RF Characterization Report

Samtec HDBNC-J-P-XX-ST-BH1
Amphenol P/N 034-1028

H4SP3

HDBNC-J-P

H4SP3

034-1028

034-1026

HDBNC-J-P

034-1026

034-1028

Combination Mating with Cable Assemblies

RFB8T-H4SP3-H4SP3-0300
or
Amphenol 034-1026 terminated to1855A

Description:

75 Ohm HDBNC PCB Jacks

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Report Revision: 8/7/2013

Series: HDBNC Series
Description: 75 Ohm HDBNC Board Mount Jacks

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Introduction

Similar Samtec and Amphenol HDBNC series connector designs are performance tested to the SMPTE 424M-2006 specification for 3 Gb/s serial data. Mating combinations are Samtec Plug to Samtec Jack, Samtec Plug to Amphenol Jack, Amphenol Plug to Samtec Jack, and Amphenol Plug to Amphenol Jack. All mating combinations must meet 3G-SDI requirements and must not degrade due to interface differences. VSWR and Return Loss parameters will determine acceptable performance. Insertion Loss fixture responses are provided to indicate repeatability.

Product Description

All measurements are made utilizing a 75 Ω signal trace and optimized footprint fixture designed for HDBNC jack mount connectors *(figure 1).* Each fixture has 8 HDBNC jack connector footprints where 4 signal traces are located on the top and 4 are located on the bottom signal layers. Fixture identifier number is PCB-103276-TST-REV. Mating HDBNC plug coaxial cable assembly fixtures are 305 mm in length. There are 20 -1855A HDBNC plug assemblies, 10 Samtec and 10 Amphenol. Three PCB-103276-TST-REV boards are utilized along with the 20 HDBNC plug coaxial cable assemblies.

The above arrangement allows for 20 waveform responses for each of the 4 mating combinations,10 VSWR and 10 Return Loss This includes 5 waveform responses where signal traces run on the PCB bottom surface and 5 run on the PCB top surface. Mating designations and related filenames are below;

Key: G = result gated, S = Samtec, A = Amphenol, P# = Plug Cable Assembly, J# = PCB footprint location, BD# = PC board number, BOT = Signal Trace on Bottom, Top = Signal Trace on Top

Samtec Plug Cable Assembly mates to **Samtec PCB Jack Connector**				
Filename	Graph Name	VSWR	Return Loss	Fixture IL
G_S_P1_S_J1_BD1_BOT	P1-J1-BD1-B	Yes	Yes	Yes
G_S_P2_S_J2_BD1_BOT	P2-J2-BD1-B	Yes	Yes	Yes
G_S_P3_S_J3_BD1_BOT	P3-J3-BD1-B	Yes	Yes	Yes
G_S_P4_S_J4_BD1_BOT	P4-J4-BD1-B	Yes	Yes	Yes
G_S_P5_S_J2_BD3_BOT	P5-J2-BD3-B	Yes	Yes	Yes
G_S_P1_S_J5_BD1_TOP	P1-J5-BD1-T	Yes	Yes	Yes
G_S_P2_S_J6_BD1_TOP	P2-J6-BD1-T	Yes	Yes	Yes
G_S_P3_S_J7_BD1_TOP	P3-J7-BD1-T	Yes	Yes	Yes
G_S_P4_S_J8_BD1_TOP	P4-J8-BD1-T	Yes	Yes	Yes
G_S_P5_S_J6_BD3_TOP	P5-J6-BD3-T	Yes	Yes	Yes

Series: HDBNC Series
Description: 75 Ohm HDBNC Board Mount Jacks

Samtec Plug Cable Assembly mates to **Amphenol PCB Jack Connector**				
Filename	Graph Name	VSWR	Return Loss	Fixture IL
G_S_P1_A_J1_BD2_BOT	P1-J1-BD2-B	Yes	Yes	Yes
G_S_P2_A_J2_BD2_BOT	P1-J2-BD2-B	Yes	Yes	Yes
G_S_P3_A_J3_BD2_BOT	P1-J3-BD2-B	Yes	Yes	Yes
G_S_P4_A_J4_BD2_BOT	P1-J4-BD2-B	Yes	Yes	Yes
G_S_P5_A_J2_BD3_BOT	P1-J2-BD3-B	Yes	Yes	Yes
G_S_P1_A_J5_BD2_TOP	P1-J5-BD2-T	Yes	Yes	Yes
G_S_P2_A_J6_BD2_TOP	P1-J6-BD2-T	Yes	Yes	Yes
G_S_P3_A_J7_BD2_TOP	P1-J7-BD2-T	Yes	Yes	Yes
G_S_P4_A_J8_BD2_TOP	P1-J8-BD2-T	Yes	Yes	Yes
G_S_P5_A_J6_BD3_TOP	P1-J6-BD3-T	Yes	Yes	Yes

Amphenol Plug Cable Assembly mates to **Samtec PCB Jack Connector**				
Filename	Graph Name	VSWR	Return Loss	Fixture IL
G_A_P1_S_J1_BD1_BOT	P1-J1-BD1-B	Yes	Yes	Yes
G_A_P2_S_J2_BD1_BOT	P2-J2-BD1-B	Yes	Yes	Yes
G_A_P3_S_J3_BD1_BOT	P3-J3-BD1-B	Yes	Yes	Yes
G_A_P4_S_J4_BD1_BOT	P4-J4-BD1-B	Yes	Yes	Yes
G_A_P5_S_J2_BD3_BOT	P5-J2-BD3-B	Yes	Yes	Yes
G_A_P1_S_J5_BD1_TOP	P1-J5-BD1-T	Yes	Yes	Yes
G_A_P2_S_J6_BD1_TOP	P2-J6-BD1-T	Yes	Yes	Yes
G_A_P3_S_J7_BD1_TOP	P3-J7-BD1-T	Yes	Yes	Yes
G_A_P4_S_J8_BD1_TOP	P4-J8-BD1-T	Yes	Yes	Yes
G_A_P5_S_J6_BD3_TOP	P5-J6-BD3-T	Yes	Yes	Yes

