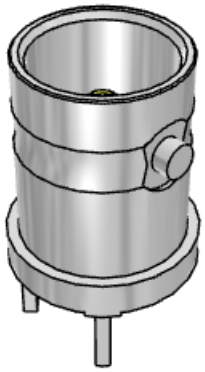
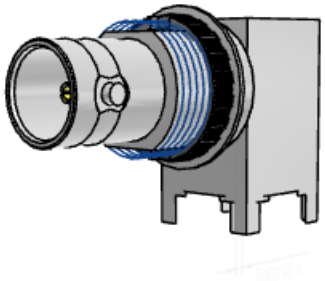
RF Characterization Report

BNC7T Series RF Connector

BNC7T-J-P-GN-ST-TH1



BNC7T-J-P-GN-RA-BH1



Description:
75 Ohm True75™ BNC Jack, Straight
75 Ohm True75™ BNC Bulkhead Jack, Right Angle

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Report Revision: 6/17/2016

Series: BNC7T
Description: 75 Ohm True75™ BNC Jack, Through Hole

Table of Contents

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Test Setup Information

Introduction:

Testing performed evaluates the electrical performance of non-standard impedance products to 12 GHz. Evaluated are two 75 Ohm BNC7T PCB mount series connector types, straight through-hole and right-angle bulkhead through-hole. Measurements evaluate mated pair connector performance over a frequency from 300 KHz to 20 GHz. All measurements conducted utilize specifically designed test boards (PCB-107141-SIG) and Keysight Technologies Automated Fixture Removal (AFR) software tool for the project. AFR methods will de-embed mixed impedance fixturing effects followed by a bifurcation process, splitting dual mated pair performance into separate, single mated pair performance results.

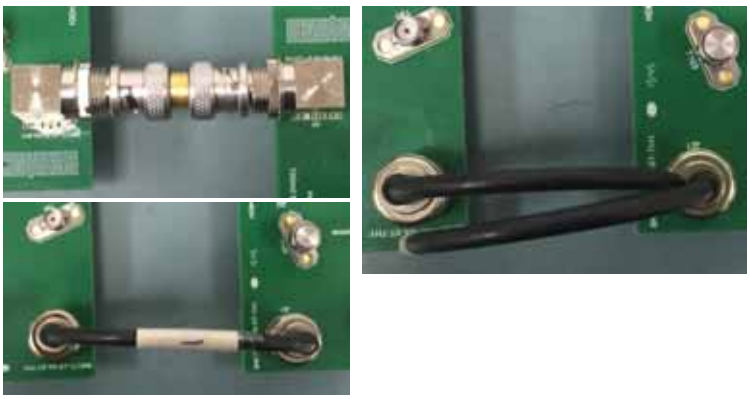
Product Description:

BNC7T-J-P-GN-ST-TH1, straight, through hole
BNC7T-J-P-GN-RA-BH1, right-angle, through hole

Measurement conditions:

Test Sample	Mating Plug Pairs					
	END A	END B	END A	END B	END A	END B
	Radiall 75Ω Barrel Adapter BNC Plug to Plug (2)		Amphenol 75Ω 6 inch Assembly BNC Plug to Plug (2)		Amphenol 75Ω 12 inch Assembly BNC Plug to Plug (2)	
BNC7T-J-P-GN-ST-TH1	V-MM-1A	V-MM-2B	V-6in-1A	V-6in-2B	V-12in-1A	V-12in-2B
	V-MM-3A	V-MM-4B	V-6in-3A	V-6in-4B	V-12in-3A	V-12in-4B
BNC7T-J-P-GN-RA-BH1	H-MM-1A	H-MM-2B	H-6in-1A	H-6in-2B	H-12in-1A	H-12in-2B
	H-MM-3A	H-MM-4B	H-6in-3A	H-6in-4B	H-12in-3A	H-12in-4B

PCB Fixture/DUT



Three Conditions

Series: BNC7T
Description: 75 Ohm True75™ BNC Jack, Through Hole

Procedures

Calibration for Fixture/DUT and 2X Thru Measurements:

Calibration is performed using the 50Ω Agilent mechanical calibration kit, PN 85052D, DC to 26.5 GHz; or an equivalent E-Cal module can be utilized. Performed at the male ends of each test port cable is an unknown thru SOLT type calibration (Figure 1). Standards used are the female open, female short and a female broadband load. The unknown thru standard is an Agilent 3.5mm (f) to 3.5mm (f) precision adapter. NIST traceable open, short and load standards establish the calibrated reflective reference points for all Fixture/DUT measurements. The unknown thru establishes transmission connection and its effects are determined negligible (Two Port Network Analyzer Calibration Using an Unknown "Thru", Andrea Ferrero, Member, IEEE and Umberto Pisani, IEEE Microwave and Guided Wave Leters, Vol. 2, No. 12, December 1992). The 50Ω standard impedance calibration provides a 20 GHz working bandwidth in which to operate. The unique 2X thru of non-standard 75Ω impedance product determines the bandwidth that can be measured effectively. The unique 2X Thru (Figure 2) standard is a one-time critical measurement applicable to all Fixture/DUT measurements. Fixture/DUT measurements total twelve, six straight and six right angle, utilizing the 3-75Ω BNC plug conditions. The AFR bifurcation process generates two mated pair results for each measurement condition totaling twenty-four mated pair results.

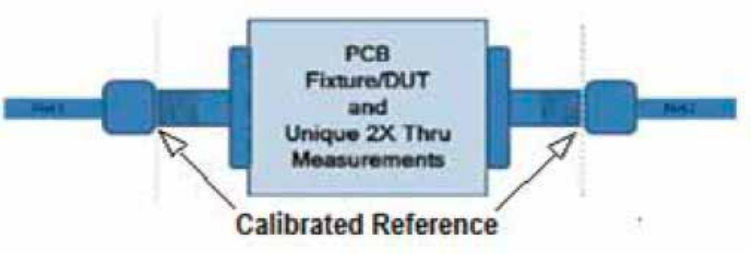


Figure 1 – Standard 50Ω Impedance Calibration

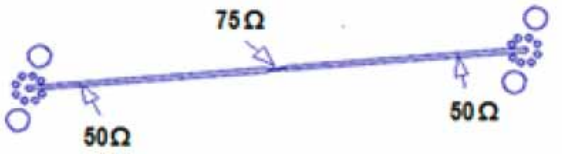


Figure 2 – Unique 2X Thru

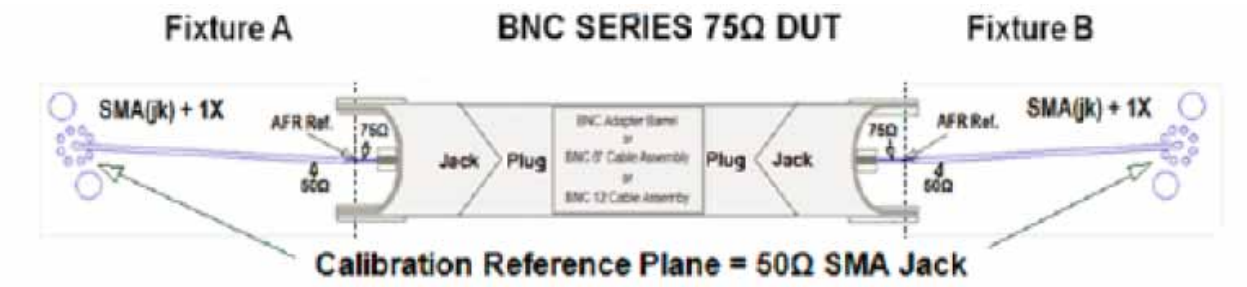


Figure 3 – Fixtures De-embedded

AFR[1]

AFR is a module embedded into Keysight Technologies PLTS simulation and de-embedding software. Correctly implemented, AFR mathematical routines effectively apply the 2X Thru standard s-parameter characteristics to each of the Fixture/DUT s-parameter measurement characteristics that de-embed all the unwanted PCB fixture

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effects. Non-shaded areas of Figure 3 depict fixture “A and B” as de-embdded. Of interest are the shaded areas of the 75Ω BNC DUT that contain SI characteristics from two mated pairs of 75Ω BNC connectors, along with induced termination and cable effects from three conditional effects monitored. Final procedure is to employ a method called bifurcation (AFR^2) to extract single mated pair results.

