



RF Characterization Report

HDBNC Series RF Connector

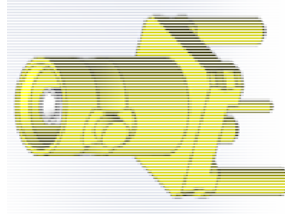
HDBNC-J-P-GN-ST-EM1



HDBNC-J-P-GN-ST-BH1



HDBNC-J-P-GN-ST-TH1



Description:
**75 Ohm True 75™ High Density BNC Straight Jack,
Edge Mount or Through-hole**

Series: HDBNC

Description: 75 Ohm True 75TM High Density BNC Straight Jack

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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:

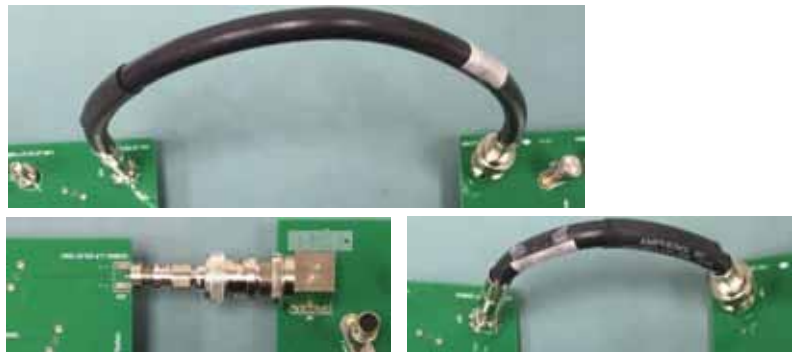
HDBNC-J-P-GN-ST-EM1, straight, edge mount
 HDBNC-J-P-GN-ST-BH1, bulk head, through hole
 HDBNC-J-P-GN-ST-TH1, straight, through hole

Measurement conditions:

| Test Sample | Mating Plug Pairs | | | | | |
|---------------------|---|---------|---|----------|--|-----------|
| | END A | END B | END A | END B | END A | END B |
| | Radial 75Ω Barrel Adapter HD- BNC Plug to BNC Plug (2) | | Amphenol 75Ω 6 inch Assembly HD-BNC Plug to BNC Plug (2) | | Amphenol 75Ω 12 inch Assembly HD-BNC Plug to BNC Plug (2) | |
| HDBNC-J-P-GN-ST-EM1 | 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 |
| HDBNC-J-P-GN-ST-BH1 | 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 |
| HDBNC-J-P-GN-ST-TH1 | V-MM-5A | V-MM-6B | V-6in-5A | V-6in-6B | V-12in-5A | V-12in-6B |
| | V-MM-7A | V-MM-8B | V-6in-7A | V-6in-8B | V-12in-7A | V-12in-8B |



PCB Fixture/DUT



Three Conditions

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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 Letters, 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 eighteen, six straight edge mount, six straight bulkhead and six straight through hole, utilizing the 3-75Ω HDBNC to BNC plug conditions. The AFR bifurcation process generates two mated pair results for each measurement condition totaling thirty-six mated pair results, including eighteen HDBNC and BNC mated pairs each.

