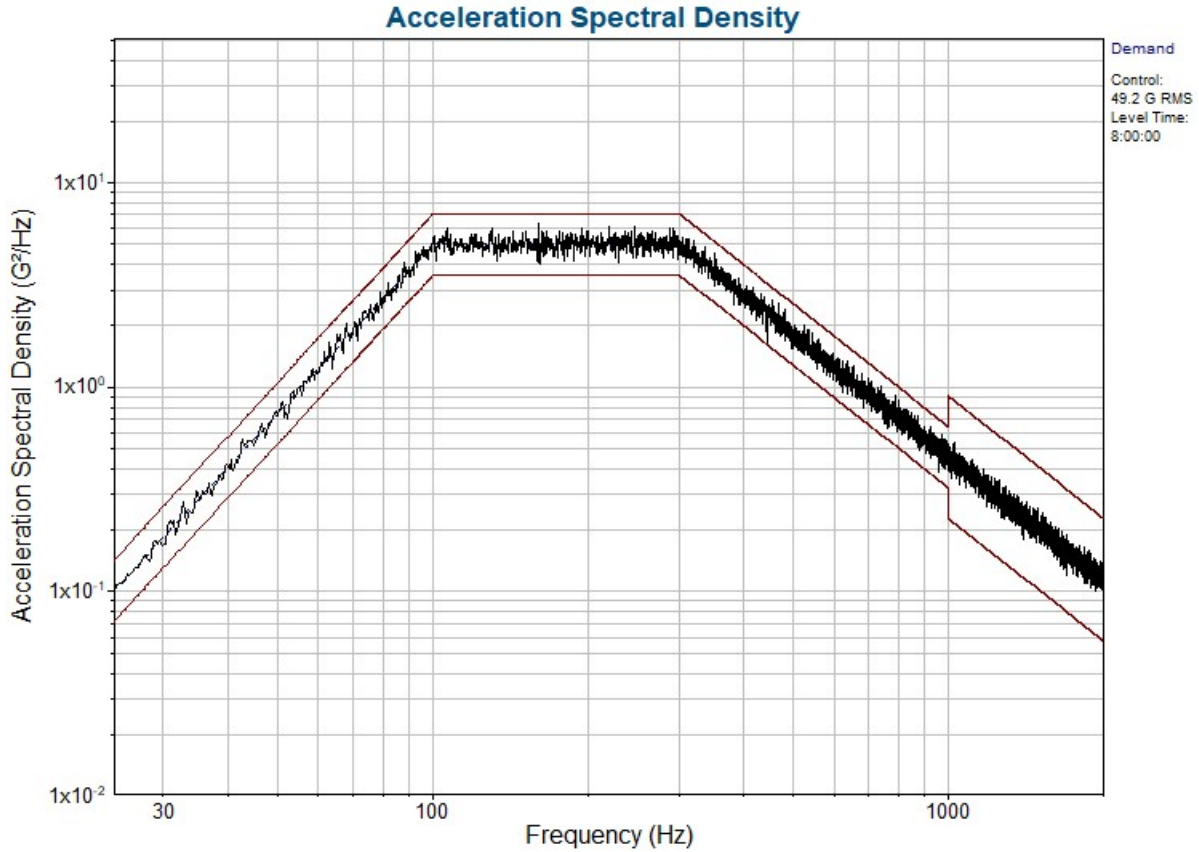
SN	Type	Pass/Fail	Test Level	Test Value	Duration	Active Pin	Ground Pin
002	IR	Pass	500V	>10G	120s	Pin3	Pin4
002	IR	Pass	500V	>10G	120s	Pin3	Pin5
002	IR	Pass	500V	>10G	120s	Pin3	Pin6
002	IR	Pass	500V	>10G	120s	Pin3	Pin7
002	IR	Pass	500V	>10G	120s	Pin3	Pin8
002	IR	Pass	500V	9637M	120s	Pin3	Shell
002	IR	Pass	500V	>10G	120s	Pin4	Pin5
002	IR	Pass	500V	>10G	120s	Pin4	Pin6
002	IR	Pass	500V	>10G	120s	Pin4	Pin7
002	IR	Pass	500V	>10G	120s	Pin4	Pin8
002	IR	Pass	500V	9969M	120s	Pin4	Shell
002	IR	Pass	500V	>10G	120s	Pin5	Pin6
002	IR	Pass	500V	>10G	120s	Pin5	Pin7
002	IR	Pass	500V	>10G	120s	Pin5	Pin8
002	IR	Pass	500V	>10G	120s	Pin5	Shell
002	IR	Pass	500V	>10G	120s	Pin6	Pin7
002	IR	Pass	500V	>10G	120s	Pin6	Pin8
002	IR	Pass	500V	9326M	120s	Pin6	Shell
002	IR	Pass	500V	>10G	120s	Pin7	Pin8
002	IR	Pass	500V	9479M	120s	Pin7	Shell
002	IR	Pass	500V	9969M	120s	Pin8	Shell

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Test Plots		

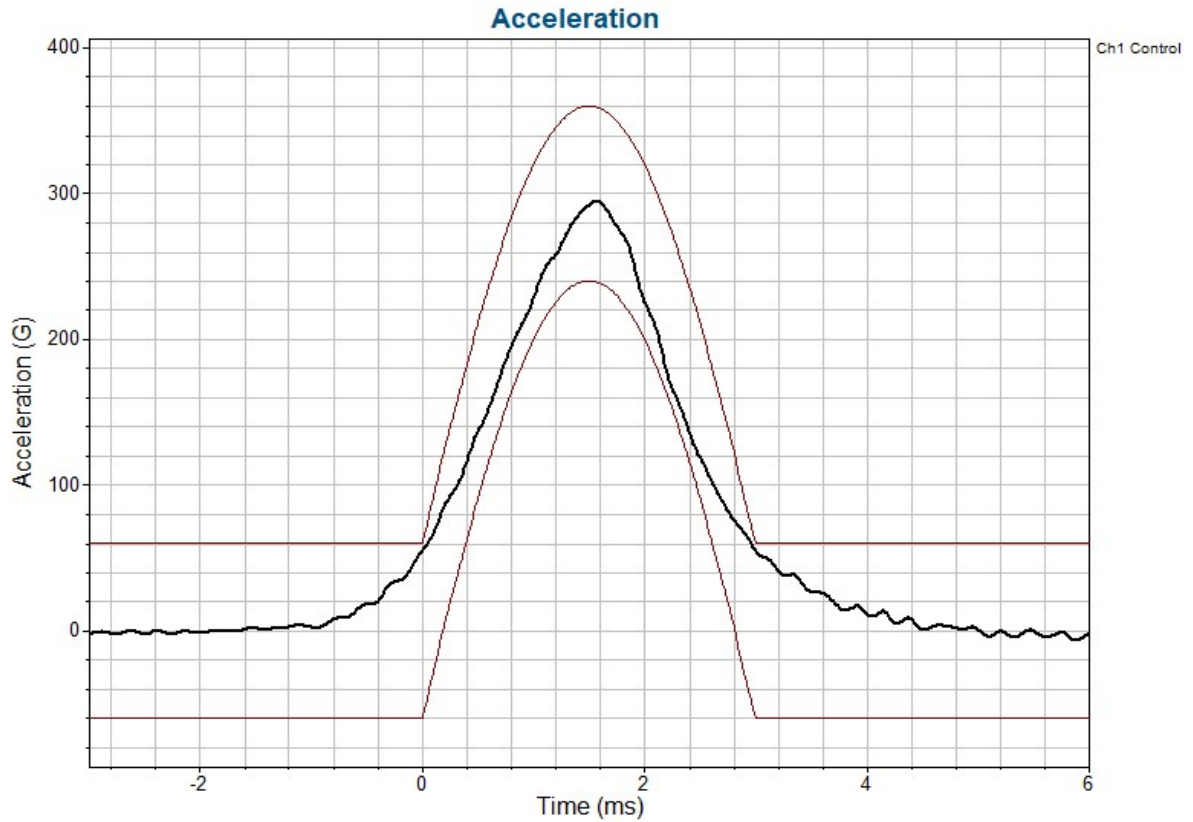


Description	Typical Sine Vibration Plot
Test Name	Sine Vibration
Part Name	Hermetic SpeedMaster Connector
Test Group	-
Part No.	233-263-H7ZL11-1SN-1
Serial No.	001

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Test Plots		



Description	Typical Random Vibration Plot
Test Name	Random Vibration
Part Name	Hermetic SpeedMaster Connector
Test Group	-
Part No.	233-263-H7ZL11-1SN-1
Serial No.	002



Description	Typical Shock Vibration Plot
Test Name	Shock Vibration
Part Name	Hermetic SpeedMaster Connector
Test Group	-
Part No.	233-263-H7ZL11-1SN-1
Serial No.	001, 002

QTP-870 Test Data Sheet

Doc. No.

