Product Data Sheet

3M™ High Routability Internal miniSAS Cable Assembly, 68-position

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1.0 Scope

This data sheet summarizes test methods, test conditions and product performance for the 3M High Routability Internal miniSAS Cable Assembly, 68-position.

2.0 Product Tested

Product:	**High Routability Internal miniSAS Cable Assembly, 68-position**
Product Number:	**8F68-AAXX05-X.XX**
Related Drawing Number:	**78-5100-2450-4 Rev B**

3.0 General Conditions

3.1 Test Specimens

The test specimens shall be strictly in compliance with the design, construction details and physical properties detailed in the relevant Technical Specification Sheet (See Section 2).

3.2 Standard Test Conditions

The test shall be done under the following conditions:

Temperature:	**19°C to 23°C**
Relative Humidity:	**58% to 69%**
Atmospheric pressure:	**742 to 750 mmHg**

4.0 Test Results Summary

Items		SFF 8087	Test Method	Results
General	Visual	No defects such as deformation, blister, damage, crack, etc.	EIA-364-18	**Pass**
Environmental	Thermal Shock	No Physical abnormalities after test 5 Cycles –30°C to +85°C Measure Contact Resistance	EIA-364-32	**Pass**
	Temperature and Humidity	No Physical abnormalities after test Cyclic test between 25 °C and 65 °C at 80-98% RH for 240 Hrs. Measure Contact Resistance	EIA-364-31	**Pass**
Mechanical	Insertion and Withdrawl Forces	Mating force: 55.5 N Max Unmating force: 49 N Max	EIA-364-13	**Pass**
	Durability	250 mate/unmate Cycles Measure LLCR, Delta 50 milliohm maximum.	EIA-364-09	**Pass**
Electrical	Insulation resistance	100VDC applied for 1 minute. Between the adjacent signal wires and signal wires and shield. 1E+8Ω Minimum.	EIA 364-21	**Pass**
	Dielectric withstanding voltage	Test between adjacent signal wires and shield and between sideband and shield. 300 V DC.No break down: current leakage <1mA.	EIA 364-20	**Pass**
	Min. SDD_{21} for internal cable assemblies	N.A	SAS 2.1	**Pass**
	$SCD_{21} - SDD_{21}$	Refer to Note 1	SAS 2.1	**Pass**
	SDD_{22}	Refer to Note 1	SAS 2.1	**Pass**
	SCD_{22}	Refer to Note 1	SAS 2.1	**Pass**
	SCD_{21}	Refer to Note 1	SAS 2.1	**Pass**
	Maximum Near-end Crosstalk	Refer to Note 1	SAS 2.1	**Pass**

5.0 Testing

Test methods are based upon EIA Standard 364.

5.1 General

Visual (Appearance) — EIA-364-18

Purpose

The purpose of this test is to visually examine and dimensionally inspect the connector in order to determine whether the connector conforms to the applicable specification and detail documents not covered by performance requirements.

Test Method
The examination shall be made in accordance with EIA-364-18. The visual examination shall include inspection of the following features as a minimum: workmanship, marking, materials, finish, standards, design and construction. The dimensional inspection shall be a check for compliance with the outline drawings of the detail specification.

5.2 Environmental

Thermal Shock — EIA-364-32
Purpose
The purpose of this test is to determine the difference in resistance of a given cable assembly to exposure at extremes of high and low temperatures and to the shock of alternate exposures to these extremes, simulating the worst probable conditions of storage, transportation and application.

Test Method
Mated connectors shall be tested in accordance with EIA-364-32.

Temperature:	-55°C and +85°C
Cycle Time:	30 minutes each Temperature
Transition Time:	1 minute maximum
Cycles:	5

Difference in Resistance:	mΩ
Overall Minimum:	0.00
Overall Maximum:	44.66
Overall Average	4.80

Humidity — EIA-364-31
Purpose
The purpose of this test is to permit evaluation of the properties of materials used in connectors as they are influenced or deteriorated by the effects of high humidity and heat condition.

Mated connectors shall be tested in accordance with EIA-364-31.