AFR^2
The definition of bifurcation means to divide into two separate branches, which, when AFR is employed a second time, will occur. By dividing the dual mated pair file result from above against itself, using AFR, the equivalent files are extracted as fixtures, “A” and “B” creating the equivalent mated pair result sought.

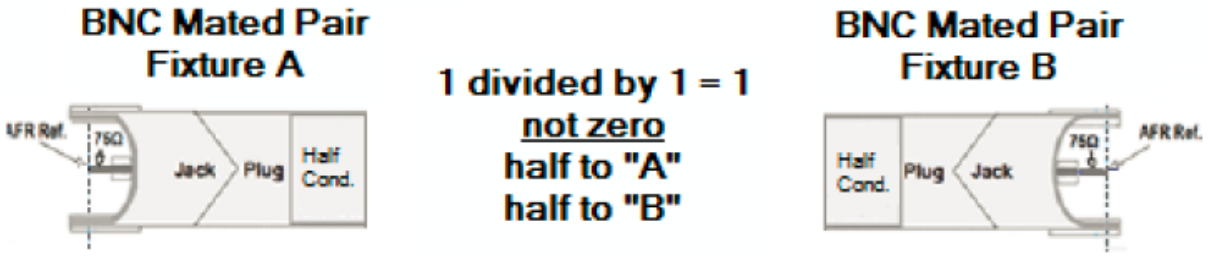

Figure 4 – Two Mated Pair Results Extracted

Instrument Setup:

Network Analyzer	Agilent N5230C PNA-L Series (300 KHz – 20 GHz) 2-Port Configuration
Mechanical Calibration Kit	85052D
Averaging Factor	0
Smoothing	Off
IF Bandwidth	1 KHz
Sweep Start	300 KHz
Sweep End	20 GHz
Points	1601
Test Cables	Gore OWD01D02039-4 (DC-26.5 GHz)

Simulation, Modeling and Analysis Tools:

Physical Layer Test System (PLTS), 2014	Keysight Technologies
Automated Fixture Removal (AFR)	Keysight Technologies
AFR (Bifurcation)	Keysight Technologies
AFR^1 / AFR^2 Methods Reference	Non-Standard Impedance Testing
Advanced Design System	Keysight Technologies