19315D1BMV4

Version

4

Sheet Name

Test Photos



Description	Temperature Cycling Setup
Test Name	Temperature Cycling
Part Name	Hermetic SpeedMaster Connector
Test Group	-
Part No.	233-263-H7ZL11-1SN-1
Serial No.	001, 002

QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Test Photos		



Description	Air Leakage Test Setup
Test Name	Air Leakage
Part Name	Hermetic SpeedMaster Connector
Test Group	-
Part No.	233-263-H7ZL11-1SN-1
Serial No.	001, 002

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Test Photos		



Description	Insulation Resistance @ Elevated Temperature Setup
Test Name	Insulation Resistance @ Elevated Temperature
Part Name	Hermetic SpeedMaster Connector
Test Group	-
Part No.	233-263-H7ZL11-1SN-1
Serial No.	001, 002

QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Test Photos		



Description	Typical Random Vibration Test Setup
Test Name	Random Vibration
Part Name	Hermetic SpeedMaster Connector
Test Group	-
Part No.	233-263-H7ZL11-1SN-1
Serial No.	001, 002

QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Test Photos		



Description	Typical Sine Vibration Test Setup
Test Name	Sine Vibration
Part Name	Hermetic SpeedMaster Connector
Test Group	-
Part No.	233-263-H7ZL11-1SN-1
Serial No.	001, 002

QTP-870 Test Data Sheet

Doc. No.	19315D1BMV4	Version	4
Sheet Name	Test Photos		



Description	Typical Shock Testing Setup
Test Name	Shock Test
Part Name	Hermetic SpeedMaster Connector
Test Group	-
Part No.	233-263-H7ZL11-1SN-1
Serial No.	001, 002

End of Test Data Sheet

TEST REPORT
No. GT-20-268
October 12, 2020



Glenair, Inc. 1211 Air Way, Glendale, California, 91201
Tel: (818) 247-6000 Fax: (818) 247-7240

APPENDIX C

Fluke Network Analyzer Post Test Ethernet Performance Checks



Cable ID: INITIAL 001

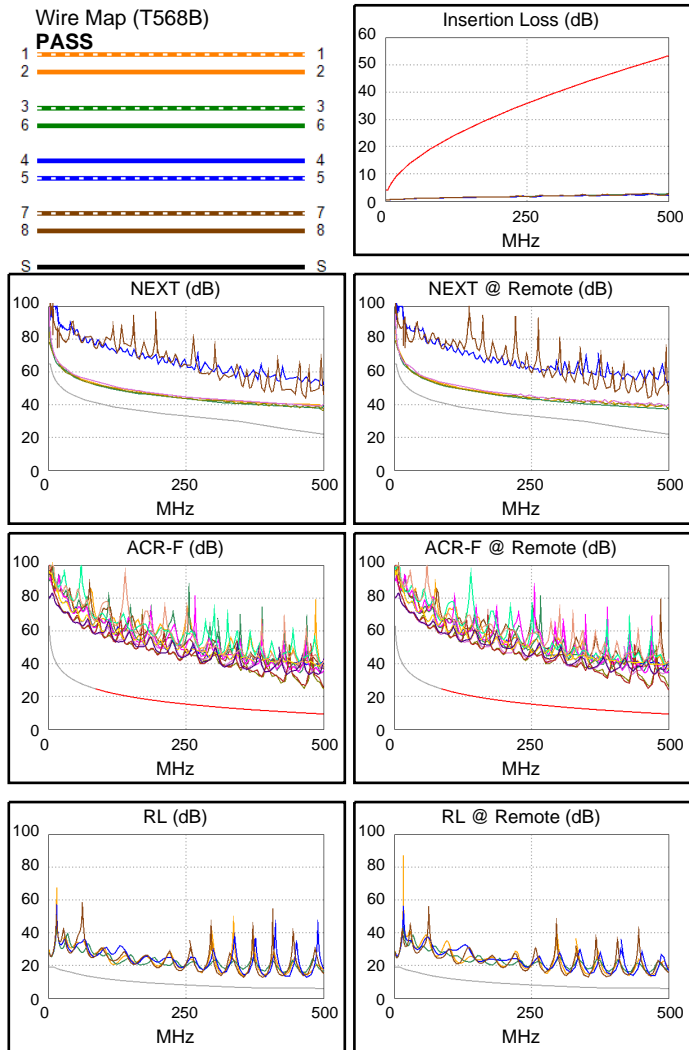
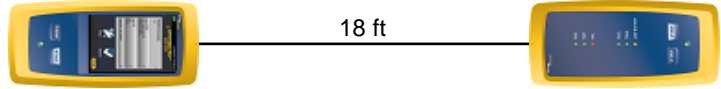
Date / Time: 12/26/2019 09:11:47 AM
Headroom 9.5 dB (NEXT 12-45)
Test Limit: 10GBASE-T
 Cable Type: Cat 6A F/UTP
 NVP: 74.0%

Operator: Vertical Labs
 Software Version: V6.4 Build 4
 Limits Version: V7.4
 Calibration Date:
 Main (Module): 09/23/2019
 Remote (Module): 09/23/2019

Test Summary: PASS

Model: DSX-5000
 Main S/N: 2766289
 Remote S/N: 2766352
 Main Adapter: DSX-CHA004
 Remote Adapter: DSX-CHA004

Length (ft), Limit 328	[Pair 12]	18
Prop. Delay (ns), Limit 555	[Pair 78]	25
Delay Skew (ns), Limit 50	[Pair 12]	0
Resistance (ohms), Limit 25.00	[Pair 78]	1.02
Insertion Loss Margin (dB)	[Pair 78]	48.6
Frequency (MHz)	[Pair 78]	470.0
Limit (dB)	[Pair 78]	51.5



Worst Case Margin Worst Case Value

N/A	MAIN	SR	MAIN	SR
Worst Pair	12-45	12-45	36-78	12-45
NEXT (dB)	9.5	9.5	14.5	13.8
Freq. (MHz)	318.0	280.0	499.0	474.0
Limit (dB)	31.3	32.3	22.0	23.1
Worst Pair	45	12	36	36
PS NEXT (dB)	10.1	10.1	13.4	13.9
Freq. (MHz)	316.0	285.0	500.0	500.0
Limit (dB)	28.4	29.2	20.4	20.4

PASS	MAIN	SR	MAIN	SR
Worst Pair	36-45	45-36	36-45	45-36
ACR-F (dB)	15.1	14.6	15.3	14.6
Freq. (MHz)	464.0	500.0	500.0	500.0
Limit (dB)	9.9	9.3	9.3	9.3
Worst Pair	45	36	45	36
PS ACR-F (dB)	17.9	17.3	17.9	17.3
Freq. (MHz)	500.0	500.0	500.0	500.0
Limit (dB)	6.3	6.3	6.3	6.3

N/A	MAIN	SR	MAIN	SR
Worst Pair	36	78	45	78
RL (dB)	6.2	5.5	6.7	6.3
Freq. (MHz)	4.8	4.6	471.0	352.0
Limit (dB)	19.0	19.0	6.0	6.5

Compliant Network Standards:
 10BASE-T 100BASE-TX 100BASE-T4
 1000BASE-T 10GBASE-T ATM-25
 ATM-51 ATM-155 100VG-AnyLan
 TR-4 TR-16 Active TR-16 Passive