Amphenol Plug Cable Assembly mates to **Amphenol PCB Jack Connector**				
Filename	Graph Name	VSWR	Return Loss	Fixture IL
G_A_P1_A_J1_BD2_BOT	P1-J1-BD2-B	Yes	Yes	Yes
G_A_P2_A_J2_BD2_BOT	P2-J2-BD2-B	Yes	Yes	Yes
G_A_P3_A_J3_BD2_BOT	P3-J3-BD2-B	Yes	Yes	Yes
G_A_P4_A_J4_BD2_BOT	P4-J4-BD2-B	Yes	Yes	Yes
G_A_P5_A_J2_BD3_BOT	P5-J2-BD3-B	Yes	Yes	Yes
G_A_P1_A_J5_BD2_TOP	P1-J5-BD2-B	Yes	Yes	Yes
G_A_P2_A_J6_BD2_TOP	P2-J6-BD2-B	Yes	Yes	Yes
G_A_P3_A_J7_BD2_TOP	P3-J7-BD2-B	Yes	Yes	Yes
G_A_P4_A_J8_BD2_TOP	P4-J8-BD2-B	Yes	Yes	Yes
G_A_P5_A_J6_BD3_TOP	P5-J6-BD3-B	Yes	Yes	Yes

Series: HDBNC Series
Description: 75 Ohm HDBNC Board Mount Jacks

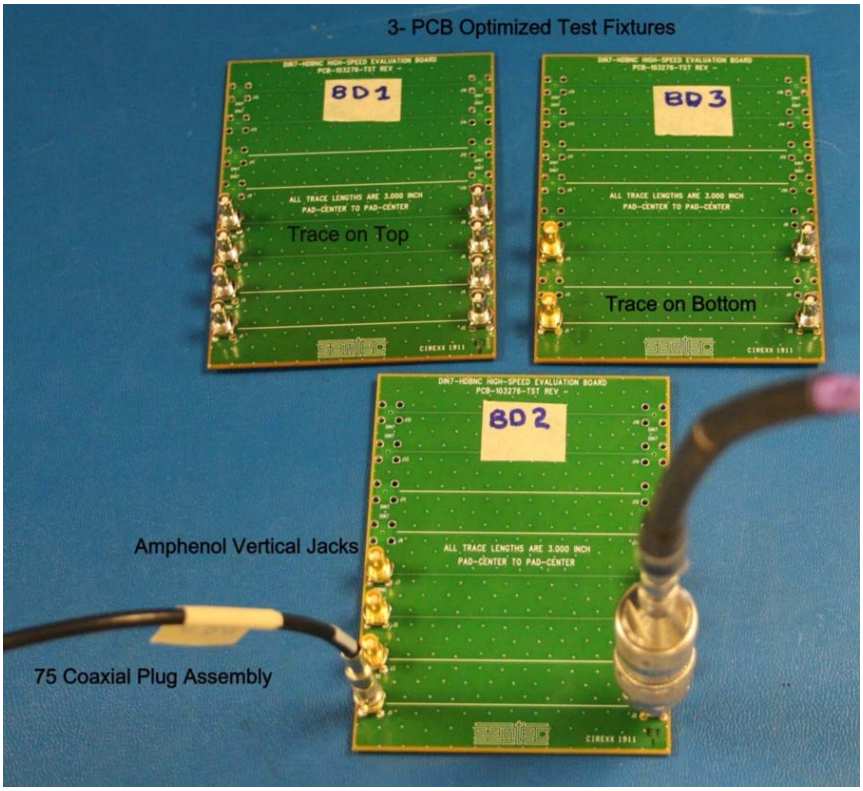


Figure 1- Product Description

Test Procedure

8364B PNA is setup as a 2-port standalone analyzer. Instrument sweep is between 10MHz and 20GHz covering 6401 points at a 1 KHz resolution bandwidth. The calibration utilizes an Agilent 85036B 75Ω "N" Type interface kit. Calibration is full 2-port SOLT utilizing a prescribed "unknown thru" technique. Physical transition from a 50 Ω impedance to a 75 Ω impedance is achieved using 2 Pasternack 50Ω "N" (f) to 75Ω "N"(m) adapters. No low loss impedance transformers are necessary. Physical Layer Test System tools will re-reference (s11) the test system impedance to 75Ω in post-processing. The calibrated system impedance reference is at the 75Ω "N" (m) port 1 and port 2 interfaces respectively *(figure 2)*

Figure 2 – Calibrated 75Ω "N" Type Reference

Series: HDBNC Series
Description: 75 Ohm HDBNC Board Mount Jacks

Post-processing utilizes a procedure called gating. In this test the PLTS tool references the time domain response to 75Ω and allows notch type gates (2) to be placed around the area of interest. The area of interest for this test is the mating HDBNC cable plug and HDBNC PCB jack *(figure 3 - B & C)*. Notch gates are placed between A & B and C & E. and when activated become ideal 75 Ω transmission lines *(figure 4, Gated Response)*. Transformation back into frequency domain parameters yields VSWR and Return Loss parameters for the mated pair of connectors. Gating cannot be utilized in generating transmission (S21) measurements, therefore insertion losses will include all losses between points A & E of figure 3.