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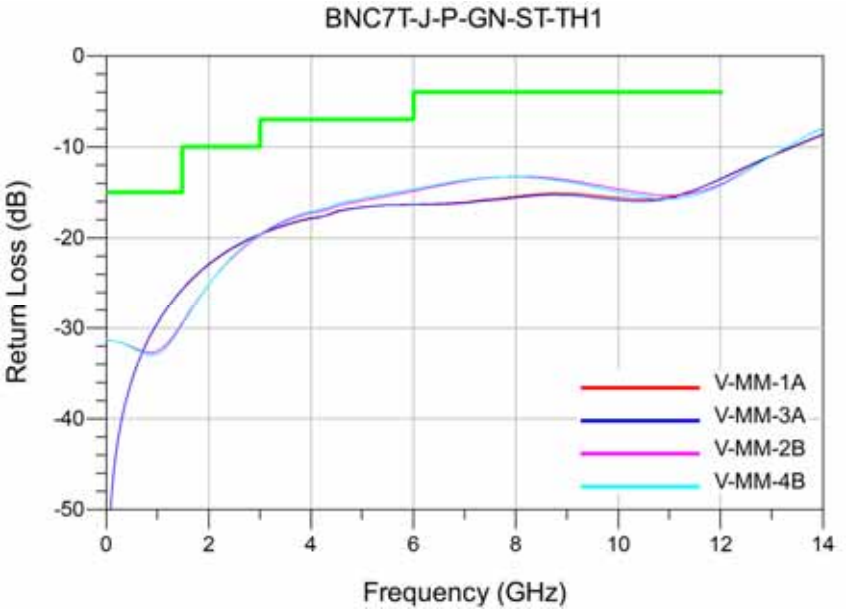
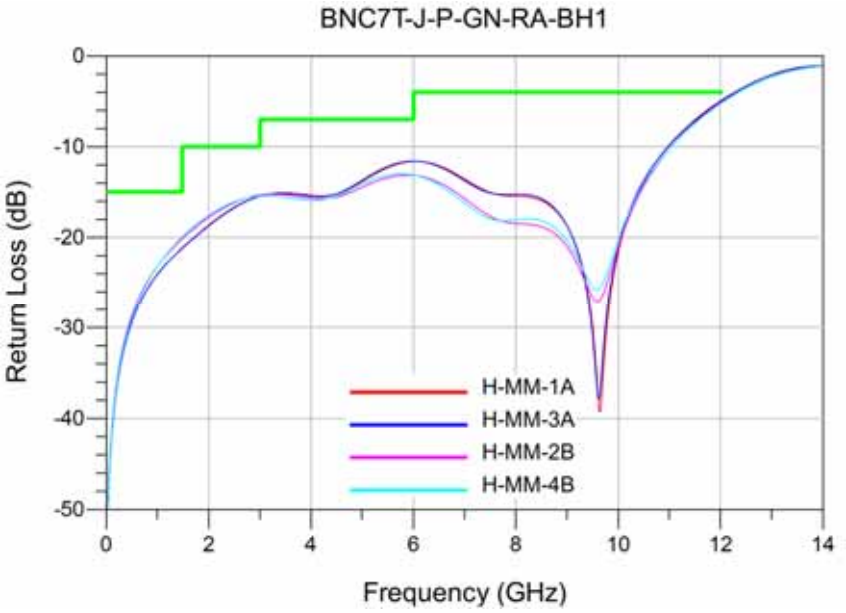
Return Loss Results

75 Ohm Straight BNC Jack Mated to Radiall Plug Barrel Adapter



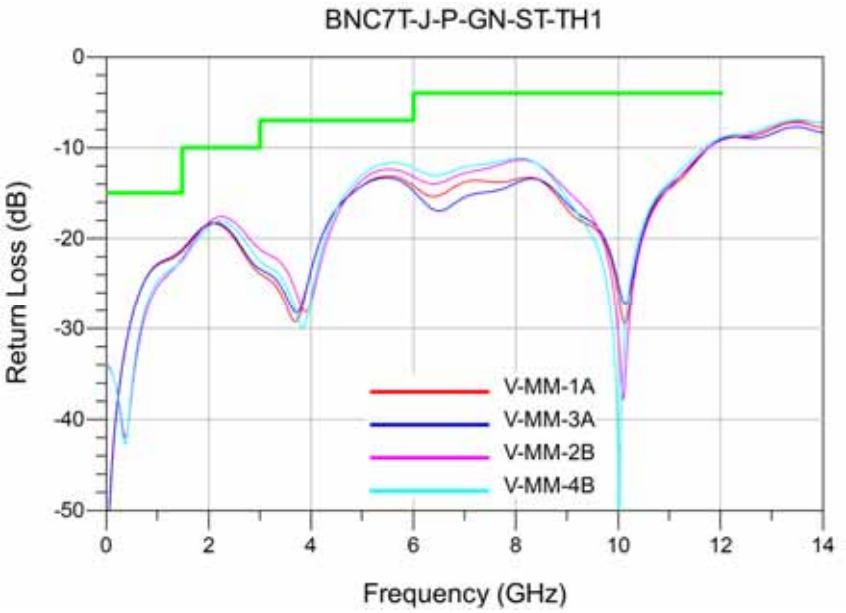
75 Ohm Right-Angle BNC Jack Mated to Radiall Plug Barrel Adapter