Cable ID: INITIAL 002

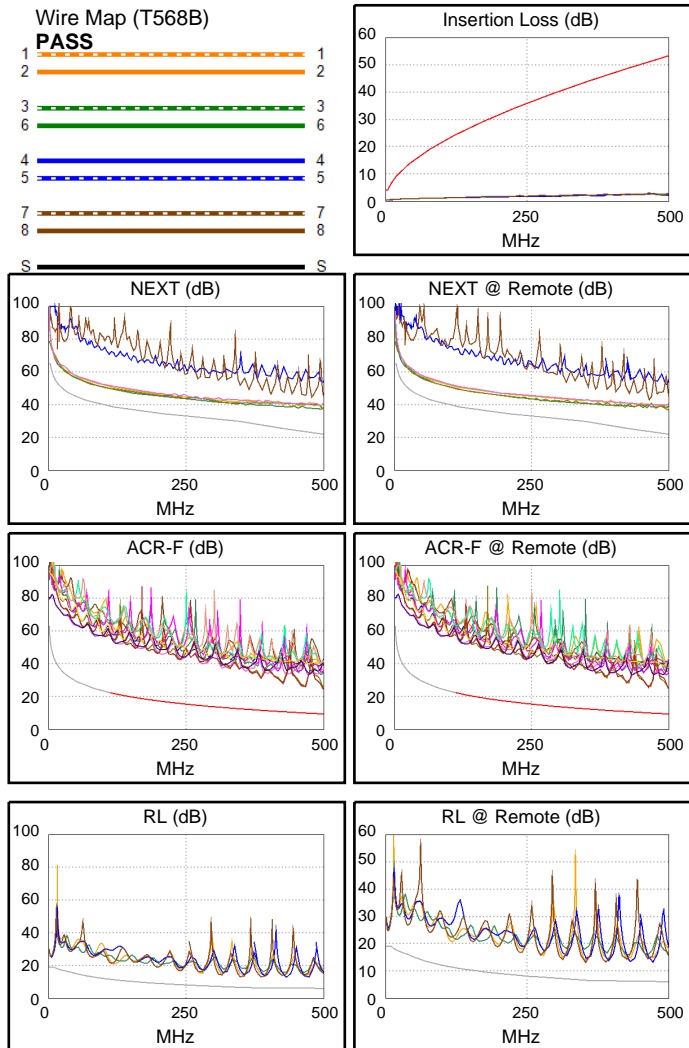
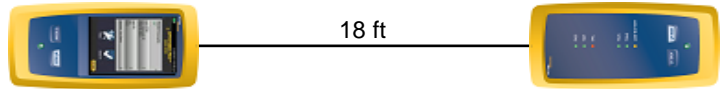
Date / Time: 12/26/2019 09:57:31 AM
Headroom 9.4 dB (NEXT 12-45)
Test Limit: 10GBASE-T
 Cable Type: Cat 6A F/UTP
 NVP: 74.0%

Operator: Vertical Labs
 Software Version: V6.4 Build 4
 Limits Version: V7.4
 Calibration Date:
 Main (Module): 09/23/2019
 Remote (Module): 09/23/2019

Test Summary: PASS

Model: DSX-5000
 Main S/N: 2766289
 Remote S/N: 2766352
 Main Adapter: DSX-CHA004
 Remote Adapter: DSX-CHA004

Length (ft), Limit 328	[Pair 12]	18
Prop. Delay (ns), Limit 555	[Pair 78]	25
Delay Skew (ns), Limit 50	[Pair 12]	0
Resistance (ohms), Limit 25.00	[Pair 12]	1.02
Insertion Loss Margin (dB)	[Pair 78]	48.6
Frequency (MHz)	[Pair 78]	470.0
Limit (dB)	[Pair 78]	51.5



Worst Case Margin Worst Case Value

N/A	MAIN	SR	MAIN	SR
Worst Pair	12-45	12-45	12-45	36-78
NEXT (dB)	9.4	9.5	13.7	14.9
Freq. (MHz)	280.0	316.0	474.0	499.0
Limit (dB)	32.3	31.4	23.1	22.0
Worst Pair	12	45	36	36
PS NEXT (dB)	10.1	10.2	13.7	13.6
Freq. (MHz)	282.0	316.0	500.0	500.0
Limit (dB)	29.2	28.4	20.4	20.4

PASS	MAIN	SR	MAIN	SR
Worst Pair	45-36	45-36	45-36	45-36
ACR-F (dB)	15.0	15.3	15.0	15.3
Freq. (MHz)	500.0	500.0	500.0	500.0
Limit (dB)	9.3	9.3	9.3	9.3
Worst Pair	36	36	36	36
PS ACR-F (dB)	17.7	18.0	17.7	18.0
Freq. (MHz)	500.0	500.0	500.0	500.0
Limit (dB)	6.3	6.3	6.3	6.3

N/A	MAIN	SR	MAIN	SR
Worst Pair	36	78	45	78
RL (dB)	6.0	5.6	6.6	6.4
Freq. (MHz)	4.8	4.4	471.0	354.0
Limit (dB)	19.0	19.0	6.0	6.5

Compliant Network Standards:
 10BASE-T 100BASE-TX 100BASE-T4
 1000BASE-T 10GBASE-T ATM-25
 ATM-51 ATM-155 100VG-AnyLan
 TR-4 TR-16 Active TR-16 Passive



Cable ID: POST TS 001

Date / Time: 01/09/2020 03:37:12 PM

Headroom 9.8 dB (NEXT 36-78)

Test Limit: 10GBASE-T

Cable Type: Cat 6A F/UTP

NVP: 74.0%

Operator: Vertical Labs

Software Version: V6.4 Build 4

Limits Version: V7.4

Calibration Date:

Main (Module): 09/23/2019

Remote (Module): 09/23/2019

Test Summary: PASS

Model: DSX-5000

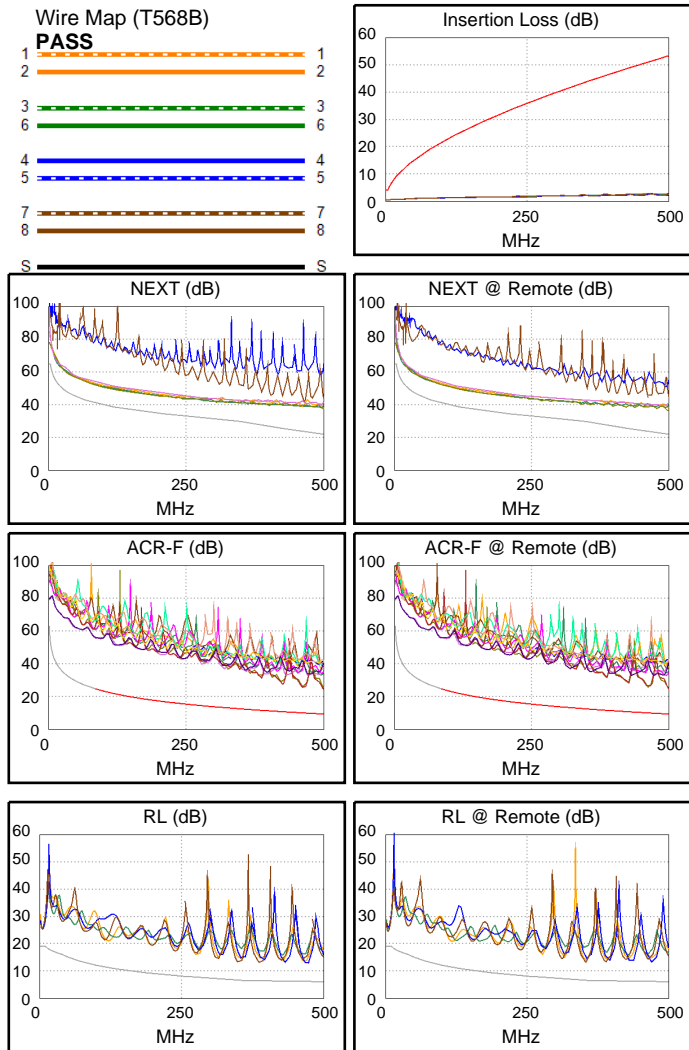
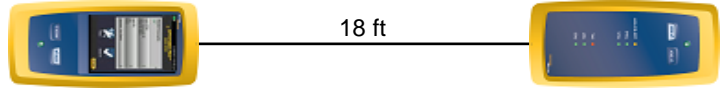
Main S/N: 2766289

Remote S/N: 2766352

Main Adapter: DSX-CHA004

Remote Adapter: DSX-CHA004

Length (ft), Limit 328	[Pair 12]	18
Prop. Delay (ns), Limit 555	[Pair 78]	25
Delay Skew (ns), Limit 50	[Pair 12]	0
Resistance (ohms), Limit 25.00	[Pair 12]	1.06
Insertion Loss Margin (dB)	[Pair 78]	48.4
Frequency (MHz)	[Pair 78]	467.0
Limit (dB)	[Pair 78]	51.3



Worst Case Margin Worst Case Value

N/A	MAIN	SR	MAIN	SR
Worst Pair	36-78	36-78	12-45	36-78
NEXT (dB)	9.9	9.8	14.5	14.5
Freq. (MHz)	305.0	303.0	474.0	498.0
Limit (dB)	31.6	31.7	23.1	22.1
Worst Pair	12	36	36	36
PS NEXT (dB)	10.6	10.5	13.8	13.5
Freq. (MHz)	281.0	304.0	500.0	500.0
Limit (dB)	29.3	28.7	20.4	20.4

