



# **DataHost II RB Antenna Characterization**

**November 14, 2002**

# Contents

- 1 DATAHOST II RB ANTENNA MEASUREMENTS ..... 3**
  - 1.1 Scope..... 3**
  - 1.2 Required Equipment ..... 3**
  - 1.3 DH2 Assembly and Calibration ..... 3**
  - 1.4 Stand-Alone DH2 RB Measurements..... 7**
  - 1.5 DH2 RB Installed in an RFU without iDEN RBs Measurements ..... 10**
  - 1.6 DH2 RB Installed in an RFU with iDEN RBs Measurements..... 14**

# 1 DataHost II RB Antenna Measurements

## 1.1 Scope

Perform swept signal measurements to characterize various antennas installed in common setups. These measurements will be used in conjunction with in-system characterization to determine the overall performance of each antenna.

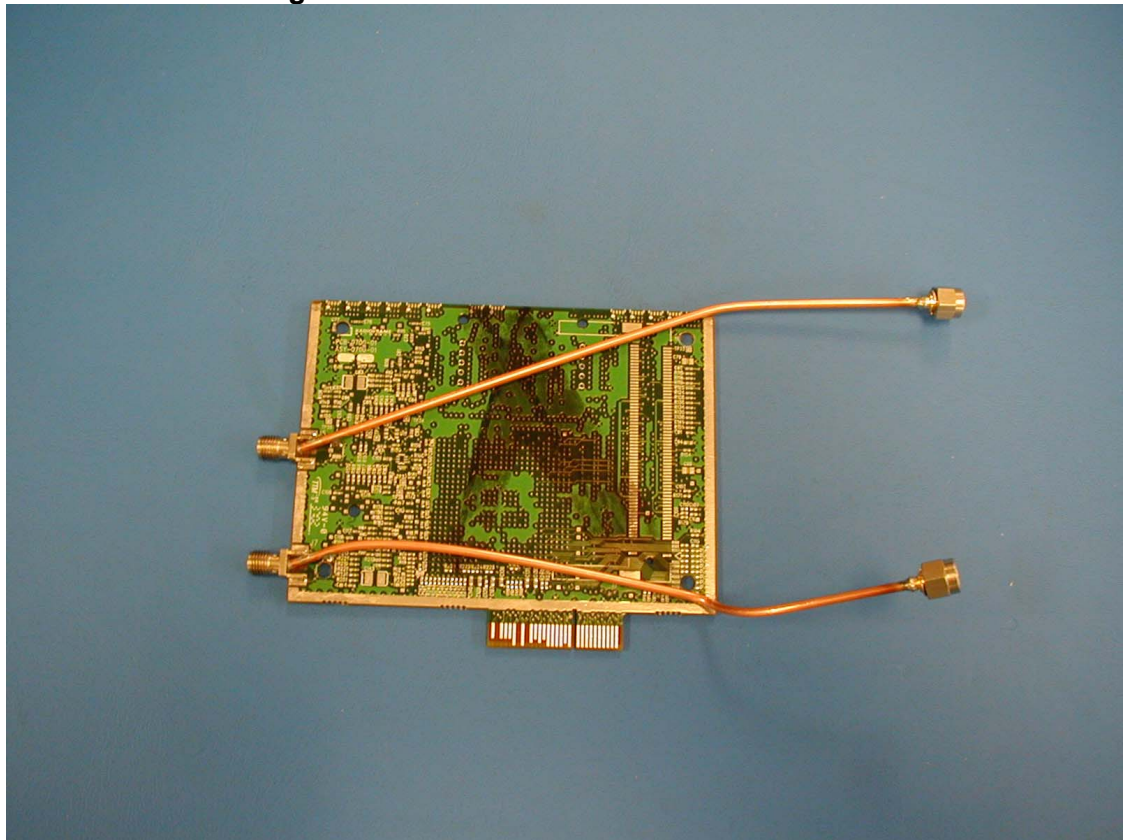
## 1.2 Required Equipment

- 1 Network Analyzer (Agilent 8753D)
- 1 3.5mm Calibration Kit (Agilent 85033D)
- 1 RFU (with ASY-0520-05 RFU Backplane installed)
- 2 iDEN RBs (RFN P/N 101-0620-05)
- 1 Piece of RF absorptive foam (R&F Products P/N 4502)
- 1 DataHost II (DH2) RB Mechanical Mockup using RFN PCB-0700-01
- Miscellaneous RF cables and connectors