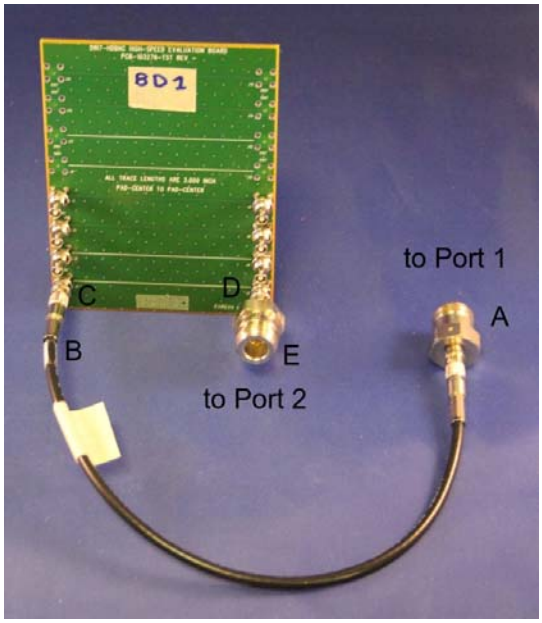


Figure 3 – DUT

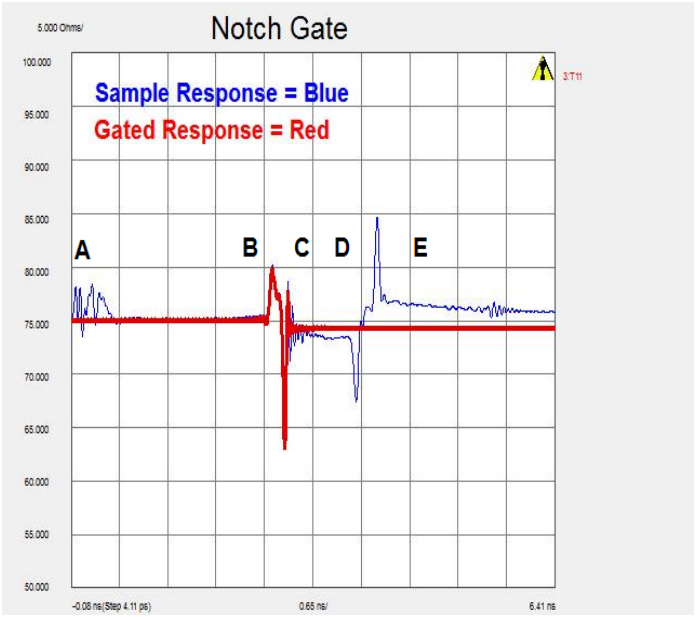


Figure 4 - Gating

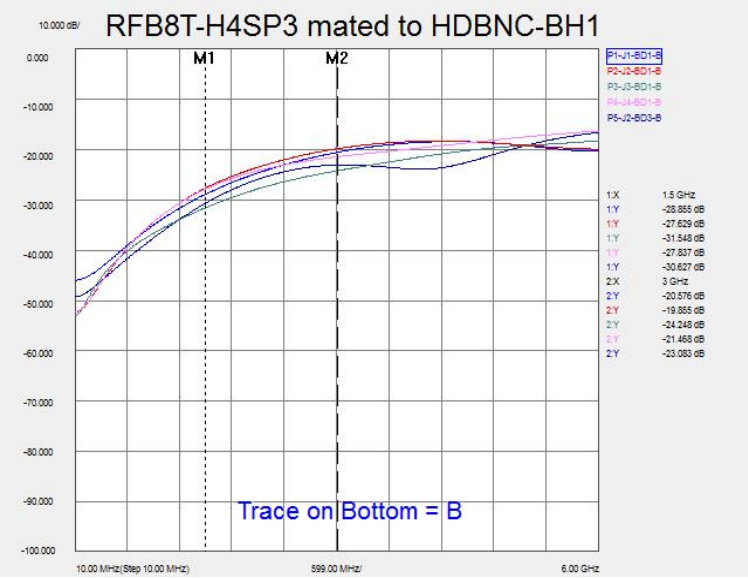
Results Summary

All of the connector combinations tested with their optimized footprints met the requirements of the SMPTE 424M-2006 specification for 3 Gb/s serial data.

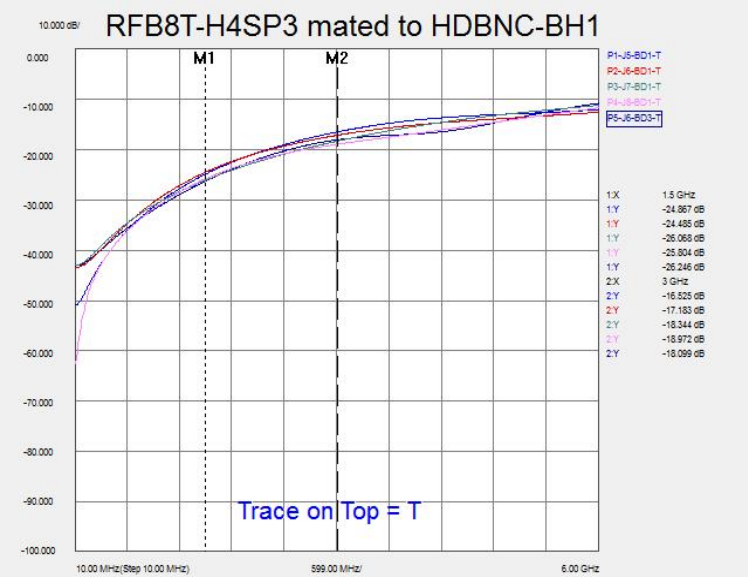
Series: HDBNC Series
Description: 75 Ohm HDBNC Board Mount Jacks

Return Loss Results Summary

Samtec Cable Plug Assembly to Samtec PCB Jack Assembly



3G SDI Requirement		
Bottom Signal Trace	<-15dB max. to 1.5GHz	<-10dB max. to 3.0GHz
P1-J1-BD1-B	-28.8	-20.5
P2-J2-BD1-B	-27.6	-19.8
P3-J3-BD1-B	-31.5	-24.2
P4-J4-BD1-B	-27.8	-21.4
P5-J2-BD3-B	-30.6	-23.0
PASS		

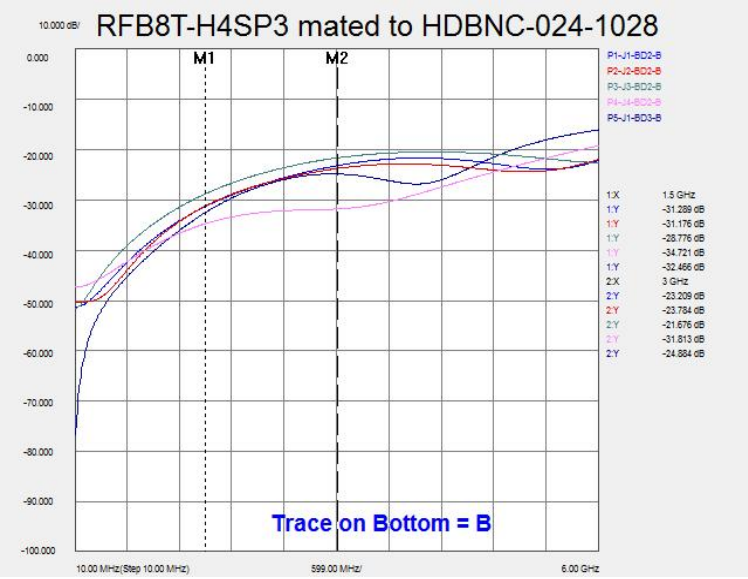


3G SDI Requirement		
Top Signal Trace	<-15dB max. to 1.5GHz	<-10dB max. to 3.0GHz
P1-J5-BD1-B	-24.8	-16.5
P2-J6-BD1-B	-24.4	-17.1
P3-J7-BD1-B	-26.0	-18.3
P4-J8-BD1-B	-25.8	-18.9
P5-J6-BD3-B	-26.2	-18.0
PASS		