PASS	MAIN	SR	MAIN	SR
Worst Pair	45-36	45-36	45-36	45-36
ACR-F (dB)	15.0	15.3	15.0	15.3
Freq. (MHz)	500.0	500.0	500.0	500.0
Limit (dB)	9.3	9.3	9.3	9.3
Worst Pair	36	36	36	36
PS ACR-F (dB)	17.7	18.0	17.7	18.0
Freq. (MHz)	500.0	500.0	500.0	500.0
Limit (dB)	6.3	6.3	6.3	6.3

N/A	MAIN	SR	MAIN	SR
Worst Pair	36	78	45	45
RL (dB)	6.2	5.5	6.7	7.1
Freq. (MHz)	5.4	4.5	471.0	471.0
Limit (dB)	19.0	19.0	6.0	6.0

Compliant Network Standards:

10BASE-T	100BASE-TX	100BASE-T4
1000BASE-T	10GBASE-T	ATM-25
ATM-51	ATM-155	100VG-AnyLan
TR-4	TR-16 Active	TR-16 Passive



Cable ID: POST TS 002

Date / Time: 01/09/2020 03:39:13 PM

Headroom 8.9 dB (NEXT 12-36)

Test Limit: 10GBASE-T

Cable Type: Cat 6A F/UTP

NVP: 74.0%

Operator: Vertical Labs

Software Version: V6.4 Build 4

Limits Version: V7.4

Calibration Date:

Main (Module): 09/23/2019

Remote (Module): 09/23/2019

Test Summary: PASS

Model: DSX-5000

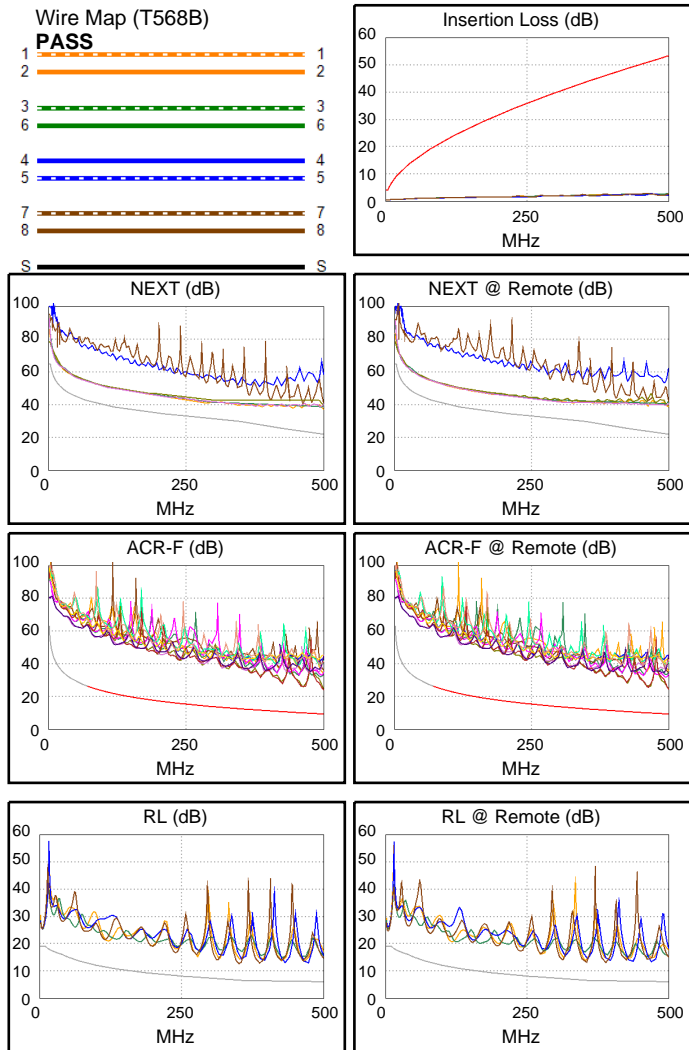
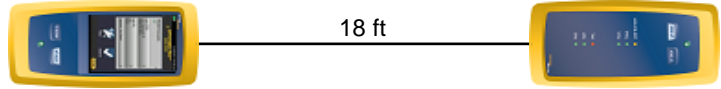
Main S/N: 2766289

Remote S/N: 2766352

Main Adapter: DSX-CHA004

Remote Adapter: DSX-CHA004

Length (ft), Limit 328	[Pair 12]	18
Prop. Delay (ns), Limit 555	[Pair 78]	25
Delay Skew (ns), Limit 50	[Pair 12]	0
Resistance (ohms), Limit 25.00	[Pair 45]	1.04
Insertion Loss Margin (dB)	[Pair 36]	50.5
Frequency (MHz)	[Pair 36]	500.0
Limit (dB)	[Pair 36]	53.4



Worst Case Margin Worst Case Value

N/A	MAIN	SR	MAIN	SR
Worst Pair	12-36	12-36	12-36	12-36
NEXT (dB)	8.9	9.7	14.9	16.6
Freq. (MHz)	288.0	309.0	500.0	500.0
Limit (dB)	32.1	31.5	22.0	22.0
Worst Pair	45	45	36	36
PS NEXT (dB)	9.3	9.8	13.9	14.8
Freq. (MHz)	316.0	316.0	500.0	500.0
Limit (dB)	28.4	28.4	20.4	20.4

PASS	MAIN	SR	MAIN	SR
Worst Pair	45-36	45-36	45-36	45-36
ACR-F (dB)	14.6	15.0	14.6	15.0
Freq. (MHz)	500.0	500.0	500.0	500.0
Limit (dB)	9.3	9.3	9.3	9.3
Worst Pair	36	36	36	36
PS ACR-F (dB)	17.2	17.7	17.2	17.7
Freq. (MHz)	500.0	500.0	500.0	500.0
Limit (dB)	6.3	6.3	6.3	6.3

N/A	MAIN	SR	MAIN	SR
Worst Pair	78	78	45	78
RL (dB)	6.1	5.5	6.6	6.9
Freq. (MHz)	352.0	4.6	471.0	390.0
Limit (dB)	6.5	19.0	6.0	6.1

Compliant Network Standards:
 10BASE-T 100BASE-TX 100BASE-T4
 1000BASE-T 10GBASE-T ATM-25
 ATM-51 ATM-155 100VG-AnyLan
 TR-4 TR-16 Active TR-16 Passive



Cable ID: POST IR@T 001

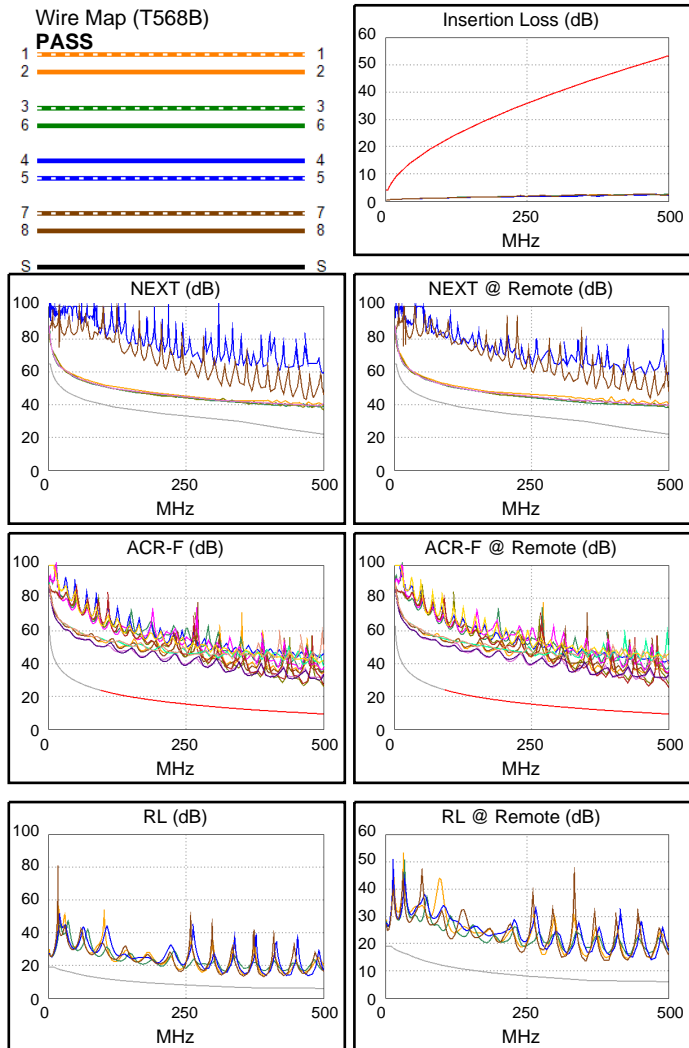
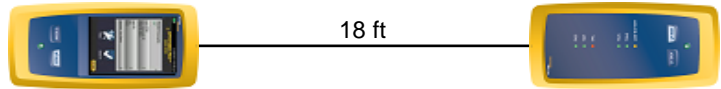
Date / Time: 01/17/2020 07:50:16 AM
Headroom 10.2 dB (NEXT 12-45)
Test Limit: 10GBASE-T
 Cable Type: Cat 6A F/UTP
 NVP: 74.0%