## 1.3 DH2 Assembly and Calibration

### 1.3.1 Assemble the DH2 RB Mechanical Mockup

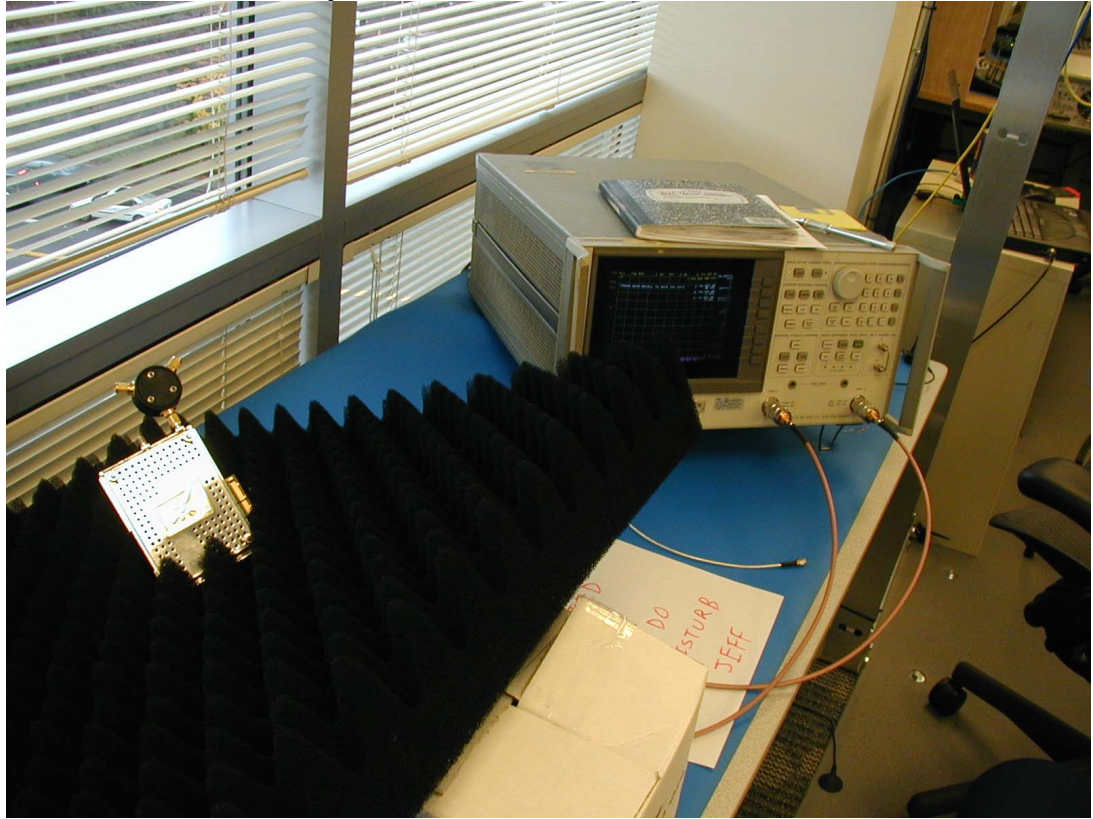
1.3.1.1 Connect some semi-rigid cable to both DH2 SMA connectors.