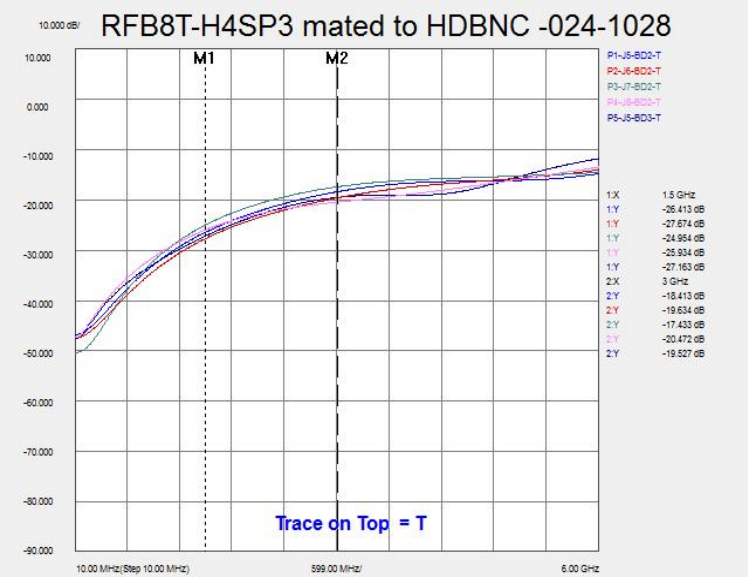
Series: HDBNC Series
Description: 75 Ohm HDBNC Board Mount Jacks

Return Loss Results Summary

Samtec Cable Plug Assembly to Amphenol PCB Jack Assembly



3G SDI Requirement		
Bottom Signal Trace	<-15dB max. to 1.5GHz	<-10dB max. to 3.0GHz
P1-J1-BD2-B	-31.2	-23.2
P2-J2-BD2-B	-31.1	-23.7
P3-J3-BD2-B	-28.7	-21.6
P4-J4-BD2-B	-34.7	-31.8
P5-J2-BD3-B	-32.4	-24.8
PASS		

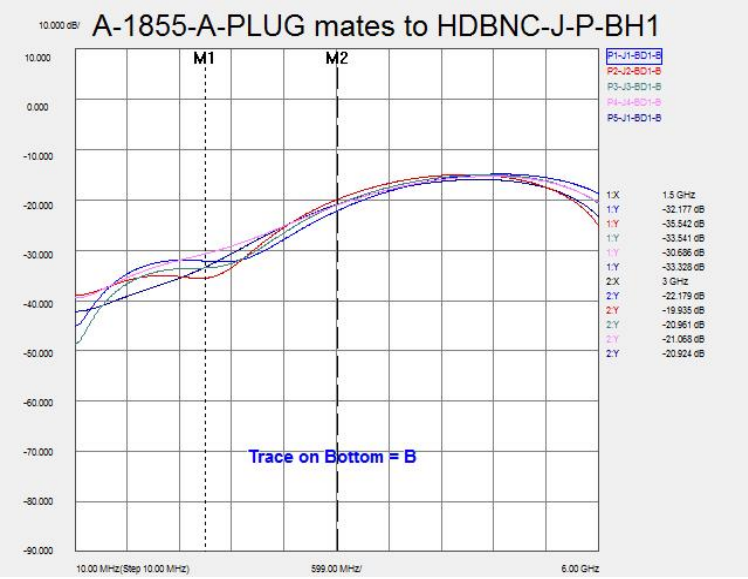


3G SDI Requirement		
Top Signal Trace	<-15dB max. to 1.5GHz	<-10dB max. to 3.0GHz
P1-J5-BD2-B	-26.4	-18.4
P2-J6-BD2-B	-27.6	-19.6
P3-J7-BD2-B	-24.9	-17.4
P4-J8-BD2-B	-25.9	-20.4
P5-J6-BD3-B	-27.1	-19.5
PASS		

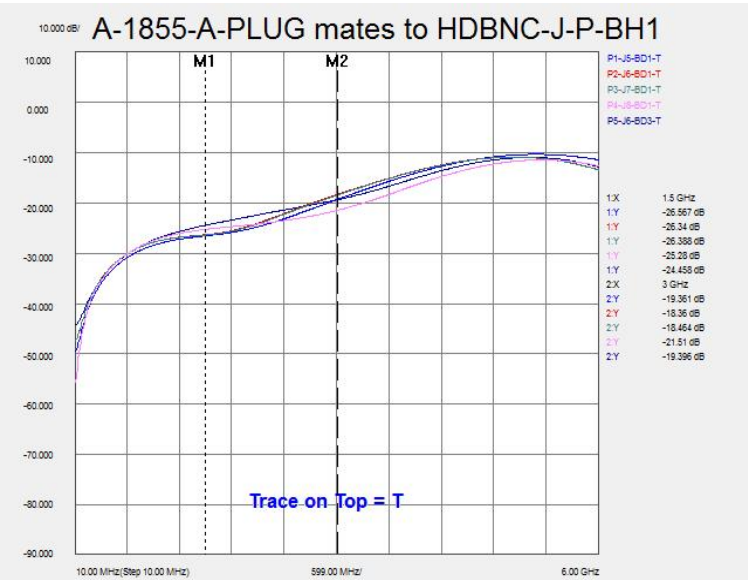
Series: HDBNC Series
Description: 75 Ohm HDBNC Board Mount Jacks

Return Loss Results Summary

Amphenol Cable Plug Assembly to Samtec PCB Jack Assembly



3G SDI Requirement		
Bottom Signal Trace	<-15dB max. to 1.5GHz	<-10dB max. to 3.0GHz
P1-J1-BD2-B	-32.1	-22.1
P2-J2-BD2-B	-35.5	-19.9
P3-J3-BD2-B	-33.5	-20.9
P4-J4-BD2-B	-30.6	-21.0
P5-J2-BD3-B	-33.3	-20.9
PASS		