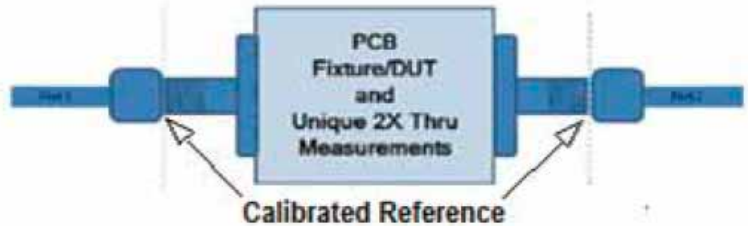


Figure 1 – Standard 50Ω Impedance Calibration

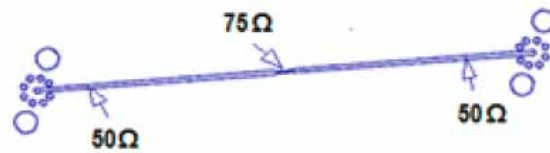


Figure 2 – Unique 2X Thru

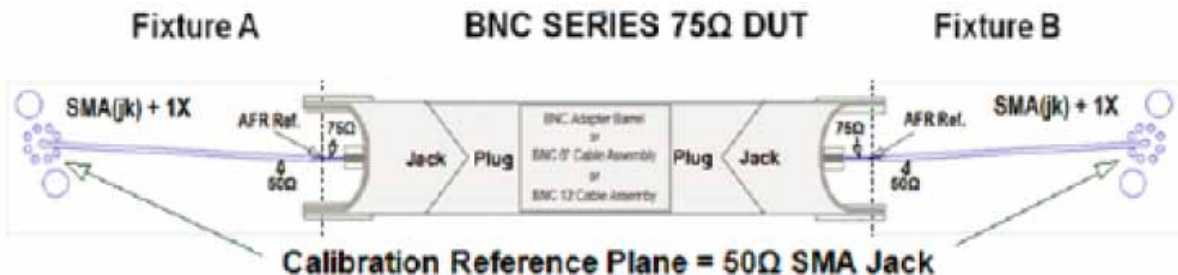


Figure 3 – Fixtures De-embedded

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AFR¹

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 effects. Non-shaded areas of Figure 3 depict fixture “A and B” as de-embedded. 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 (AFR²) to extract single mated pair results.

AFR²

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.

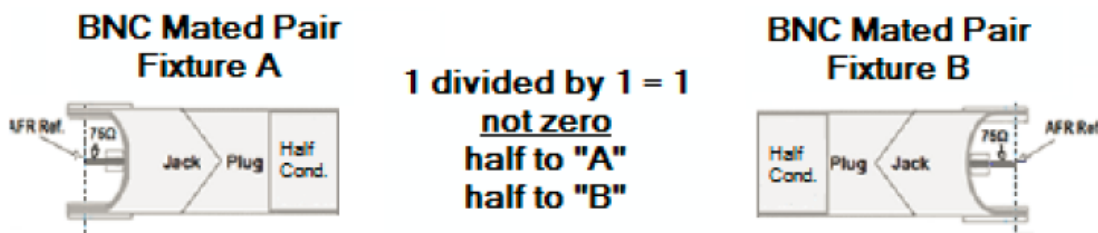


Figure 4 – Two Mated Pair Results Extracted

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:

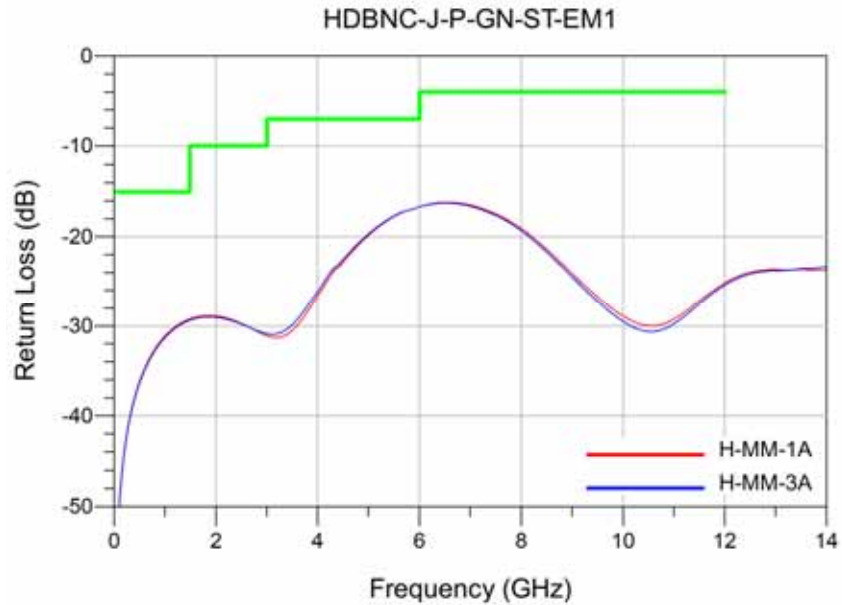
| | |
|---|--------------------------------|
| Physical Layer Test System (PLTS), 2014 | Keysight Technologies |
| Automated Fixture Removal (AFR) | Keysight Technologies |
| AFR (Bifurcation) | Keysight Technologies |
| AFR ¹ / AFR ² Methods Reference | Non-Standard Impedance Testing |
| Advanced Design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