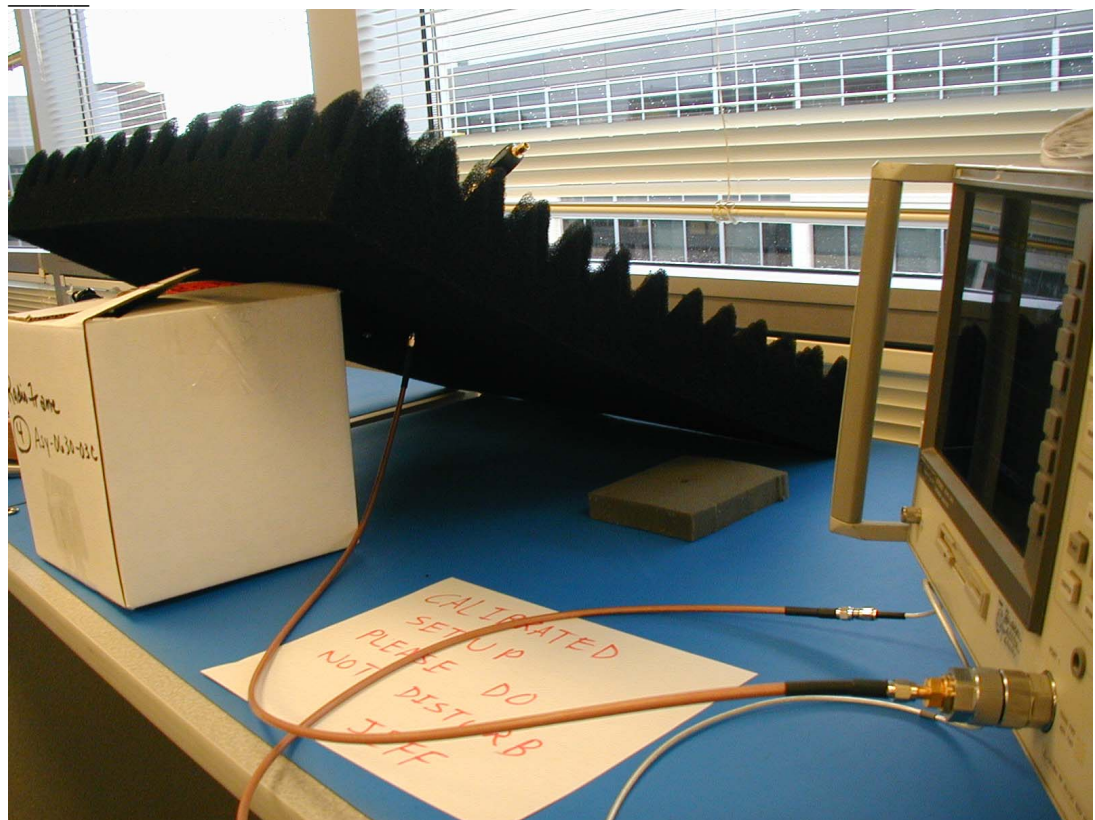
1.3.1.2 Install the shield on the DH2 so that it can be removed again if needed. Route the semi-rigid cable connected to the DH2 SMA connector closest to the RB edge connector so that it exits from the corner of the RB closest to the edge connector. Route the semi-cable connected to the DH2 SMA connector furthest from the RB edge connector so that it exits from the corner of the RB that is farthest away from the DH2 SMA connectors.