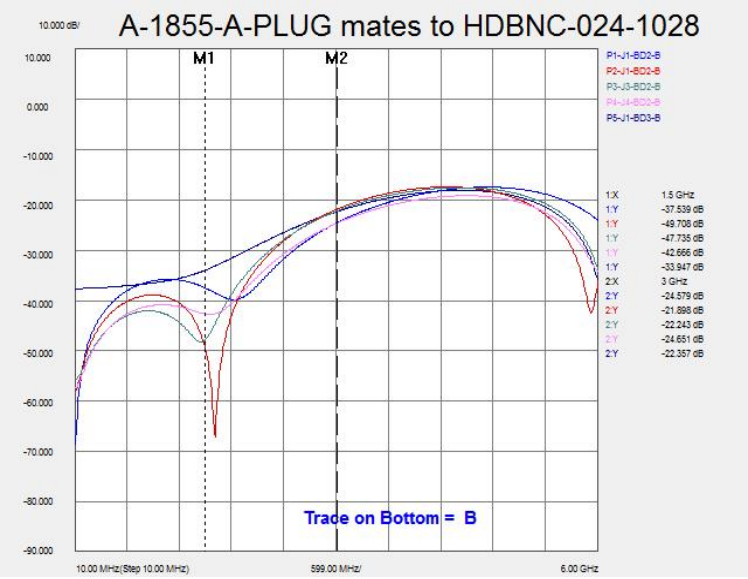


3G SDI Requirement		
Top Signal Trace	<-15dB max. to 1.5GHz	<-10dB max. to 3.0GHz
P1-J5-BD2-B	-26.5	-19.3
P2-J6-BD2-B	-26.3	-18.3
P3-J7-BD2-B	-26.3	-18.4
P4-J8-BD2-B	-25.2	-21.5
P5-J6-BD3-B	-24.4	-19.3
PASS		

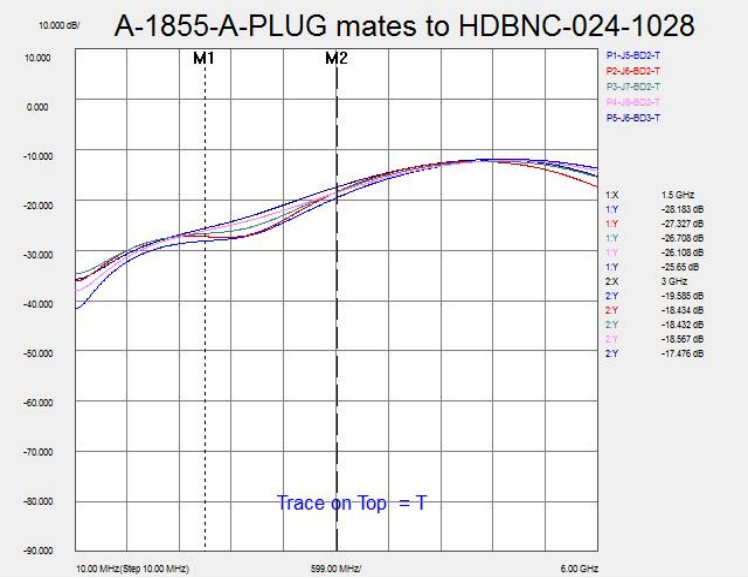
Series: HDBNC Series
Description: 75 Ohm HDBNC Board Mount Jacks

Return Loss Results Summary

Amphenol Cable Plug Assembly to Amphenol PCB Jack Assembly



3G SDI Requirement		
Bottom Signal Trace	<-15dB max. to 1.5GHz	<-10dB max. to 3.0GHz
P1-J1-BD2-B	-37.5	-24.5
P2-J2-BD2-B	-49.7	-21.8
P3-J3-BD2-B	-47.7	-22.2
P4-J4-BD2-B	-42.6	-24.6
P5-J2-BD3-B	-33.9	-22.3
PASS		

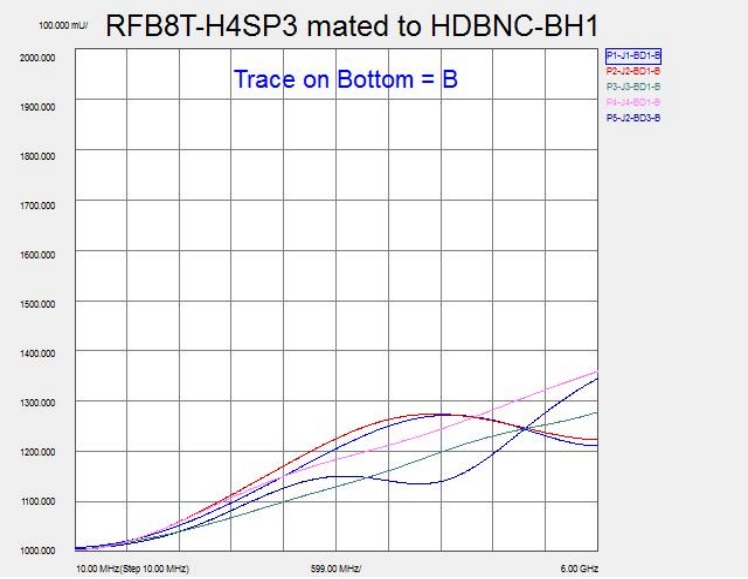


3G SDI Requirement		
Top Signal Trace	<-15dB max. to 1.5GHz	<-10dB max. to 3.0GHz
P1-J5-BD2-B	-28.1	-19.5
P2-J6-BD2-B	-27.3	-18.4
P3-J7-BD2-B	-26.7	-18.4
P4-J8-BD2-B	-26.1	-18.4
P5-J6-BD3-B	-25.6	-17.4
PASS		

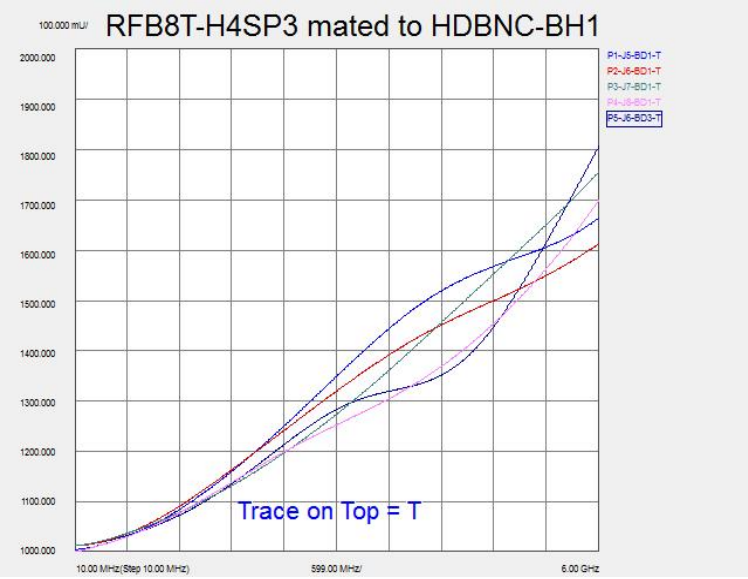
Series: HDBNC Series
Description: 75 Ohm HDBNC Board Mount Jacks