Operator: Vertical Labs
 Software Version: V6.4 Build 4
 Limits Version: V7.4
 Calibration Date:
 Main (Module): 09/23/2019
 Remote (Module): 09/23/2019

Test Summary: PASS

Model: DSX-5000
 Main S/N: 2766289
 Remote S/N: 2766352
 Main Adapter: DSX-CHA004
 Remote Adapter: DSX-CHA004

Length (ft), Limit 328	[Pair 12]	18
Prop. Delay (ns), Limit 555	[Pair 78]	25
Delay Skew (ns), Limit 50	[Pair 12]	0
Resistance (ohms), Limit 25.00	[Pair 12]	1.06
Insertion Loss Margin (dB)	[Pair 78]	48.7
Frequency (MHz)	[Pair 78]	469.0
Limit (dB)	[Pair 78]	51.5



Worst Case Margin Worst Case Value

N/A	MAIN	SR	MAIN	SR
Worst Pair	12-45	12-45	36-78	12-45
NEXT (dB)	10.2	10.5	14.9	16.1
Freq. (MHz)	316.0	316.0	500.0	497.0
Limit (dB)	31.4	31.4	22.0	22.1
Worst Pair	45	45	36	45
PS NEXT (dB)	10.4	10.8	14.1	14.4
Freq. (MHz)	316.0	316.0	500.0	475.0
Limit (dB)	28.4	28.4	20.4	21.4

PASS	MAIN	SR	MAIN	SR
Worst Pair	36-45	45-36	36-45	45-36
ACR-F (dB)	16.4	16.1	16.7	16.1
Freq. (MHz)	465.0	500.0	500.0	500.0
Limit (dB)	9.9	9.3	9.3	9.3
Worst Pair	45	36	36	36
PS ACR-F (dB)	19.2	18.3	19.3	18.3
Freq. (MHz)	465.0	500.0	500.0	500.0
Limit (dB)	6.9	6.3	6.3	6.3

N/A	MAIN	SR	MAIN	SR
Worst Pair	36	78	78	78
RL (dB)	6.1	5.6	6.9	7.2
Freq. (MHz)	6.0	3.5	392.0	391.0
Limit (dB)	19.0	19.0	6.1	6.1

Compliant Network Standards:
 10BASE-T 100BASE-TX 100BASE-T4
 1000BASE-T 10GBASE-T ATM-25
 ATM-51 ATM-155 100VG-AnyLan
 TR-4 TR-16 Active TR-16 Passive



Cable ID: POST IR@T 002

Date / Time: 01/17/2020 07:51:46 AM

Headroom 9.5 dB (NEXT 45-78)

Test Limit: 10GBASE-T

Cable Type: Cat 6A F/UTP

NVP: 74.0%

Operator: Vertical Labs

Software Version: V6.4 Build 4

Limits Version: V7.4

Calibration Date:

Main (Module): 09/23/2019

Remote (Module): 09/23/2019

Test Summary: PASS

Model: DSX-5000

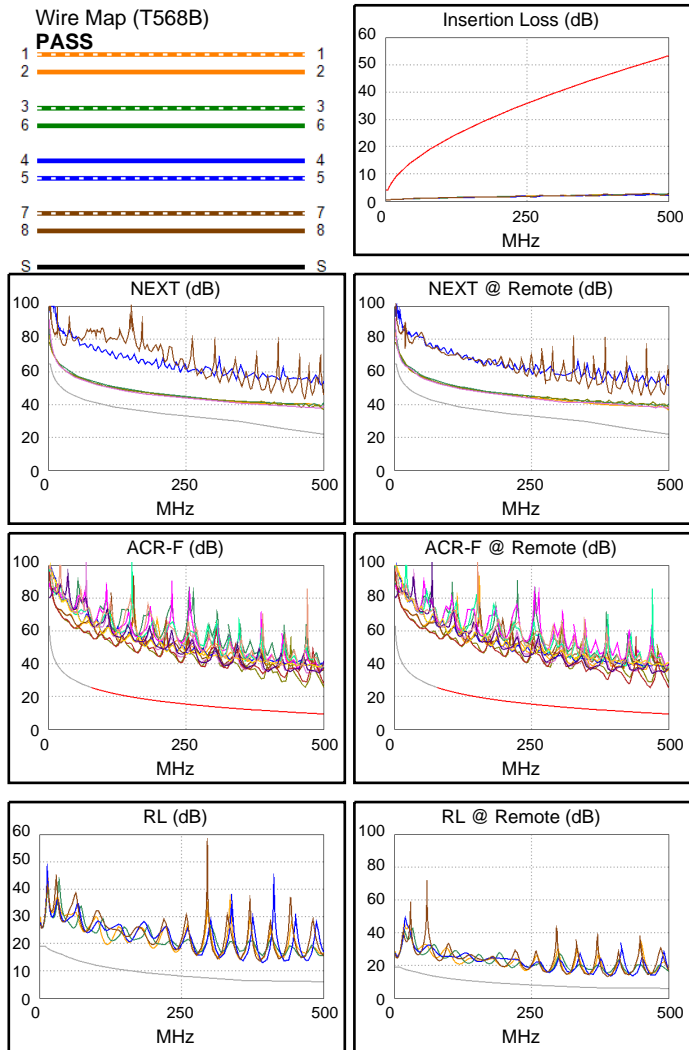
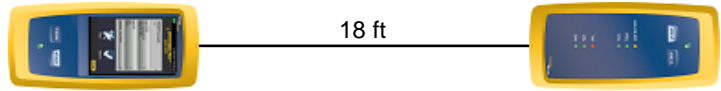
Main S/N: 2766289

Remote S/N: 2766352

Main Adapter: DSX-CHA004

Remote Adapter: DSX-CHA004

Length (ft), Limit 328	[Pair 12]	18
Prop. Delay (ns), Limit 555	[Pair 78]	25
Delay Skew (ns), Limit 50	[Pair 12]	0
Resistance (ohms), Limit 25.00	[Pair 78]	1.05
Insertion Loss Margin (dB)	[Pair 78]	48.7
Frequency (MHz)	[Pair 78]	469.0
Limit (dB)	[Pair 78]	51.5



Worst Case Margin Worst Case Value

N/A	MAIN	SR	MAIN	SR
Worst Pair	45-78	45-78	12-36	12-36
NEXT (dB)	9.6	9.5	15.3	14.7
Freq. (MHz)	315.0	317.0	500.0	500.0
Limit (dB)	31.4	31.3	22.0	22.0
Worst Pair	45	45	36	36
PS NEXT (dB)	10.3	10.3	13.7	14.0
Freq. (MHz)	316.0	317.0	500.0	500.0
Limit (dB)	28.4	28.3	20.4	20.4

PASS	MAIN	SR	MAIN	SR
Worst Pair	36-45	45-36	36-45	45-36
ACR-F (dB)	15.7	15.5	15.7	15.9
Freq. (MHz)	466.0	466.0	466.0	500.0
Limit (dB)	9.9	9.9	9.9	9.3
Worst Pair	45	36	45	36
PS ACR-F (dB)	18.6	18.1	19.2	18.5
Freq. (MHz)	466.0	466.0	500.0	500.0
Limit (dB)	6.9	6.9	6.3	6.3

N/A	MAIN	SR	MAIN	SR
Worst Pair	78	78	45	78
RL (dB)	6.5	5.4	6.7	7.0
Freq. (MHz)	4.6	4.5	395.0	391.0
Limit (dB)	19.0	19.0	6.0	6.1

Compliant Network Standards:
 10BASE-T 100BASE-TX 100BASE-T4
 1000BASE-T 10GBASE-T ATM-25
 ATM-51 ATM-155 100VG-AnyLan
 TR-4 TR-16 Active TR-16 Passive



Cable ID: POST SINE 001

Date / Time: 02/04/2020 11:04:56 AM

Headroom 8.8 dB (NEXT 45-78)

Test Limit: 10GBASE-T

Cable Type: Cat 6A F/UTP

NVP: 74.0%

Operator: Vertical Labs

Software Version: V6.4 Build 4

Limits Version: V7.4

Calibration Date:

Main (Module): 09/23/2019

Remote (Module): 09/23/2019

Test Summary: PASS

Model: DSX-5000

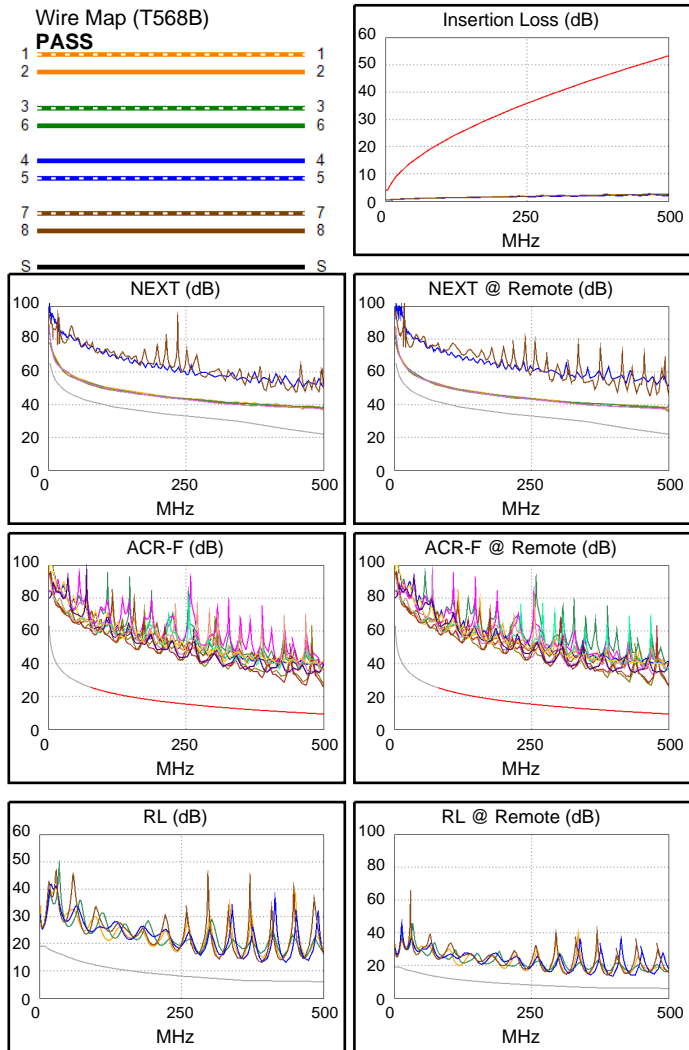
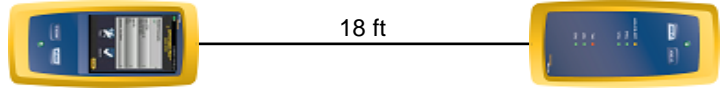
Main S/N: 2766289

Remote S/N: 2766352

Main Adapter: DSX-CHA004

Remote Adapter: DSX-CHA004

Length (ft), Limit 328	[Pair 12]	18
Prop. Delay (ns), Limit 555	[Pair 78]	25
Delay Skew (ns), Limit 50	[Pair 12]	0
Resistance (ohms), Limit 25.00	[Pair 12]	1.06
Insertion Loss Margin (dB)	[Pair 78]	48.7
Frequency (MHz)	[Pair 78]	468.0
Limit (dB)	[Pair 78]	51.4



Worst Case Margin Worst Case Value

N/A	MAIN	SR	MAIN	SR
Worst Pair	45-78	45-78	12-36	36-78
NEXT (dB)	8.8	8.9	14.3	14.2
Freq. (MHz)	317.0	316.0	500.0	500.0
Limit (dB)	31.3	31.4	22.0	22.0
Worst Pair	45	45	36	36
PS NEXT (dB)	9.3	9.3	13.2	12.9
Freq. (MHz)	317.0	316.0	500.0	500.0
Limit (dB)	28.3	28.4	20.4	20.4

PASS	MAIN	SR	MAIN	SR
Worst Pair	45-36	36-45	45-36	36-45
ACR-F (dB)	16.2	16.7	16.2	16.8
Freq. (MHz)	500.0	466.0	500.0	500.0
Limit (dB)	9.3	9.9	9.3	9.3
Worst Pair	36	45	36	45
PS ACR-F (dB)	18.7	19.5	18.7	19.5
Freq. (MHz)	500.0	500.0	500.0	500.0
Limit (dB)	6.3	6.3	6.3	6.3

N/A	MAIN	SR	MAIN	SR
Worst Pair	45	78	45	45
RL (dB)	6.4	6.0	7.1	7.2
Freq. (MHz)	5.1	4.5	436.0	396.0
Limit (dB)	19.0	19.0	6.0	6.0

Compliant Network Standards:
 10BASE-T 100BASE-TX 100BASE-T4
 1000BASE-T 10GBASE-T ATM-25
 ATM-51 ATM-155 100VG-AnyLan
 TR-4 TR-16 Active TR-16 Passive



Cable ID: POST RANDOM 002

Date / Time: 02/06/2020 10:34:25 AM

Headroom 9.7 dB (NEXT 36-78)

Test Limit: 10GBASE-T

Cable Type: Cat 6A F/UTP

NVP: 74.0%

Operator: Vertical Labs

Software Version: V6.4 Build 4

Limits Version: V7.4

Calibration Date:

Main (Module): 09/23/2019

Remote (Module): 09/23/2019

Test Summary: PASS

Model: DSX-5000

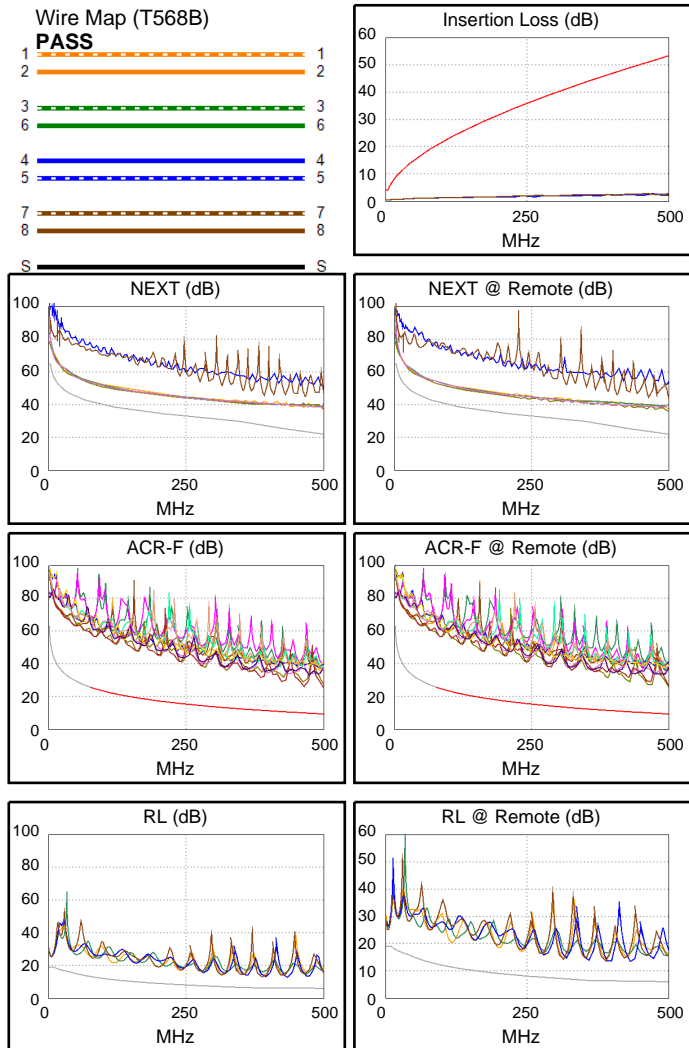
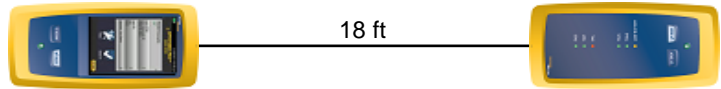
Main S/N: 2766289

Remote S/N: 2766352

Main Adapter: DSX-CHA004

Remote Adapter: DSX-CHA004

Length (ft), Limit 328	[Pair 12]	18
Prop. Delay (ns), Limit 555	[Pair 78]	25
Delay Skew (ns), Limit 50	[Pair 12]	0
Resistance (ohms), Limit 25.00	[Pair 12]	1.03
Insertion Loss Margin (dB)	[Pair 78]	48.7
Frequency (MHz)	[Pair 78]	469.0
Limit (dB)	[Pair 78]	51.5