### 1.3.2 Calibrate the DH2 RB Mechanical Mockup

1.3.2.1 Calibrate both DH2 SMA ports for return loss.

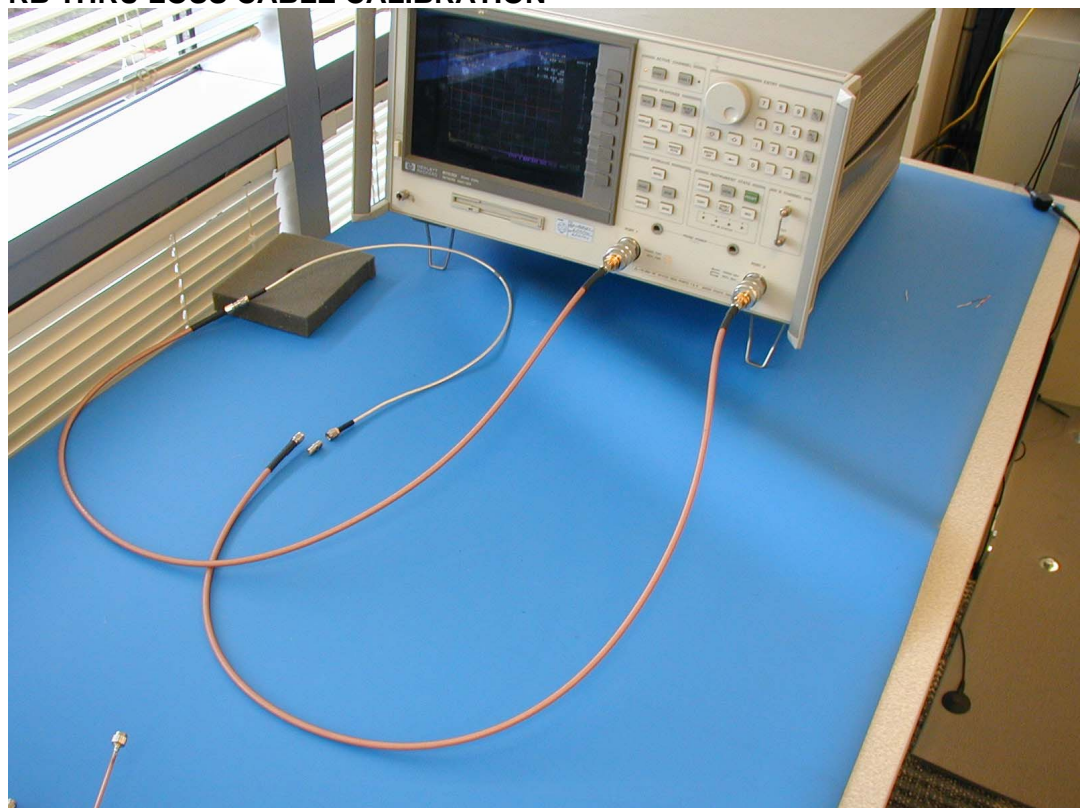




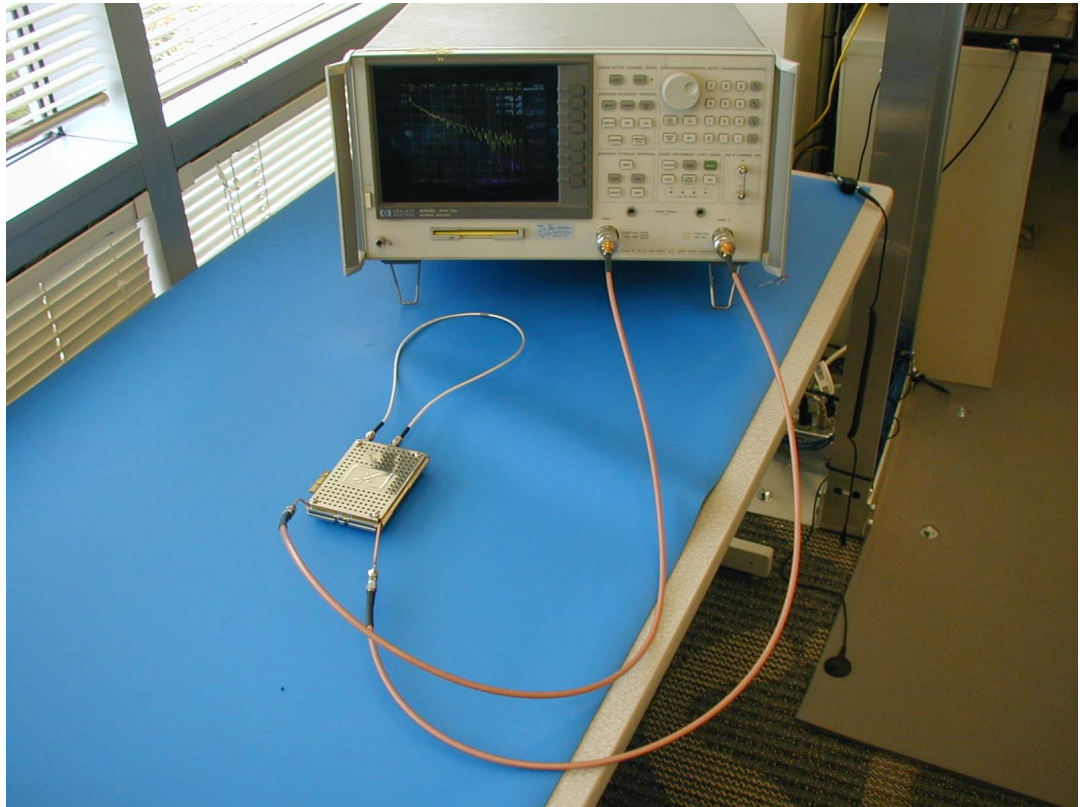


**1.3.2.2 Calibrate both DH2 SMA ports for thru loss.  
RB THRU LOSS CABLE CALIBRATION**

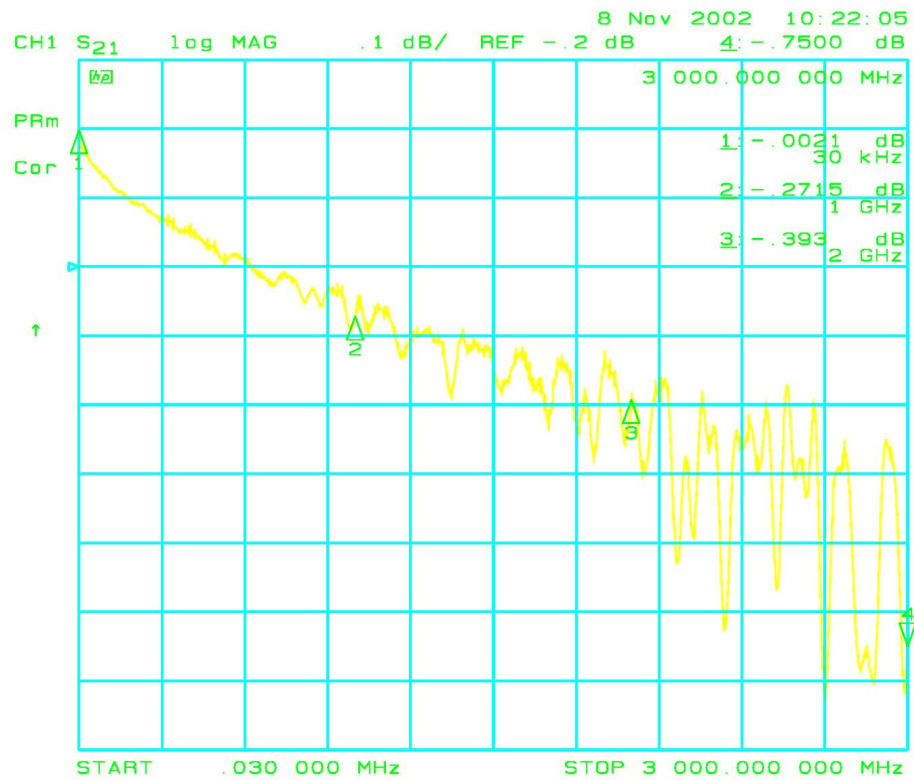
**DH2**



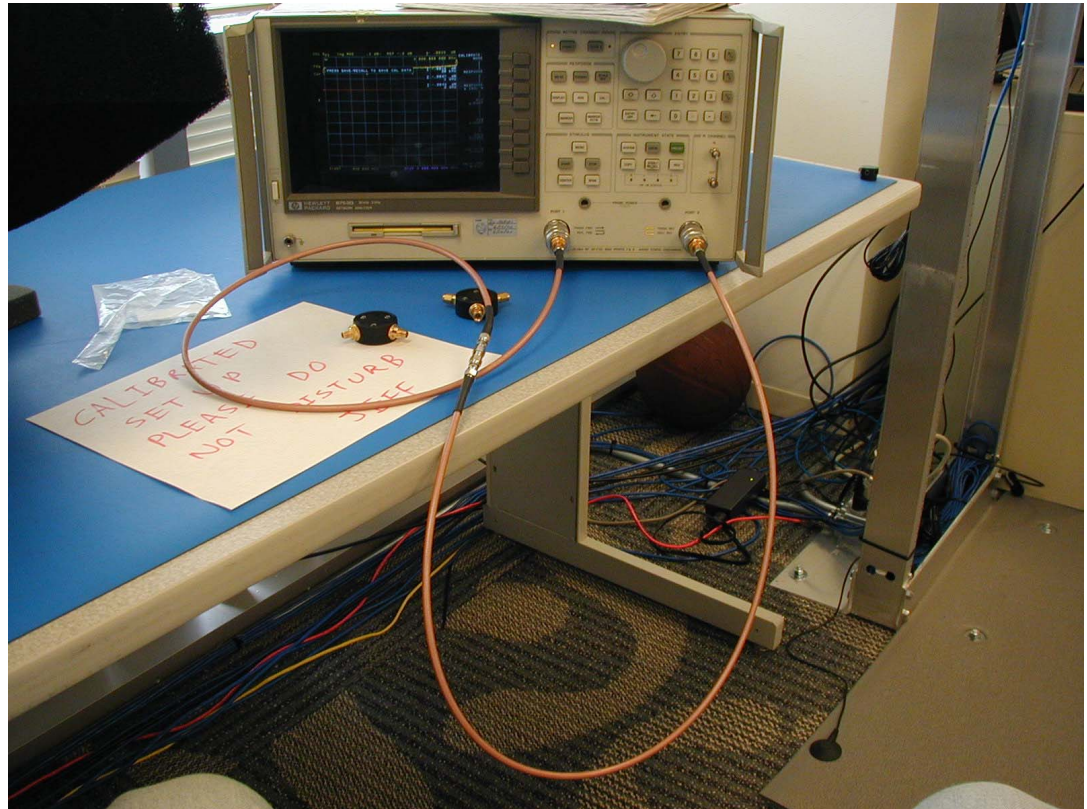
## DH2 RB THRU LOSS SETUP



## DH2 RB THRU LOSS






















**ANTENNA THRU LOSS CABLE CALIBRATION****1.4 Stand-Alone DH2 RB Measurements**

**1.4.1 Route the semi-rigid cable from the DH2 SMA connectors thru the RF absorptive foam.**

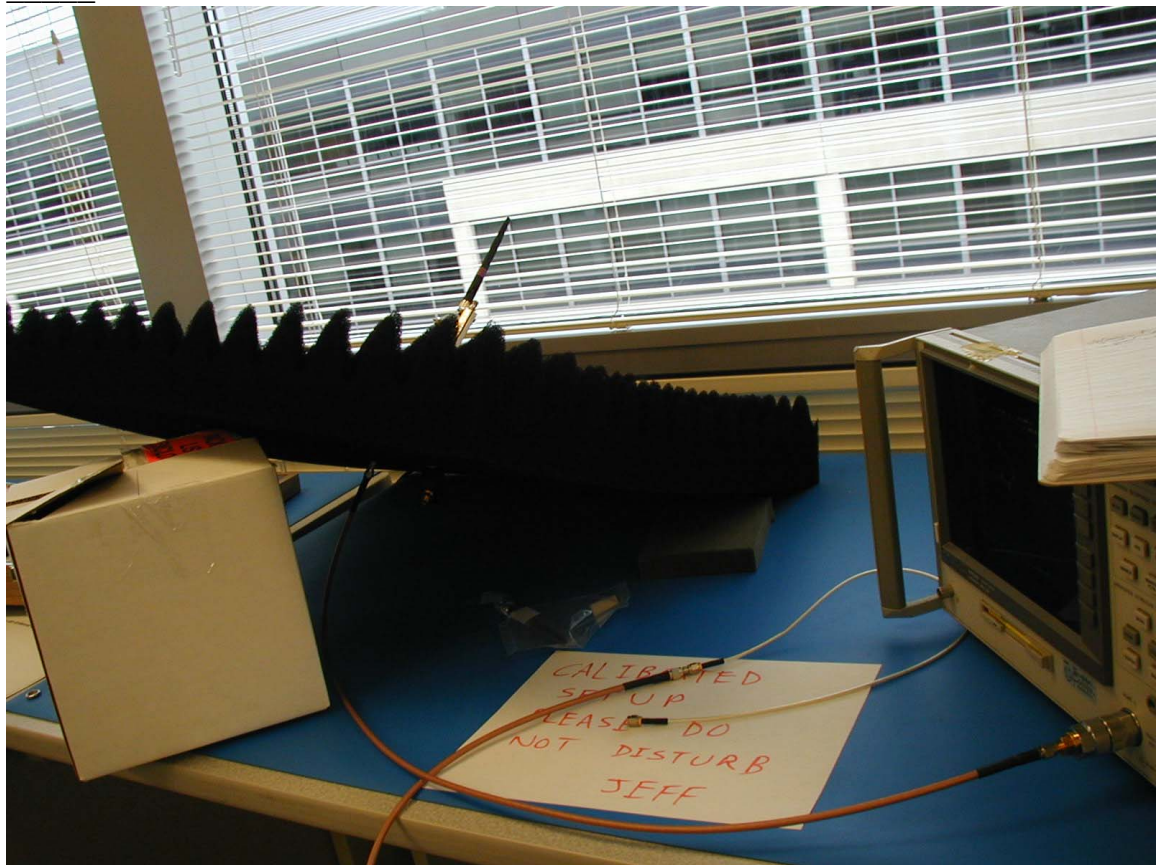