Resistance:	mΩ
Overall Minimum:	0.00
Overall Maximum:	47.66
Overall Average	4.25

5.3 Mechanical

Insertion and Withdrawal Forces

Purpose

The purpose of this test is to determine the mechanical forces required to mate and unmate electrical connectors.

Test Method

The mechanical forces required to mate and unmate these electrical connectors.

Test Results

Force (units):	Newtons
Insertion:	32.01 N Max.
Withdrawl:	12.83 N Max

Durability

Purpose

The purpose of this test is to determine the effects of subjecting the cable assembly to a condition of flexing of the cable assembly simulating operations approximating the life of the connector.

Test Method

Cable Flexing testing has been performed for 250 cycles.

Condition:	250 Cycles

Test Results

Low level contact Resistance(LLCR) (units):	Milli Ohm
Maximum difference:	77.00
Minimum difference:	0.00
Overall Average:	3.11

5.4 Electrical:

Insulation resistance

Purpose

EIA 364-21 , 100V DC applied to adjacent signal contacts, signal and ground wire.

Test Results

The results are shown are after temperature and humidity cycling.

Resistance:	Ohm
Overall Minimum:	1.104E+07
Overall Maximum:	8.927E+13
Overall Average	2.648E+12

Withstanding Voltage Test

Purpose

EIA 364-20 , 300V AC @ leakage current 0.5Ma for 60 seconds, applied to adjacent signal contacts, signal and ground wire.

Test Results

Condition	
Initial	No spark or Flash over Was detrected.
After thermal shock	
After Temp. & Humidity	

5.5 Signal Integrity

Maximum limits for S-parameters of the passive TxRx connection
S-parameter limits are calculated per the following formula:

Note 1: Measured value < max [L, min [H, N + 13.3 * $\log_{10}$(f / 3GHz)]]

Where:

L	is the minimum value (i.e., the low frequency asymptote)
H	is the maximum value (i.e., the high frequency asymptote)
N	is the value at the Nyquist frequency (i.e., 3 GHz)
F	is the frequency of the signal in Hz;
Max [A, B]	is the maximum of A & B
Min [A,B]	is the minimum of A & B

Characteristic	L (dB)	N (dB)	H (dB)	S (dB / decade)	f min (MHz)	f max (GHz)
$SCD_{21} - SDD_{21}$	-10			0	100	6.0
Maximum near-end crosstalk (NEXT)	-26			0	100	6.0
SDD_{22}	-10	-7.9	0	13.3	100	6.0
SCD_{22}	-26	-12.7	-10	13.3	100	6.0
SCD_{21}	-18			0	100	6.0

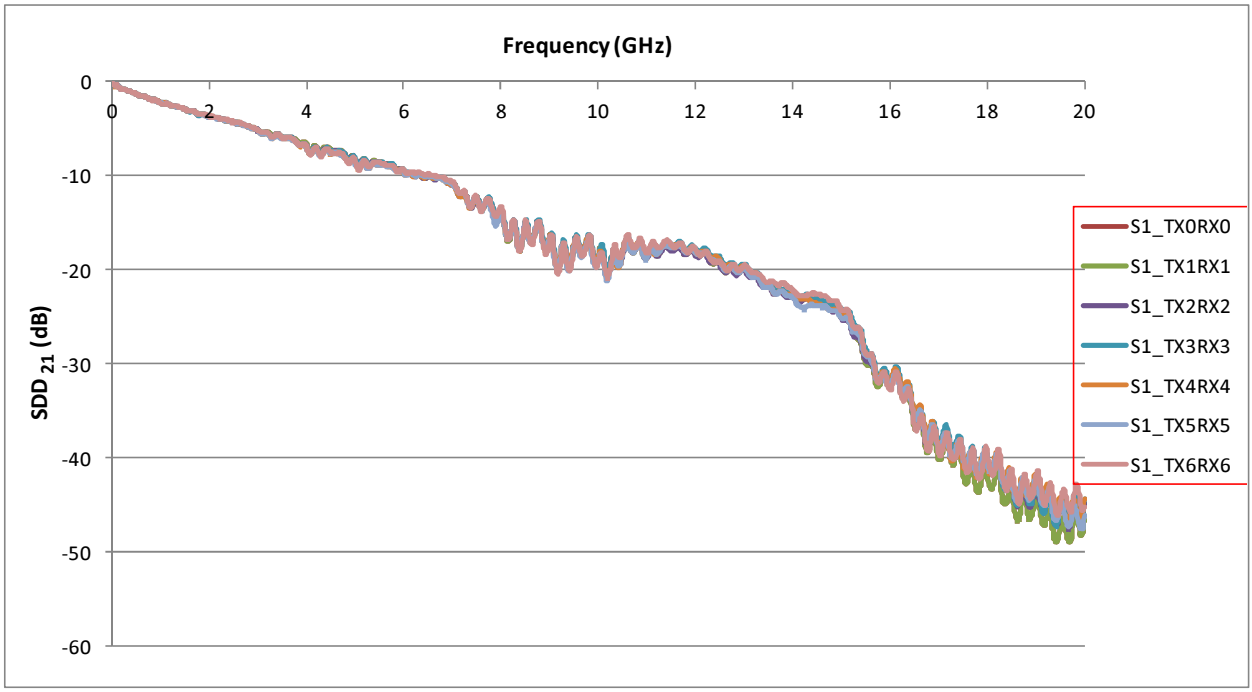
Crosstalk calculated using:

$$\mathbf{TotalNEXT(f) = 10*\log\sum * 10^{(NEXT(f)/10)}}$$

Differential Characteristics Impedance (Mated Connectors)
Minimum SDD_{21} for internal cable assemblies

Purpose

The purpose of this test is to determine the the minimum allowable differential insertion loss SDD_{21} for the internal cable assemblies.



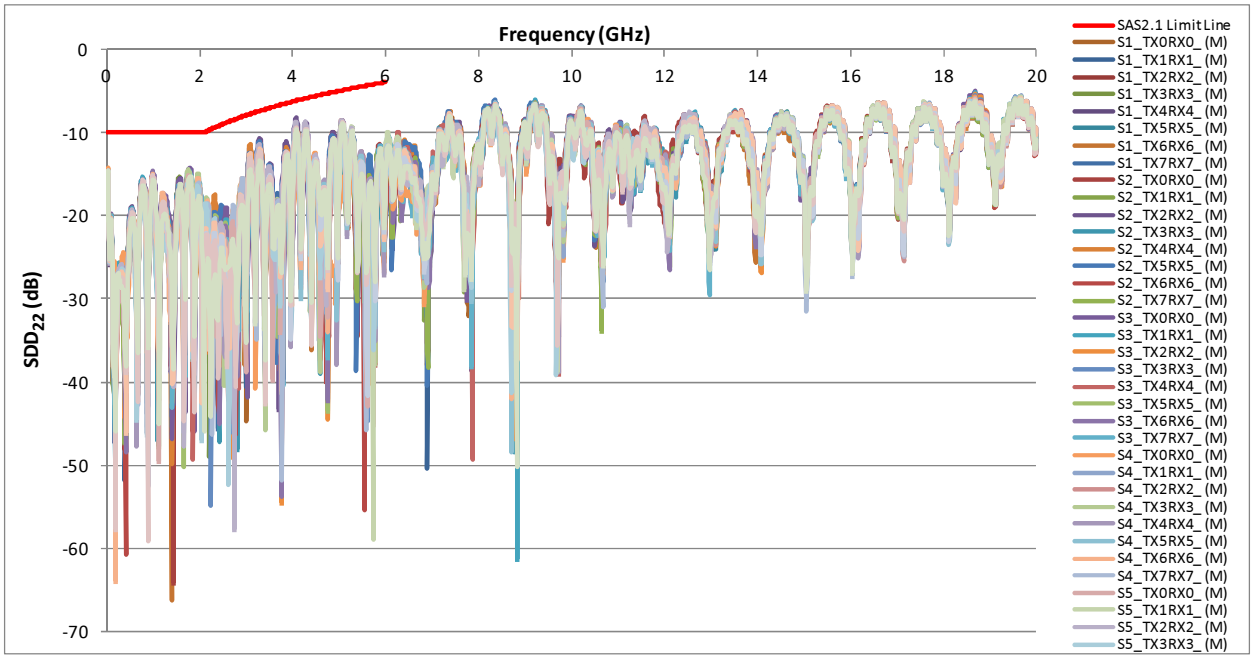
Result: Pass

Note: Results include board losses.