Worst Case Margin Worst Case Value

N/A	MAIN	SR	MAIN	SR
Worst Pair	45-78	36-78	12-36	36-78
NEXT (dB)	9.8	9.7	14.8	14.3
Freq. (MHz)	317.0	283.0	500.0	499.0
Limit (dB)	31.3	32.2	22.0	22.0
Worst Pair	45	78	36	36
PS NEXT (dB)	10.1	10.2	13.7	13.1
Freq. (MHz)	316.0	283.0	500.0	500.0
Limit (dB)	28.4	29.2	20.4	20.4

PASS	MAIN	SR	MAIN	SR
Worst Pair	45-36	36-45	45-36	36-45
ACR-F (dB)	15.9	16.4	15.9	16.5
Freq. (MHz)	500.0	465.0	500.0	500.0
Limit (dB)	9.3	9.9	9.3	9.3
Worst Pair	36	45	36	45
PS ACR-F (dB)	18.4	19.2	18.4	19.2
Freq. (MHz)	500.0	500.0	500.0	500.0
Limit (dB)	6.3	6.3	6.3	6.3

N/A	MAIN	SR	MAIN	SR
Worst Pair	36	78	45	45
RL (dB)	6.2	5.9	6.7	7.0
Freq. (MHz)	6.1	4.5	434.0	395.0
Limit (dB)	19.0	19.0	6.0	6.0

Compliant Network Standards:

10BASE-T	100BASE-TX	100BASE-T4
1000BASE-T	10GBASE-T	ATM-25
ATM-51	ATM-155	100VG-AnyLan
TR-4	TR-16 Active	TR-16 Passive



Cable ID: POST SK 001 W/002 CABLES

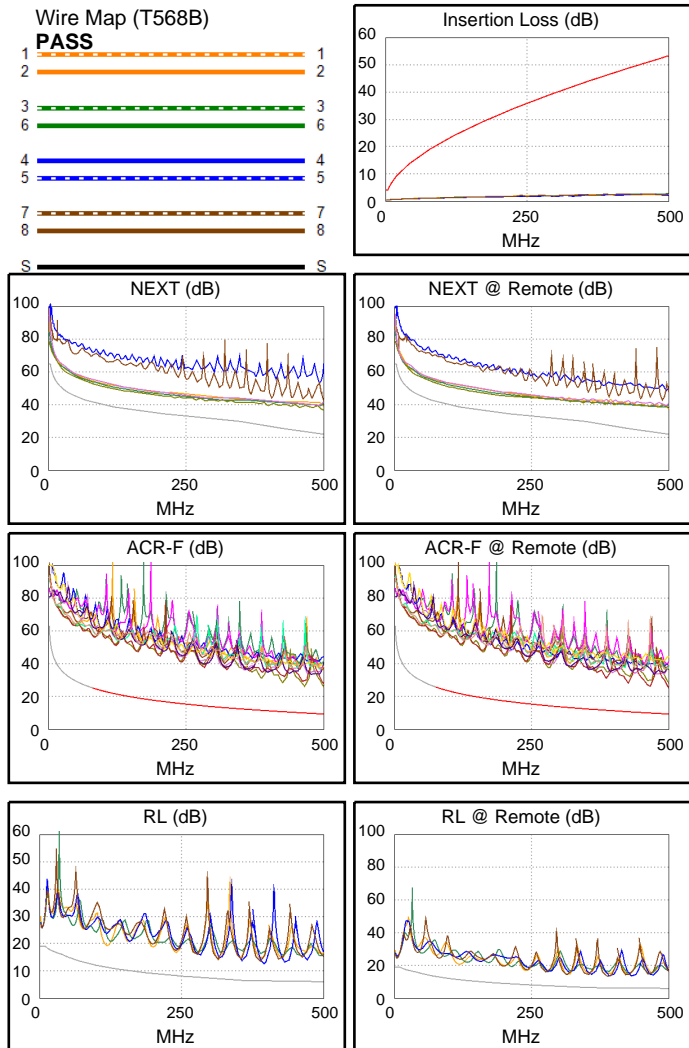
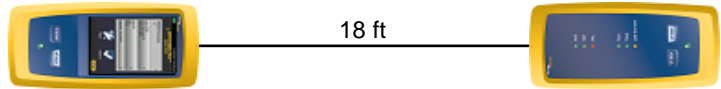
Date / Time: 02/26/2020 09:40:54 AM
Headroom 10.2 dB (NEXT 36-78)
Test Limit: 10GBASE-T
 Cable Type: Cat 6A F/UTP
 NVP: 74.0%

Operator: Vertical Labs
 Software Version: V6.4 Build 4
 Limits Version: V7.4
 Calibration Date:
 Main (Module): 09/23/2019
 Remote (Module): 09/23/2019

Test Summary: PASS

Model: DSX-5000
 Main S/N: 2766289
 Remote S/N: 2766352
 Main Adapter: DSX-CHA004
 Remote Adapter: DSX-CHA004

Length (ft), Limit 328	[Pair 12]	18
Prop. Delay (ns), Limit 555	[Pair 78]	25
Delay Skew (ns), Limit 50	[Pair 12]	0
Resistance (ohms), Limit 25.00	[Pair 45]	1.08
Insertion Loss Margin (dB)	[Pair 36]	50.6
Frequency (MHz)	[Pair 36]	500.0
Limit (dB)	[Pair 36]	53.4



Worst Case Margin Worst Case Value

N/A	MAIN	SR	MAIN	SR
Worst Pair	36-78	36-78	36-78	12-36
NEXT (dB)	10.2	10.5	15.1	15.7
Freq. (MHz)	305.0	190.0	499.0	500.0
Limit (dB)	31.6	35.2	22.0	22.0
Worst Pair	45	45	36	36
PS NEXT (dB)	10.9	10.7	13.9	14.4
Freq. (MHz)	315.0	316.0	500.0	500.0
Limit (dB)	28.4	28.4	20.4	20.4

PASS	MAIN	SR	MAIN	SR
Worst Pair	36-45	45-36	36-45	45-36
ACR-F (dB)	16.3	15.7	16.3	15.7
Freq. (MHz)	500.0	500.0	500.0	500.0
Limit (dB)	9.3	9.3	9.3	9.3
Worst Pair	45	36	45	36
PS ACR-F (dB)	19.0	18.4	19.0	18.4
Freq. (MHz)	500.0	500.0	500.0	500.0
Limit (dB)	6.3	6.3	6.3	6.3

N/A	MAIN	SR	MAIN	SR
Worst Pair	45	78	45	78
RL (dB)	6.6	5.4	6.6	7.1
Freq. (MHz)	395.0	4.5	395.0	391.0
Limit (dB)	6.0	19.0	6.0	6.1

Compliant Network Standards:
 10BASE-T 100BASE-TX 100BASE-T4
 1000BASE-T 10GBASE-T ATM-25
 ATM-51 ATM-155 100VG-AnyLan
 TR-4 TR-16 Active TR-16 Passive



Cable ID: POST SK 002

Date / Time: 02/26/2020 11:02:03 AM

Headroom 8.8 dB (NEXT 36-78)

Test Limit: 10GBASE-T

Cable Type: Cat 6A F/UTP

NVP: 74.0%

Operator: Vertical Labs

Software Version: V6.4 Build 4

Limits Version: V7.4

Calibration Date:

Main (Module): 09/23/2019

Remote (Module): 09/23/2019

Test Summary: PASS

Model: DSX-5000

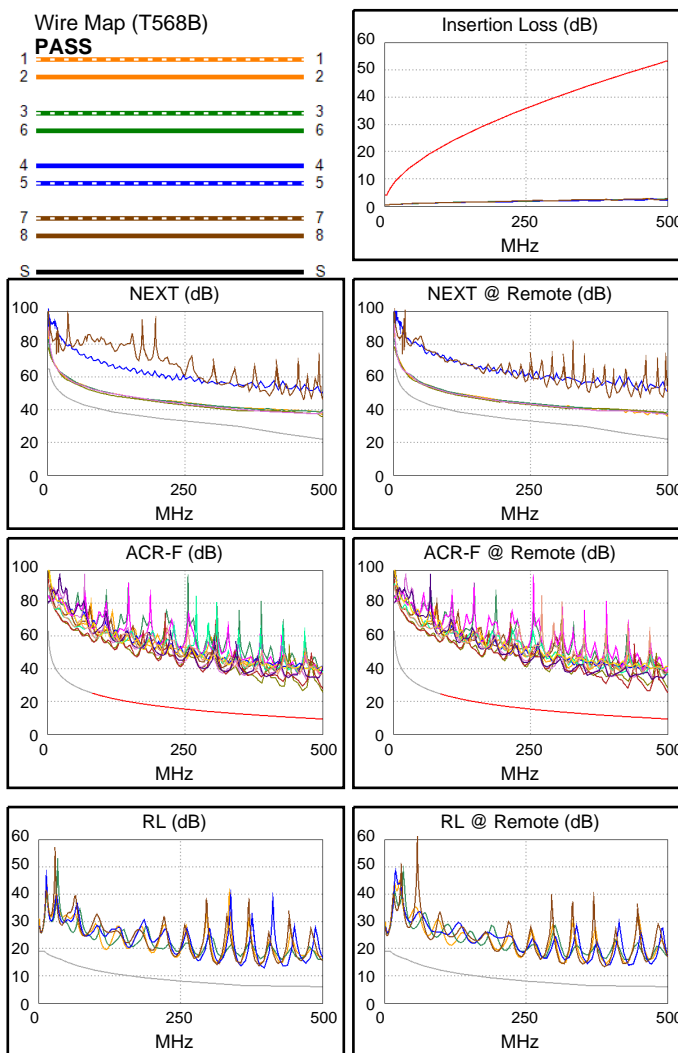
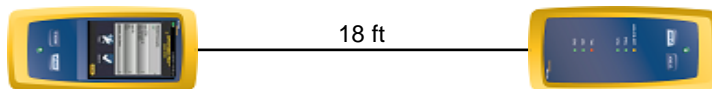
Main S/N: 2766289