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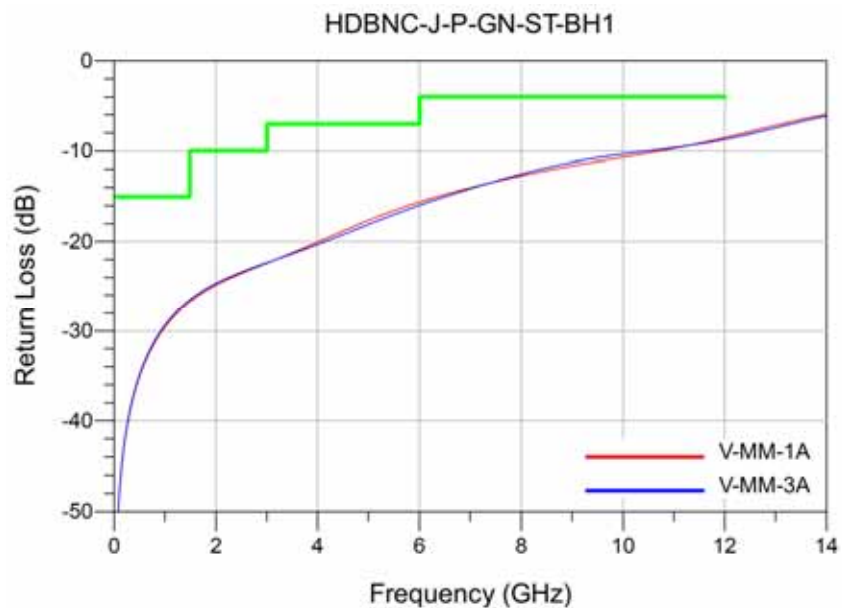
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Return Loss Results

75 Ohm Edge Mount Straight HDBNC Jack Mated to Radial Plug Barrel Adapter



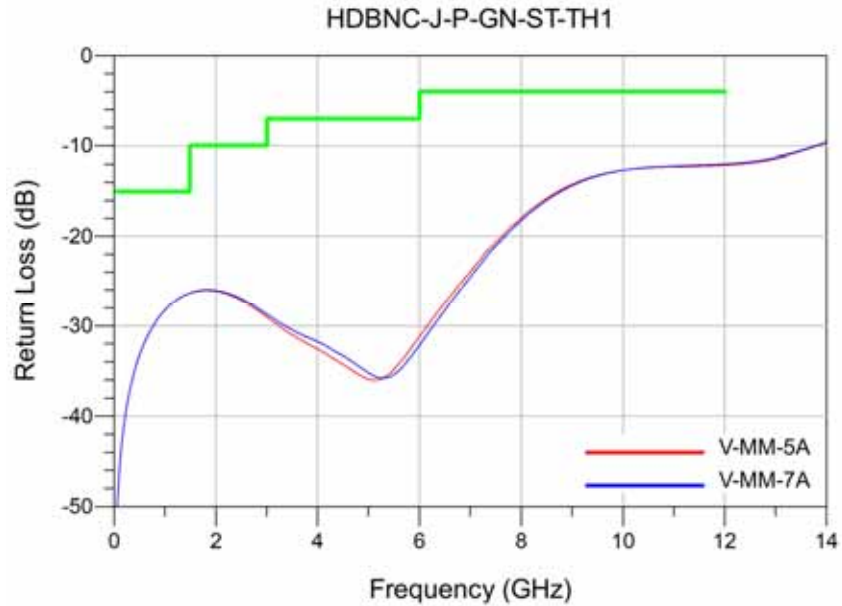
75 Ohm Through-hole Straight HDBNC Bulkhead Jack Mated to Radial Plug Barrel Adapter



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75 Ohm Through-hole Straight HDBNC Jack Mated to Radial Plug Barrel Adapter