SDD_{22} – Differential Output Return Loss

Purpose

The purpose of this test is to determine the absolute value of the differential output return loss for the cable assemblies.



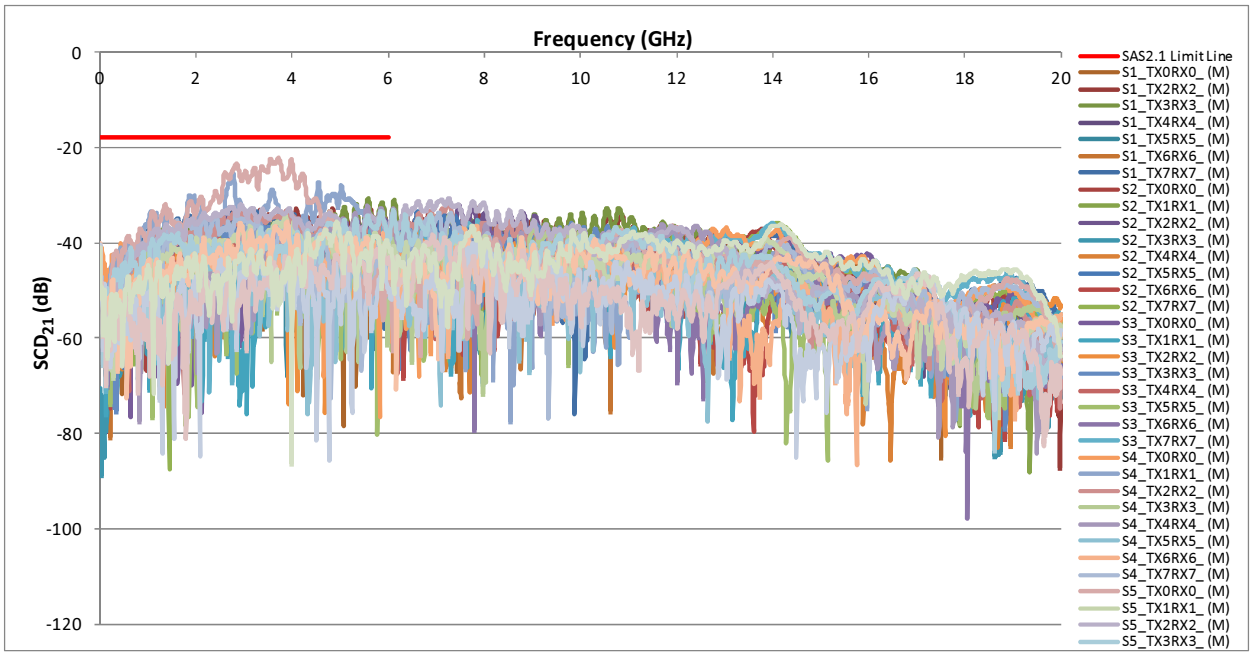
Result: Pass

Results shown are based on de-embedded data.

SCD_{21} – Differential to Common Mode Output Insertion Loss Conversion

Purpose

The purpose of this test is to determine the absolute value of the differential to common mode output insertion loss conversion for the cable assemblies.