VSWR Results Summary

Samtec Cable Plug Assembly to Samtec PCB Jack Assembly



3G SDI Requirement		
Bottom Signal Trace	1.43 SWR to 1.5GHz	1.92 SWR to 3.0GHz
P1-J1-BD1-B	1.08	1.21
P2-J2-BD1-B	1.09	1.23
P3-J3-BD1-B	1.06	1.13
P4-J4-BD1-B	1.08	1.19
P5-J2-BD3-B	1.06	1.15
PASS		

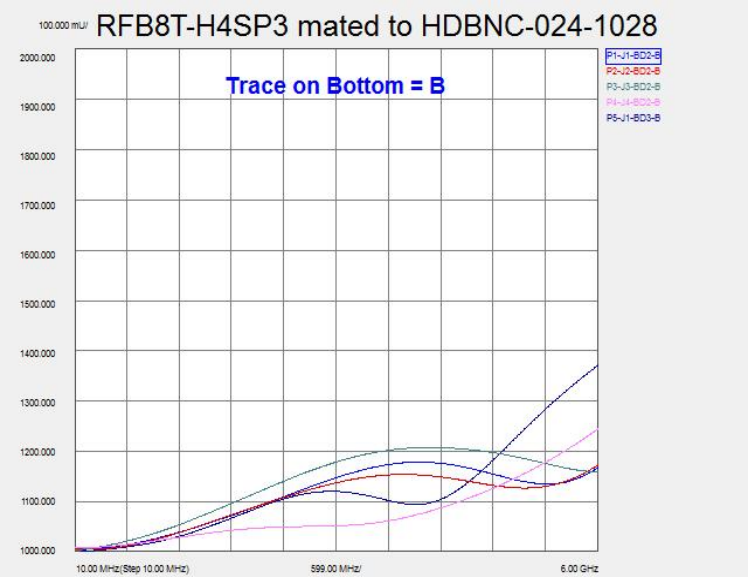


3G SDI Requirement		
Top Signal Trace	1.43 SWR to 1.5GHz	1.92 SWR to 3.0GHz
P1-J5-BD1-B	1.12	1.35
P2-J6-BD1-B	1.13	1.32
P3-J7-BD1-B	1.11	1.28
P4-J8-BD1-B	1.11	1.26
P5-J6-BD3-B	1.10	1.29
PASS		

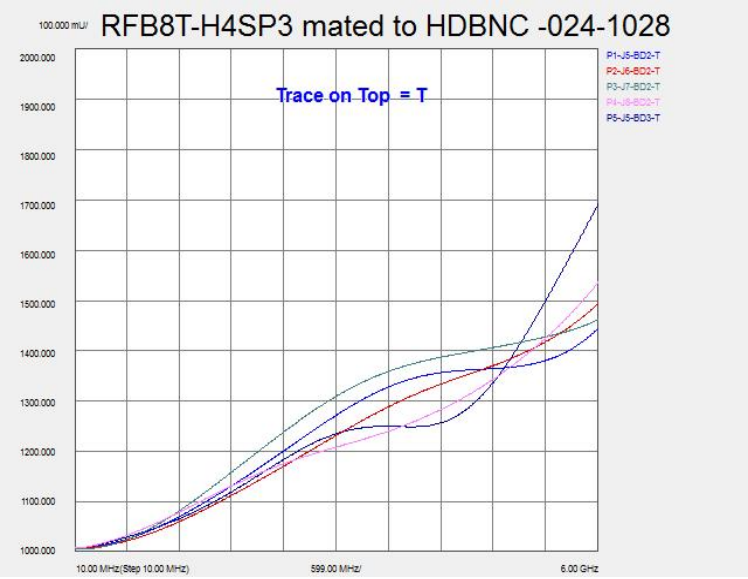
Series: HDBNC Series
Description: 75 Ohm HDBNC Board Mount Jacks

VSWR Results Summary

Samtec Cable Plug Assembly to Amphenol PCB Jack Assembly



3G SDI Requirement		
Bottom Signal Trace	1.43 SWR to 1.5GHz	1.92 SWR to 3.0GHz
P1-J1-BD2-B	1.06	1.15
P2-J2-BD2-B	1.06	1.14
P3-J3-BD2-B	1.08	1.18
P4-J4-BD2-B	1.04	1.05
P5-J2-BD3-B	1.05	1.12
PASS		

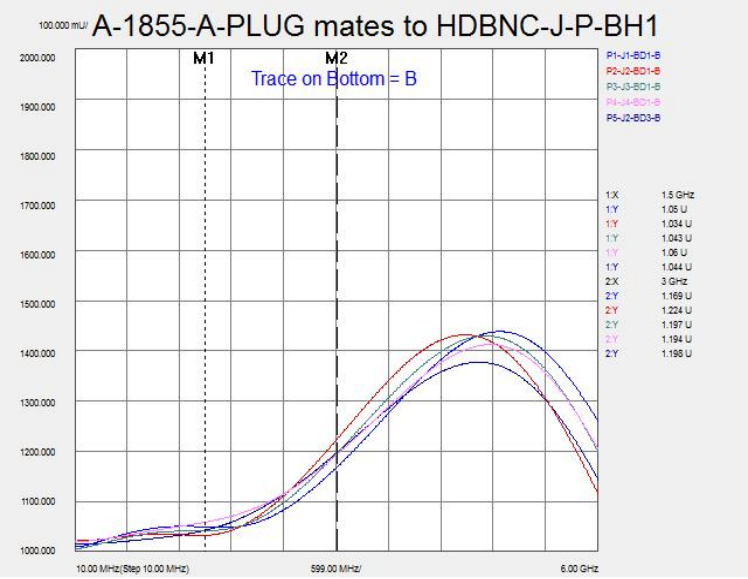


3G SDI Requirement		
Top Signal Trace	1.43 SWR to 1.5GHz	1.92 SWR to 3.0GHz
P1-J5-BD2-B	1.10	1.27
P2-J6-BD2-B	1.09	1.23
P3-J7-BD2-B	1.12	1.31
P4-J8-BD2-B	1.11	1.21
P5-J6-BD3-B	1.09	1.24
PASS		