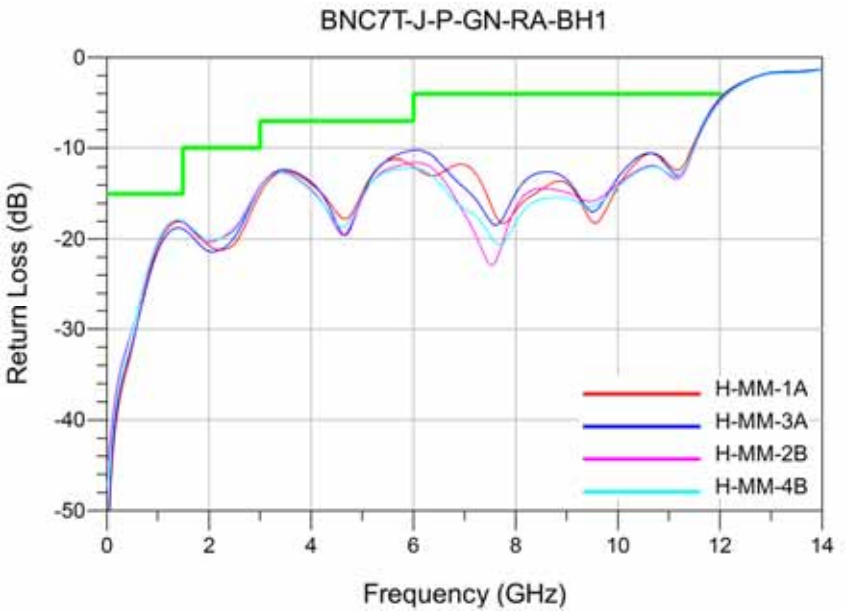
Series: BNC7T
Description: 75 Ohm True75™ BNC Jack, Through Hole

Return Loss

75 Ohm Straight BNC Jack Mated to Amphenol 6" BNC Plug Cable Assembly



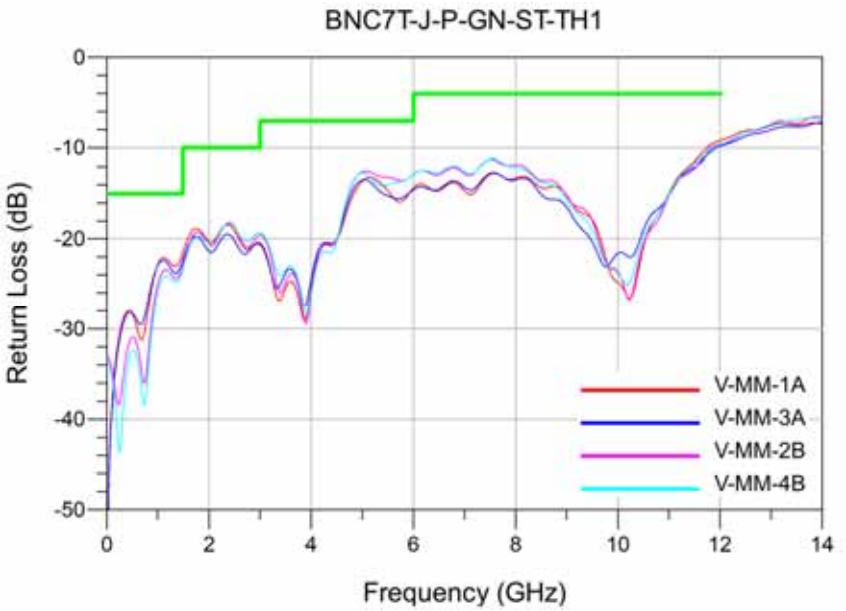
75 Ohm Right-Angle BNC Jack Mated to Amphenol 6" BNC Plug Cable Assembly