**1.4.2 Install one antenna on the DH2 SMA connector closest to the RB edge connector and measure the return loss with the other terminated into 50 ohms.**

**1.4.2.1 Data Table**













Antenna Supplier	Antenna P/N	HP-GL Data Files (Unzip and install this HP-GL viewer->  . Then double-click on files to view.)	Return Loss Data Summary
Linx	ANT-2.4-RCT-SS	Antenna #1:   Antenna #2:  	Antenna #1: -15.0dB at 2.4GHz and -21.3dB at 2.5GHz Antenna #2: -14.3dB at 2.4GHz and -21.8dB at 2.5GHz
Centurion	WCR2400SM	Antenna #1:   Antenna #2:  	Antenna #1: -14.2dB at 2.4GHz and -8.5dB at 2.5GHz Antenna #2: -16.6dB at 2.4GHz and -9.7dB at 2.5GHz
Nearson	S331AM-2450	Antenna #1:   Antenna #2:  	Antenna #1: -11.4dB at 2.4GHz and -11.8dB at 2.5GHz Antenna #2: -13.8dB at 2.4GHz and -11.0dB at 2.5GHz
Nearson	S141AM-2450	Antenna #1:  	Antenna #1: -10.2dB at 2.4GHz and -14.4dB at 2.5GHz

		Antenna #2:   S11_L2C_250MHz_18A R200L_251100_18A	Antenna #2: -12.6dB at 2.4GHz and -18.5dB at 2.5GHz
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**1.4.3 Install one antenna on the DH2 SMA connector furthest from the RB edge connector and measure the return loss with the other terminated into 50 ohms.**