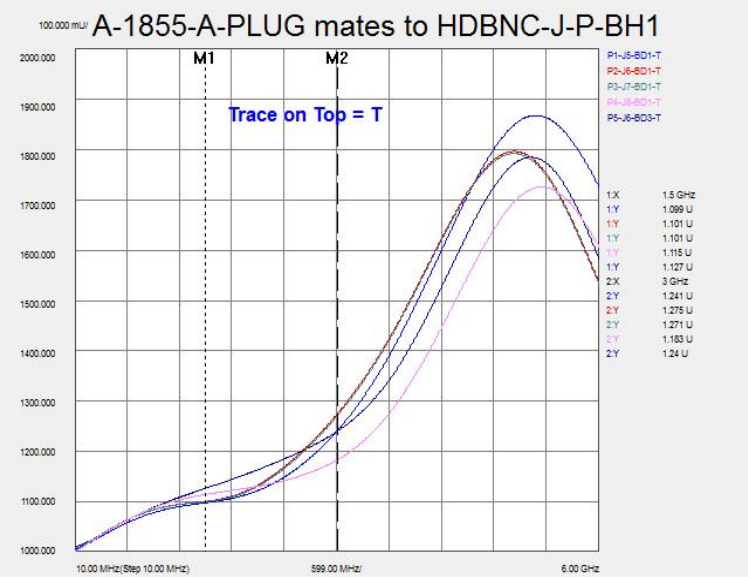
Series: HDBNC Series
Description: 75 Ohm HDBNC Board Mount Jacks

VSWR Results Summary

Amphenol Cable Plug Assembly to Samtec PCB Jack Assembly



3G SDI Requirement		
Bottom Signal Trace	1.43 SWR to 1.5GHz	1.92 SWR to 3.0GHz
P1-J1-BD2-B	1.05	1.17
P2-J2-BD2-B	1.03	1.23
P3-J3-BD2-B	1.04	1.20
P4-J4-BD2-B	1.06	1.20
P5-J2-BD3-B	1.04	1.20
PASS		

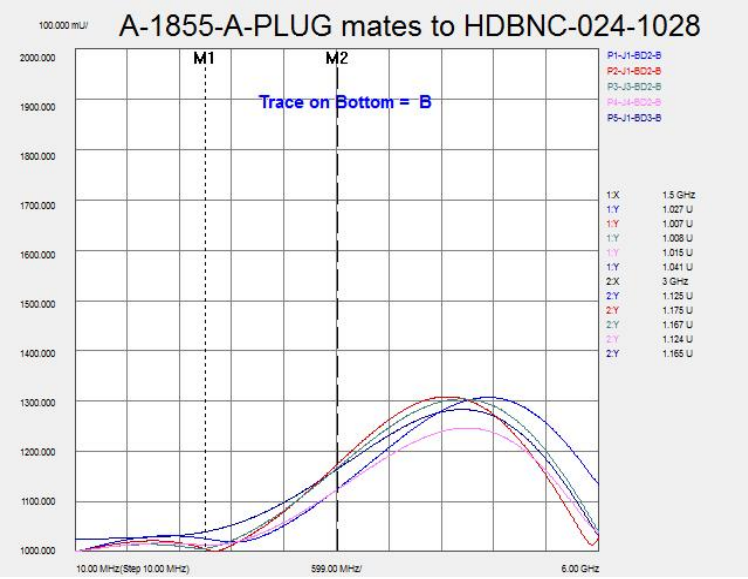


3G SDI Requirement		
Top Signal Trace	1.43 SWR to 1.5GHz	1.92 SWR to 3.0GHz
P1-J5-BD2-B	1.10	1.24
P2-J6-BD2-B	1.10	1.28
P3-J7-BD2-B	1.10	1.27
P4-J8-BD2-B	1.12	1.18
P5-J6-BD3-B	1.13	1.24
PASS		

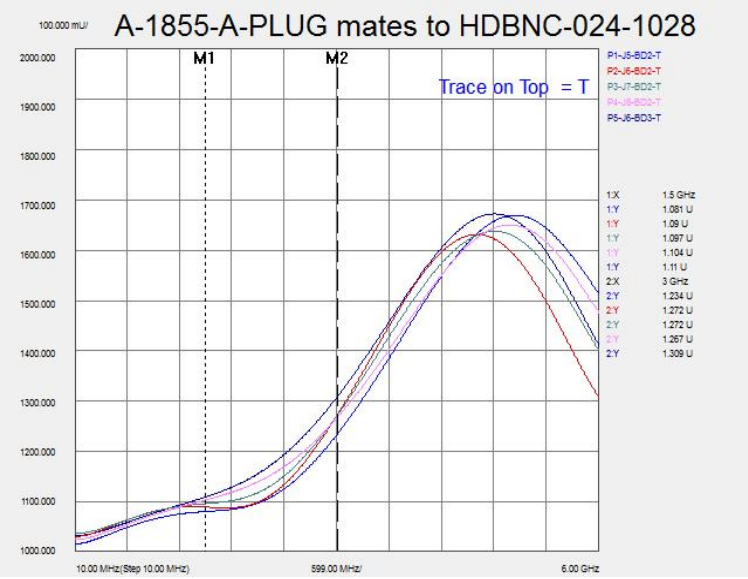
Series: HDBNC Series
Description: 75 Ohm HDBNC Board Mount Jacks

VSWR Results Summary

Amphenol Cable Plug Assembly to Amphenol PCB Jack Assembly



3G SDI Requirement		
Bottom Signal Trace	1.43 SWR to 1.5GHz	1.92 SWR to 3.0GHz
P1-J1-BD2-B	1.03	1.13
P2-J2-BD2-B	1.01	1.18
P3-J3-BD2-B	1.01	1.17
P4-J4-BD2-B	1.01	1.13
P5-J2-BD3-B	1.04	1.17
PASS		