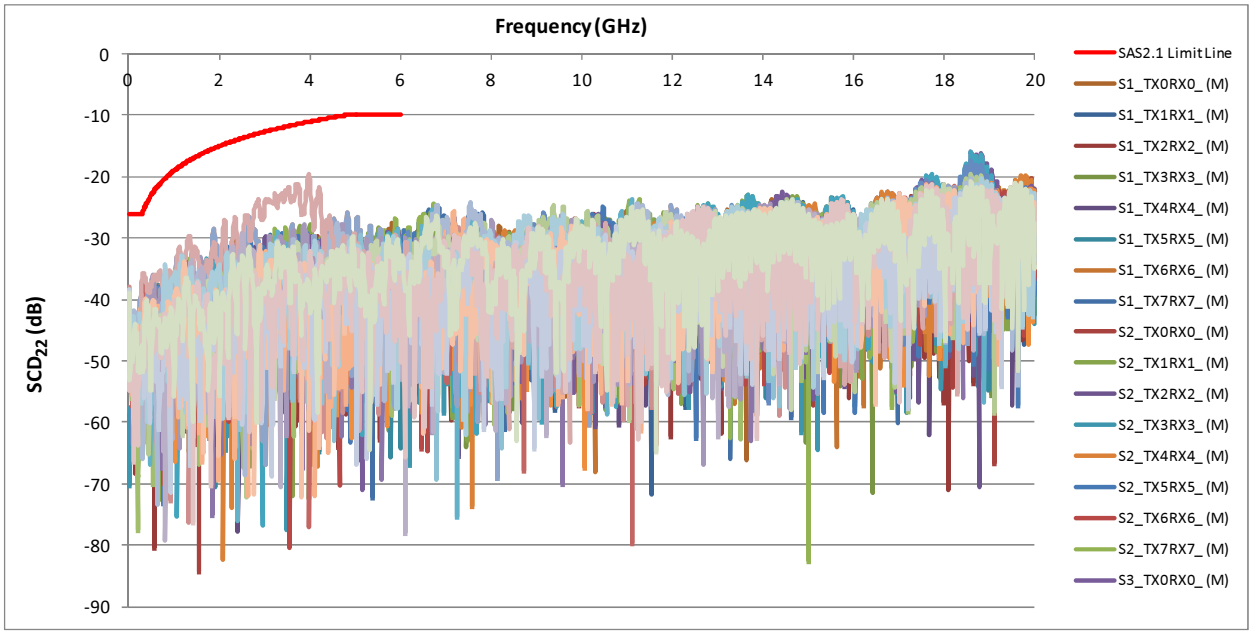
Result: Pass

Results shown are including board losses

SCD_{22} – Differential to Common Mode Output Return Loss Conversion

Purpose

The purpose of this test is to determine the absolute value of the differential to common mode output return loss conversion for the cable assemblies.