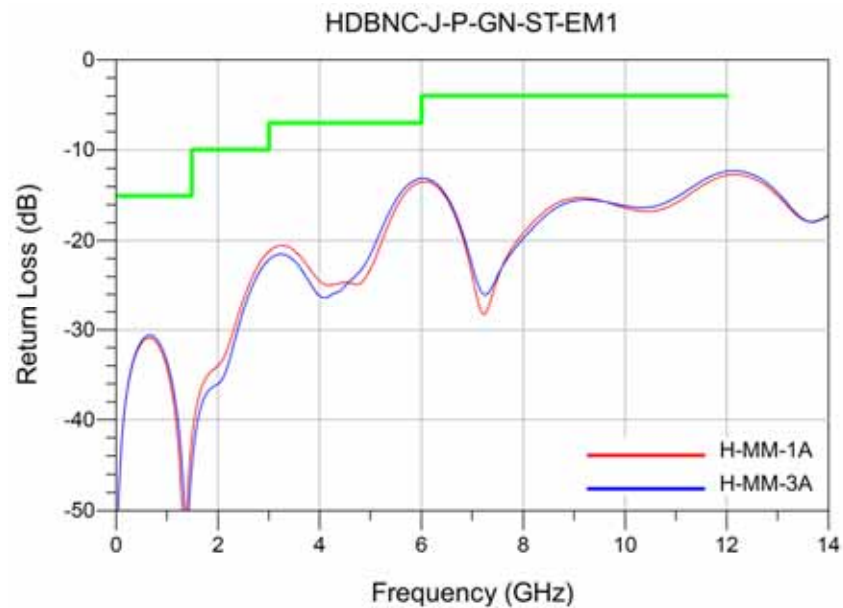


Series: HDBNC

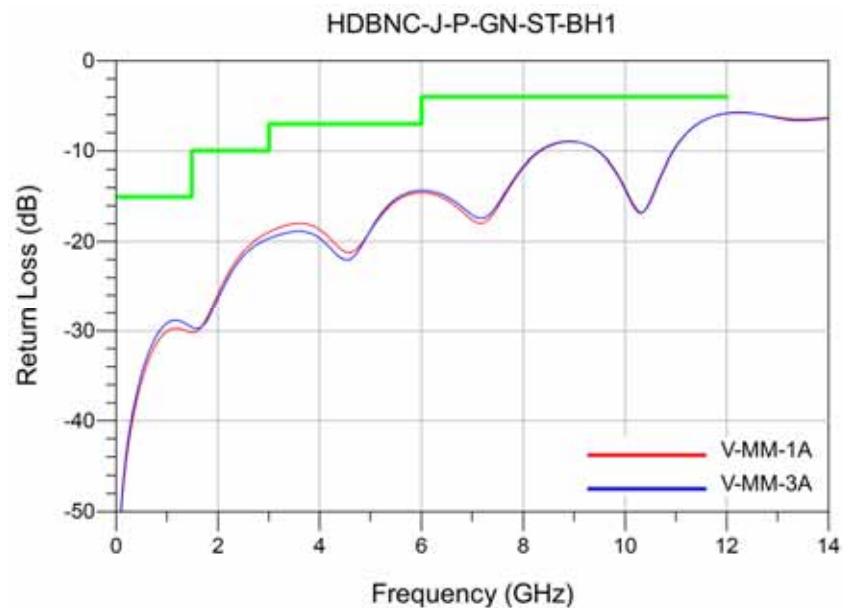
Description: 75 Ohm True 75™ High Density BNC Straight Jack

Return Loss

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



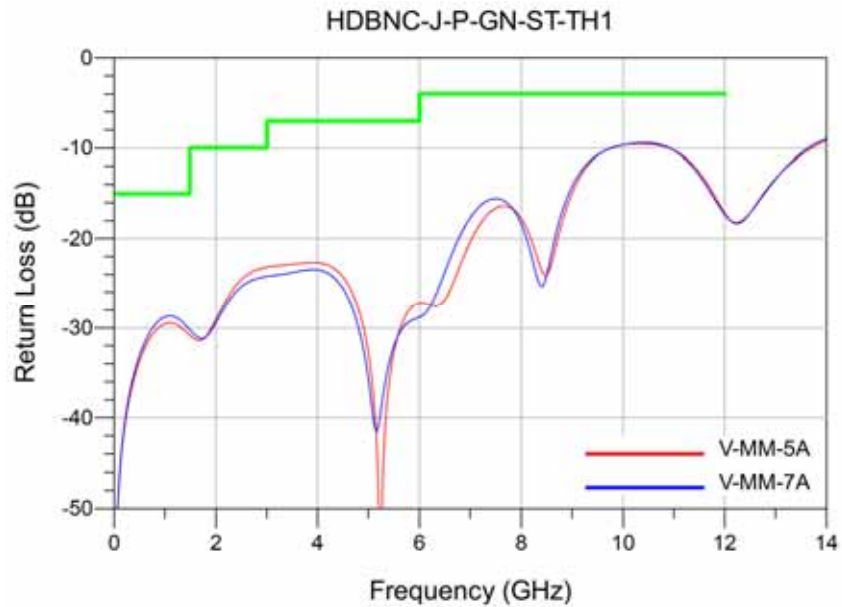
75 Ohm Through-hole Straight Bulkhead BNC Jack Mated to Amphenol 6" BNC Plug Cable Assembly