Remote S/N: 2766352

Main Adapter: DSX-CHA004

Remote Adapter: DSX-CHA004

Length (ft), Limit 328	[Pair 12]	18
Prop. Delay (ns), Limit 555	[Pair 78]	25
Delay Skew (ns), Limit 50	[Pair 12]	0
Resistance (ohms), Limit 25.00	[Pair 12]	1.06
Insertion Loss Margin (dB)	[Pair 36]	50.6
Frequency (MHz)	[Pair 36]	500.0
Limit (dB)	[Pair 36]	53.4



Worst Case Margin Worst Case Value

N/A	MAIN	SR	MAIN	SR
Worst Pair	36-78	45-78	36-78	12-36
NEXT (dB)	8.8	8.9	13.9	14.1
Freq. (MHz)	284.0	317.0	499.0	500.0
Limit (dB)	32.2	31.3	22.0	22.0
Worst Pair	78	45	36	36
PS NEXT (dB)	9.3	9.4	12.9	13.1
Freq. (MHz)	285.0	316.0	500.0	500.0
Limit (dB)	29.2	28.4	20.4	20.4

PASS	MAIN	SR	MAIN	SR
Worst Pair	36-45	45-36	36-45	45-36
ACR-F (dB)	16.5	15.9	16.5	15.9
Freq. (MHz)	500.0	500.0	500.0	500.0
Limit (dB)	9.3	9.3	9.3	9.3
Worst Pair	45	36	45	36
PS ACR-F (dB)	19.1	18.5	19.1	18.5
Freq. (MHz)	500.0	500.0	500.0	500.0
Limit (dB)	6.3	6.3	6.3	6.3

N/A	MAIN	SR	MAIN	SR
Worst Pair	45	78	45	78
RL (dB)	6.7	5.6	6.7	7.1
Freq. (MHz)	395.0	4.5	395.0	390.0
Limit (dB)	6.0	19.0	6.0	6.1

Compliant Network Standards:
 10BASE-T 100BASE-TX 100BASE-T4
 1000BASE-T 10GBASE-T ATM-25
 ATM-51 ATM-155 100VG-AnyLan
 TR-4 TR-16 Active TR-16 Passive



Cable ID: POST SK 001

Date / Time: 02/26/2020 02:17:58 PM

Headroom 9.9 dB (NEXT 12-45)

Test Limit: 10GBASE-T

Cable Type: Cat 6A F/UTP

NVP: 74.0%

Operator: Vertical Labs

Software Version: V6.4 Build 4

Limits Version: V7.4

Calibration Date:

Main (Module): 09/23/2019

Remote (Module): 09/23/2019

Test Summary: PASS

Model: DSX-5000

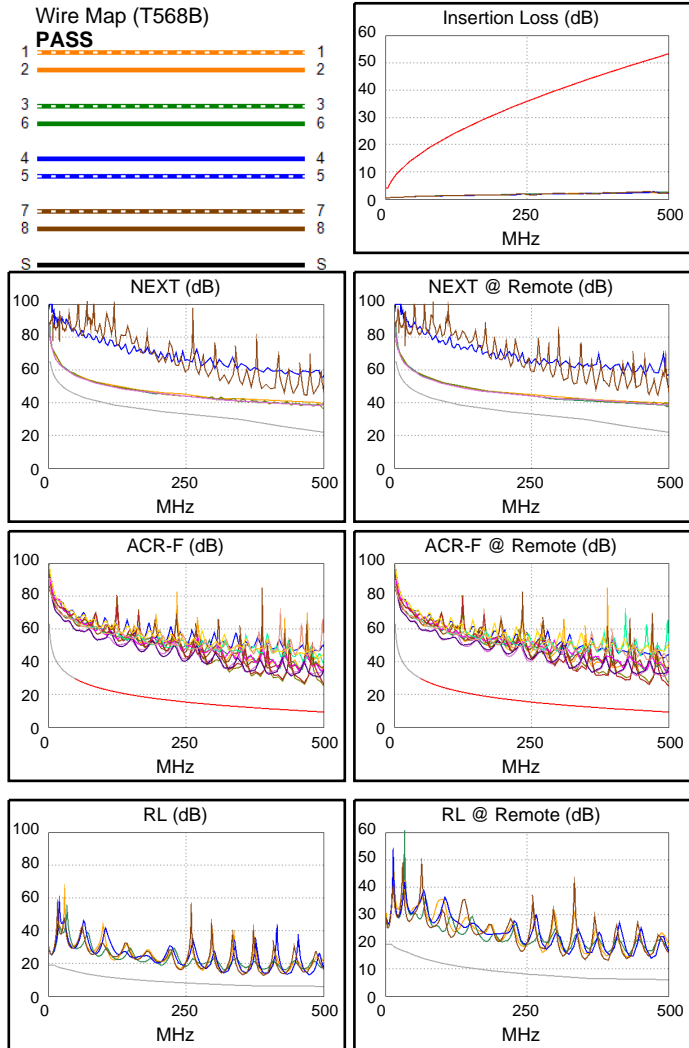
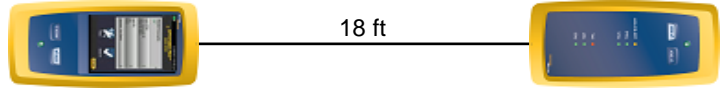
Main S/N: 2766289

Remote S/N: 2766352

Main Adapter: DSX-CHA004

Remote Adapter: DSX-CHA004

Length (ft), Limit 328	[Pair 12]	18
Prop. Delay (ns), Limit 555	[Pair 78]	25
Delay Skew (ns), Limit 50	[Pair 12]	0
Resistance (ohms), Limit 25.00	[Pair 12]	1.06
Insertion Loss Margin (dB)	[Pair 78]	48.7
Frequency (MHz)	[Pair 78]	470.0
Limit (dB)	[Pair 78]	51.5



Worst Case Margin Worst Case Value

N/A	MAIN	SR	MAIN	SR
Worst Pair	12-45	12-45	36-78	12-45
NEXT (dB)	9.9	10.2	14.4	15.7
Freq. (MHz)	319.0	318.0	500.0	498.0
Limit (dB)	31.3	31.3	22.0	22.1
Worst Pair	45	45	36	45
PS NEXT (dB)	9.8	10.1	13.6	13.7
Freq. (MHz)	316.0	316.0	500.0	476.0
Limit (dB)	28.4	28.4	20.4	21.3

PASS	MAIN	SR	MAIN	SR
Worst Pair	36-45	45-36	36-45	45-36
ACR-F (dB)	16.1	15.6	16.1	15.6
Freq. (MHz)	500.0	500.0	500.0	500.0
Limit (dB)	9.3	9.3	9.3	9.3
Worst Pair	45	36	45	36
PS ACR-F (dB)	18.6	18.1	18.6	18.1
Freq. (MHz)	500.0	500.0	500.0	500.0
Limit (dB)	6.3	6.3	6.3	6.3

N/A	MAIN	SR	MAIN	SR
Worst Pair	36	78	78	78
RL (dB)	6.1	5.8	6.5	6.8
Freq. (MHz)	5.9	4.4	392.0	392.0
Limit (dB)	19.0	19.0	6.1	6.1

Compliant Network Standards:
 10BASE-T 100BASE-TX 100BASE-T4
 1000BASE-T 10GBASE-T ATM-25
 ATM-51 ATM-155 100VG-AnyLan
 TR-4 TR-16 Active TR-16 Passive