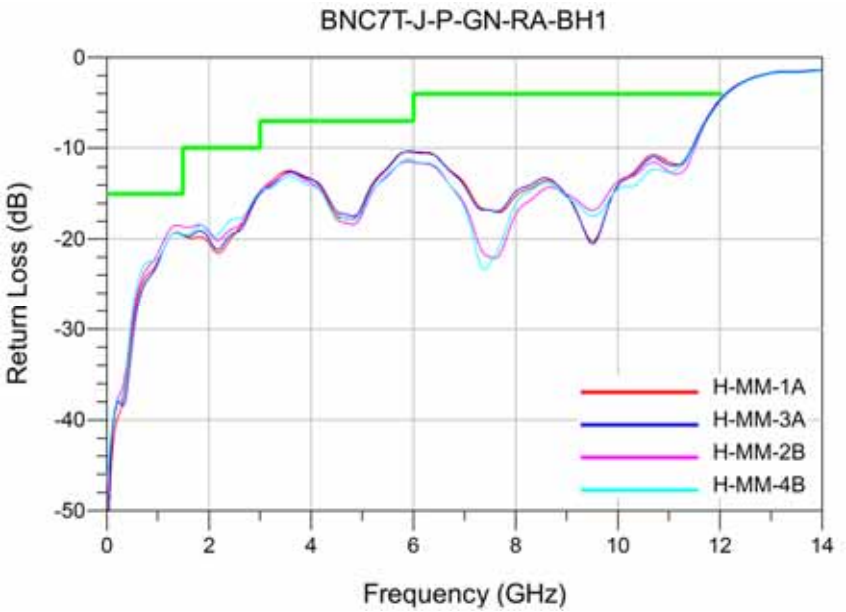
Series: BNC7T
Description: 75 Ohm True75™ BNC Jack, Through Hole

Return Loss

75 Ohm Straight BNC Jack Mated to Amphenol 12" BNC Plug Cable Assembly



75 Ohm Right-Angle BNC Jack Mated to Amphenol 12" BNC Plug Cable Assembly



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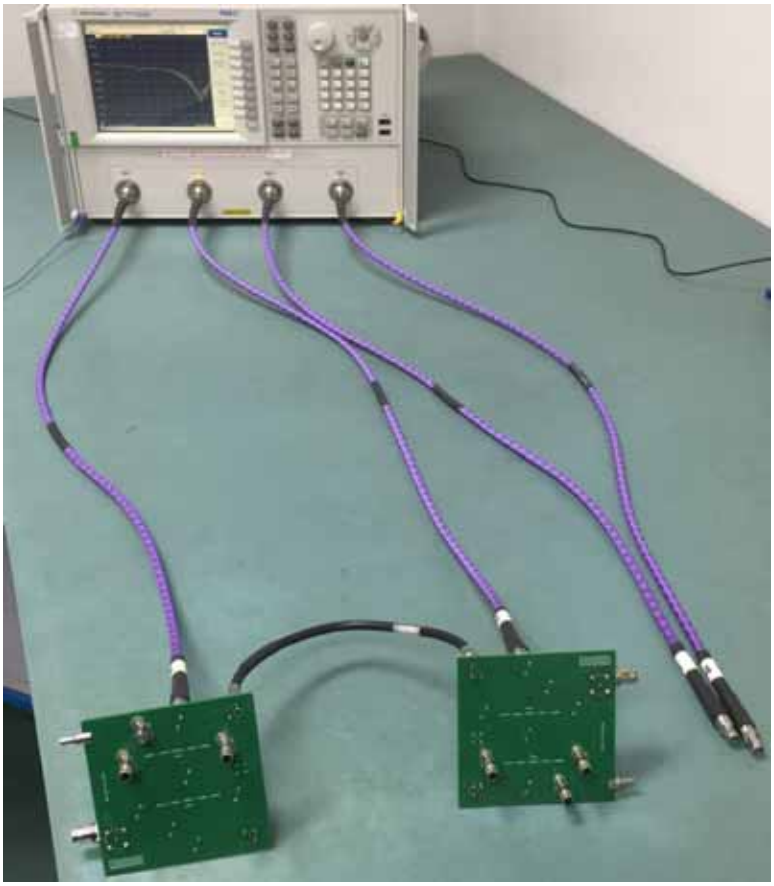
Test Environment:



(A Typical set-up, actual part depicted.)