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Description: 75 Ohm True 75™ High Density BNC Straight Jack

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

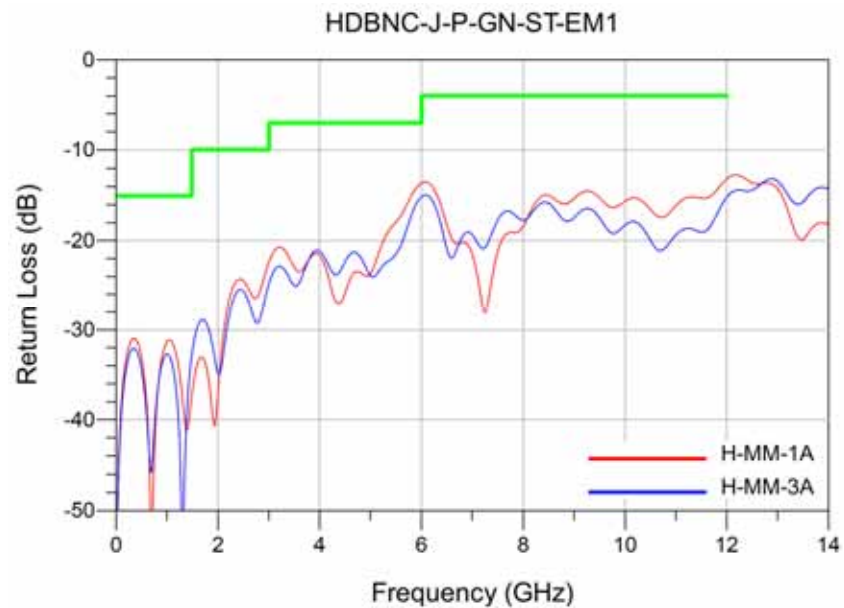


Series: HDBNC

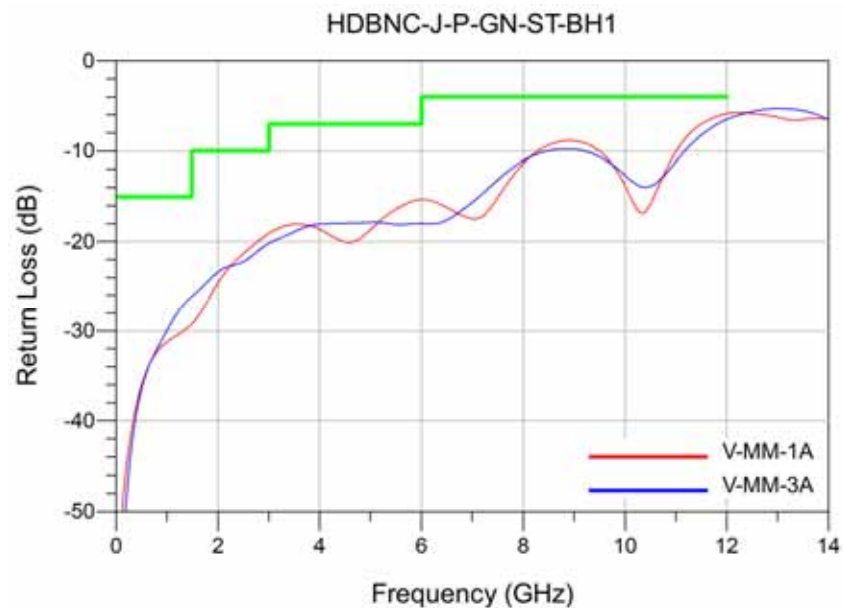
Description: 75 Ohm True 75™ High Density BNC Straight Jack