**1.4.3.1 Data Table**

Antenna Supplier	Antenna P/N	HP-GL Data Files (double-click on files to view)	Return Loss Data Summary
Linx	ANT-2.4-RCT-SS	Antenna #1:   S11_L2C_250MHz_18A R200L_251100_18A Antenna #2:   S11_L2C_250MHz_18A R200L_251100_18A	Antenna #1: -13.0dB at 2.4GHz and -21.3dB at 2.5GHz Antenna #2: -12.8dB at 2.4GHz and -21.2dB at 2.5GHz
Centurion	WCR2400SM	Antenna #1:   S11_L2C_250MHz_18A R200L_251100_18A Antenna #2:   S11_L2C_250MHz_18A R200L_251100_18A	Antenna #1: -9.6dB at 2.4GHz and -5.7dB at 2.5GHz Antenna #2: -10.3dB at 2.4GHz and -6.3dB at 2.5GHz
Nearson	S331AM-2450	Antenna #1:   S11_L2C_250MHz_18A R200L_251100_18A Antenna #2:   S11_L2C_250MHz_18A R200L_251100_18A	Antenna #1: -12.0dB at 2.4GHz and -12.7dB at 2.5GHz Antenna #2: -14.5dB at 2.4GHz and -11.7dB at 2.5GHz











Nearson	S141AM-2450	Antenna #1:   Antenna #2:  	Antenna #1: -10.1dB at 2.4GHz and -16.5dB at 2.5GHz Antenna #2: -12.5dB at 2.4GHz and -21.9dB at 2.5GHz
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**1.4.4 Install Antenna #1 on the DH2 SMA connector closest to the RB edge connector and Antenna #2 on the DH2 SMA connector furthest from the RB edge connector.**









**1.4.4.1 Measure the return loss at the DH2 SMA connector closest to the RB edge connector with the other terminated into 50 ohms.**

**1.4.4.1.1 Data Table**

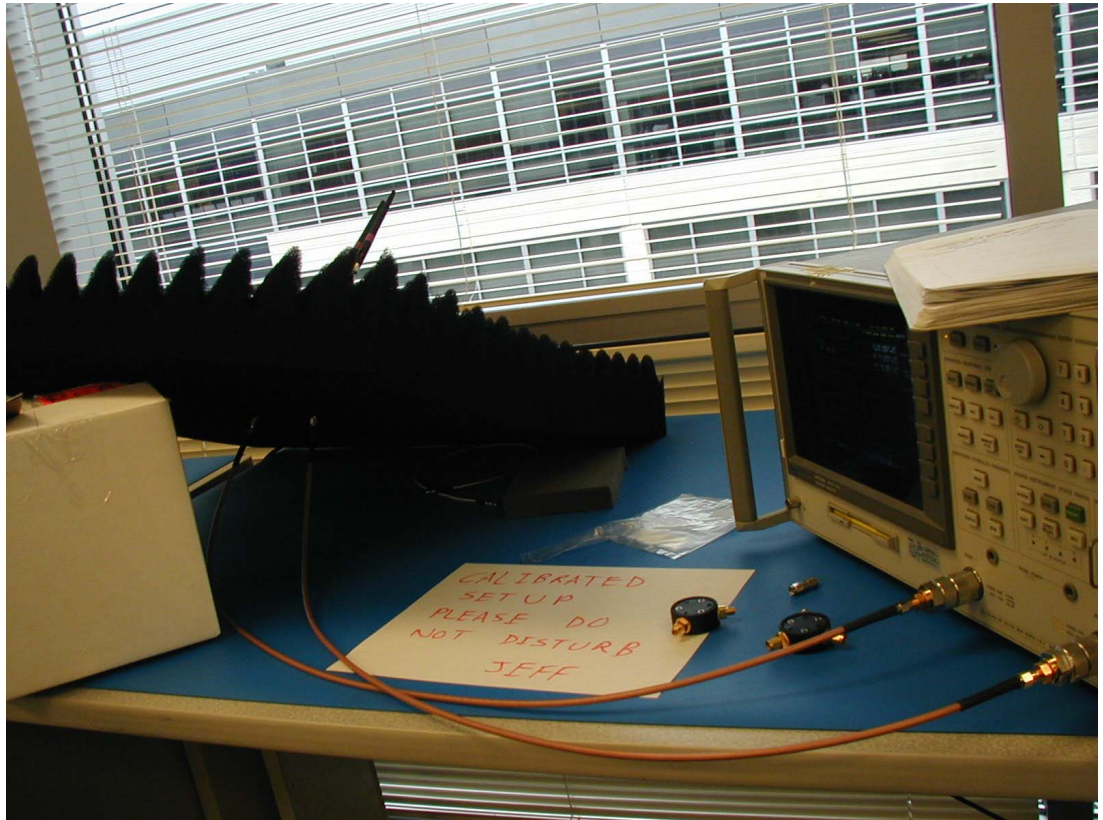
Antenna Supplier	Antenna P/N	HP-GL Data Files (double-click on files to view)	Return Loss Data Summary
Linx	ANT-2.4-RCT-SS	 	-16.8dB at 2.4GHz and -13.4dB at 2.5GHz
Centurion	WCR2400SM	 	-10.0dB at 2.4GHz and -7.8dB at 2.5GHz
Nearson	S331AM-2450	 	-19.4dB at 2.4GHz and -8.2dB at 2.5GHz
Nearson	S141AM-2450	 	-9.8dB at 2.4GHz and -20.2dB at 2.5GHz