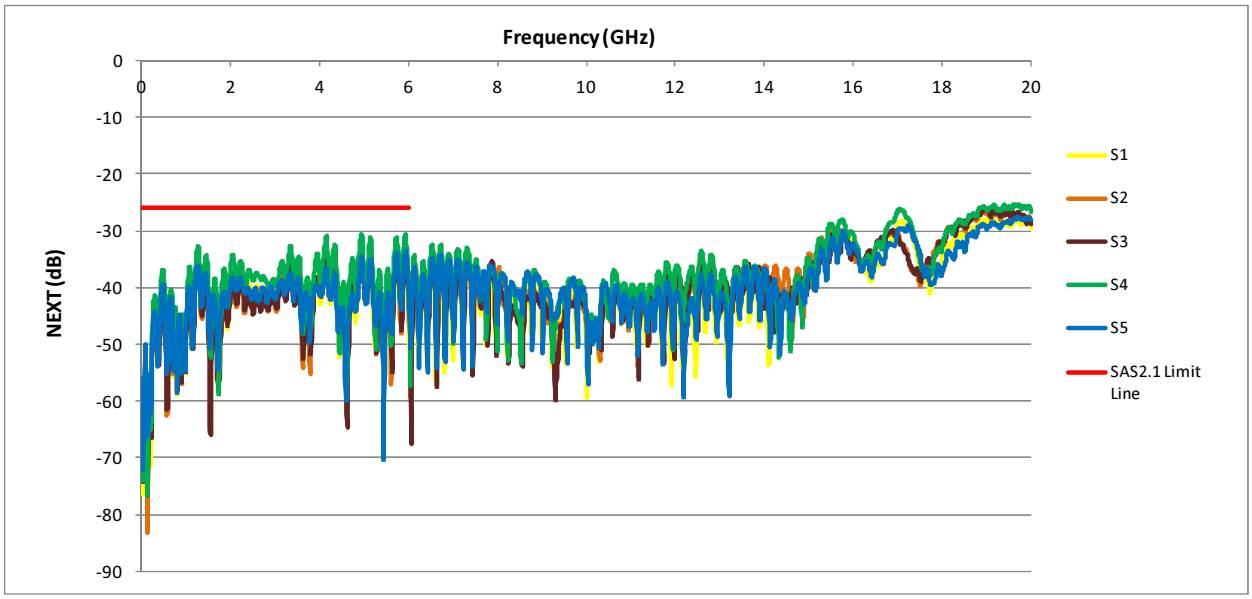
Result: Pass

Results shown are including board losses

Maximum Near-End Crosstalk (NEXT) for each receive signal pair

Purpose

The purpose of this test is to determine the maximum near-end crosstalk (NEXT) for each receive signal pair.



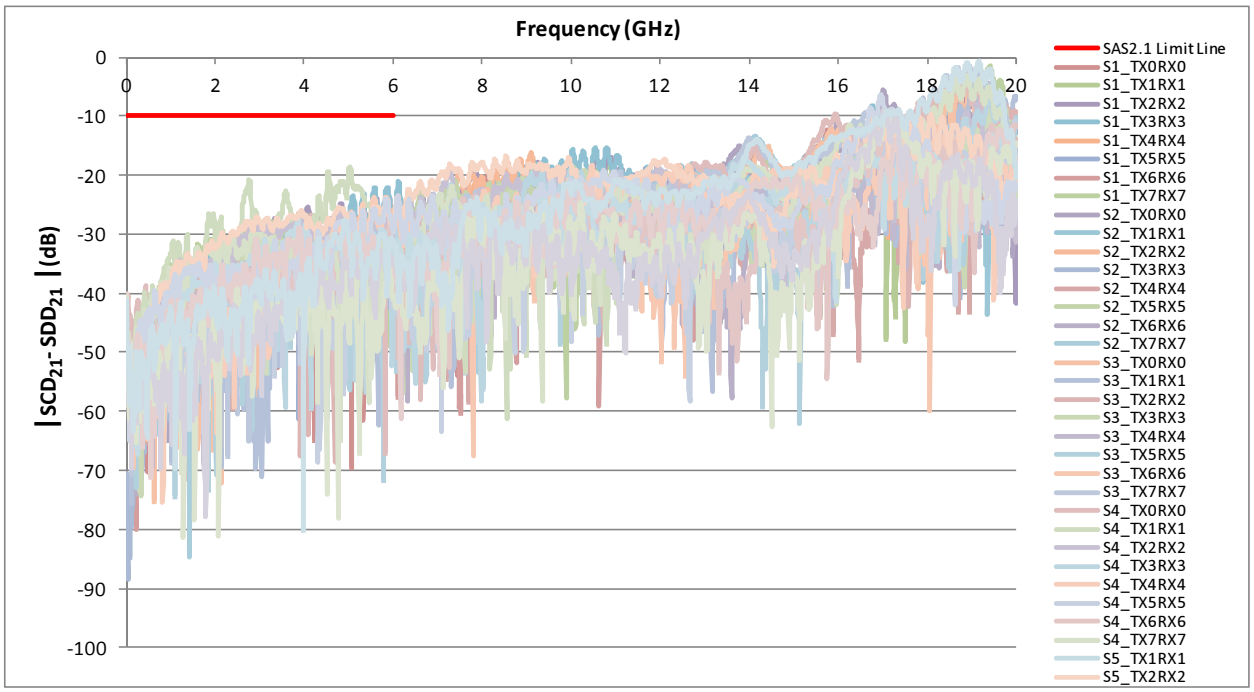
Result: Pass

Results shown are includes test board losses.

$SCD_{22} – SDD_{21}$

Purpose

The purpose of this test is to determine absolute difference between S_{CD21} & S_{DD21}.



Result: Pass

Results shown are includes test board losses.

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