Return Loss

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



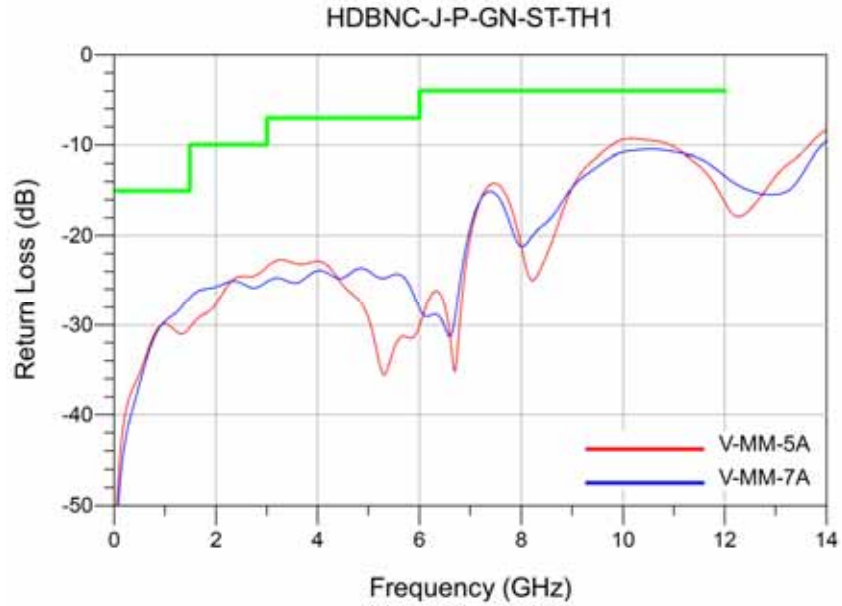
75 Ohm Through-hole BNC Bulkhead Jack Mated to Amphenol 12" BNC Plug Cable Assembly



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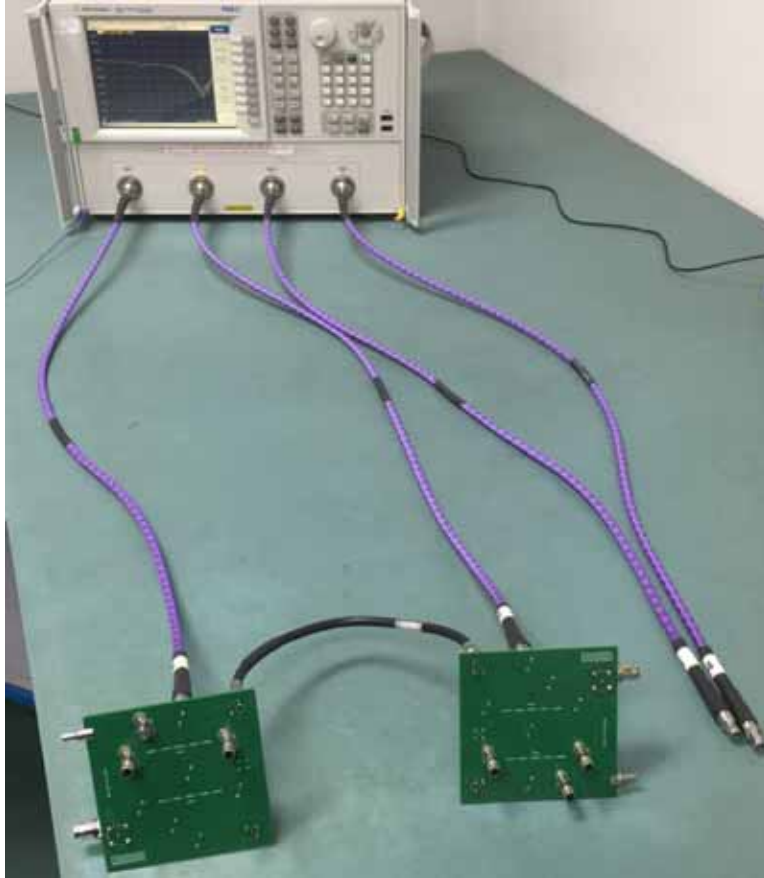
75 Ohm Through-hole BNC Jack Mated to Amphenol 12" BNC Plug Cable Assembly



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Test Environment:



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