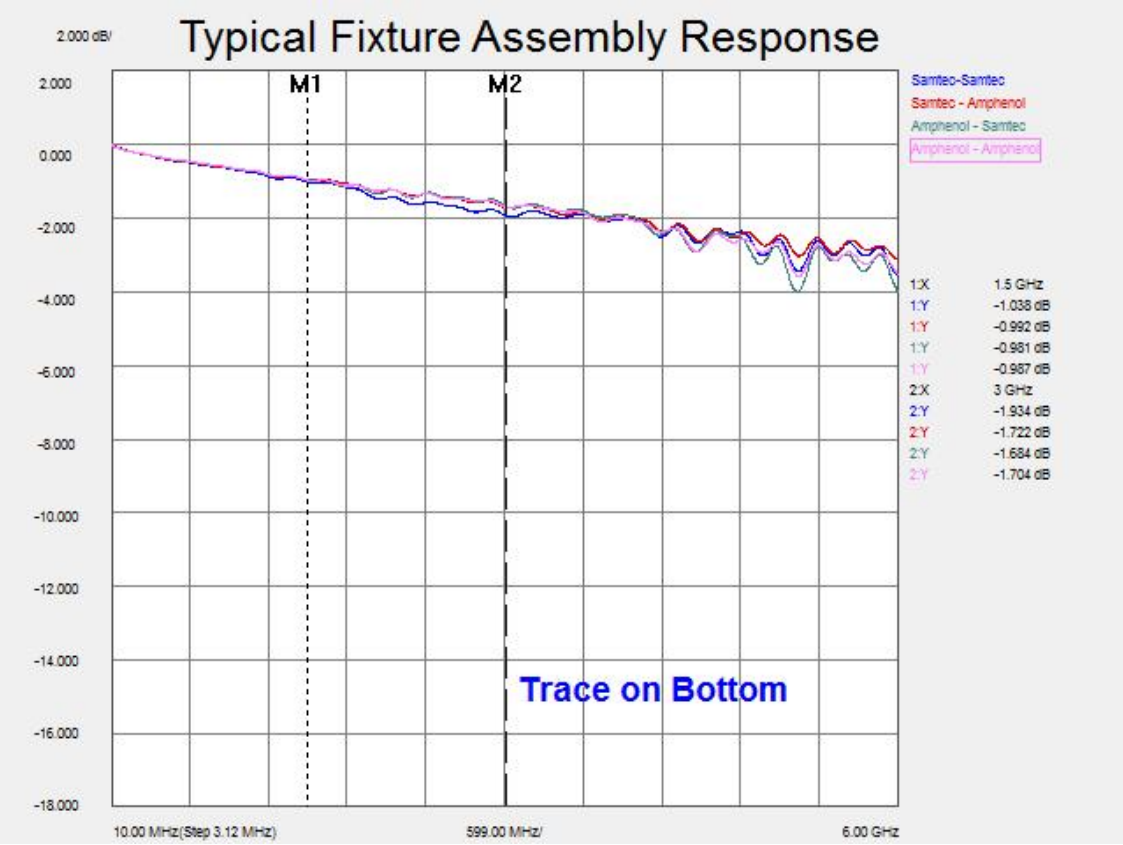


3G SDI Requirement		
Top Signal Trace	1.43 SWR to 1.5GHz	1.92 SWR to 3.0GHz
P1-J5-BD2-B	1.08	1.24
P2-J6-BD2-B	1.09	1.27
P3-J7-BD2-B	1.10	1.27
P4-J8-BD2-B	1.10	1.27
P5-J6-BD3-B	1.11	1.31
PASS		

Series: HDBNC Series
Description: 75 Ohm HDBNC Board Mount Jacks

Insertion Loss Results Summary (Bottom Trace)

Cable Plug Assembly to PCB Assembly

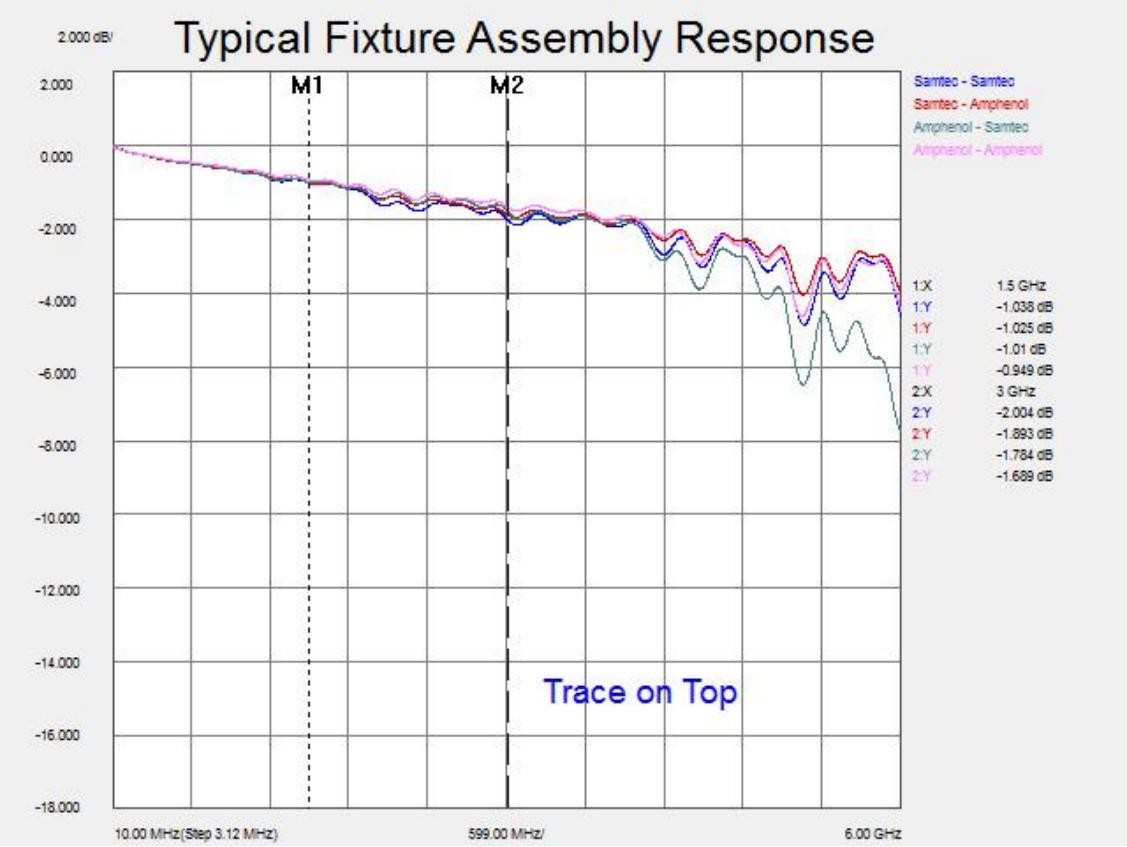


Insertion Loss Repeatability		
	dB @ 1.5 GHz	dB @ 3.0 GHz
Samtec – Samtec Combination	-1.038	-1.934
Samtec – Amphenol Combination	-0.992	-1.722
Amphenol – Samtec Combination	-0.981	-1.684
Amphenol – Amphenol Combination	-0.987	-1.704

Series: HDBNC Series
Description: 75 Ohm HDBNC Board Mount Jacks

Insertion Loss Results Summary (Top Trace)

Cable Plug Assembly to PCB Assembly



Insertion Loss Repeatability		
	dB @ 1.5 GHz	dB @ 3.0 GHz
Samtec – Samtec Combination	-1.038	-2.004
Samtec – Amphenol Combination	-1.025	-1.839
Amphenol – Samtec Combination	-1.010	-1.784
Amphenol – Amphenol Combination	-0.949	-1.689