**1.4.4.2 Measure the return loss at the DH2 SMA connector furthest from the RB edge connector with the other terminated into 50 ohms.**





**1.4.4.2.1 Data Table**

Antenna Supplier	Antenna P/N	HP-GL Data Files (double-click on files to view)	Return Loss Data Summary
Linx	ANT-2.4-RCT-SS	 	-12.2dB at 2.4GHz and -15.5dB at 2.5GHz
Centurion	WCR2400SM	 	-9.4dB at 2.4GHz and -5.9dB at 2.5GHz
Nearson	S331AM-2450	 	-42.6dB at 2.4GHz and -7.9dB at 2.5GHz
Nearson	S141AM-2450	 	-11.9dB at 2.4GHz and -27.3dB at 2.5GHz

#### 1.4.4.3 Measure the thru loss between the two DH2 SMA connectors.



1.4.4.3.1 Data Table

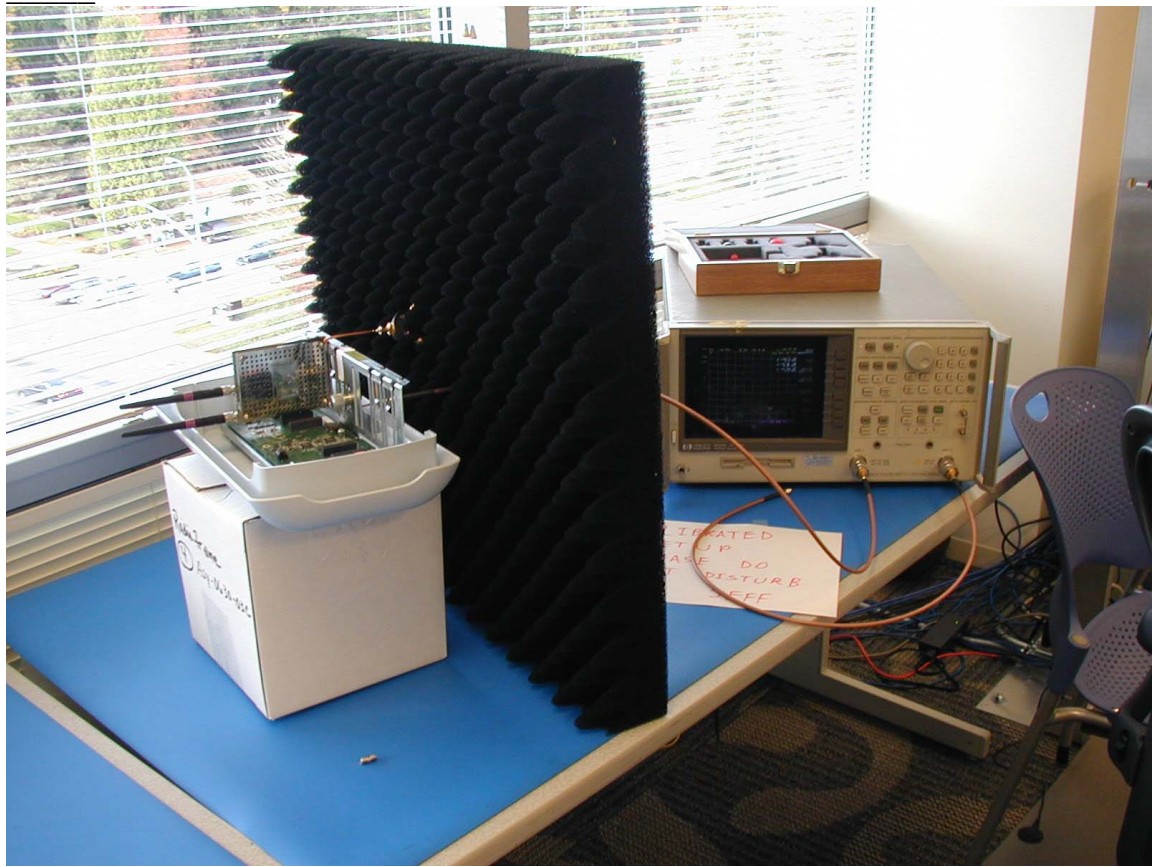
Antenna Supplier	Antenna P/N	HP-GL Data Files (double-click on files to view)	Thru Loss Data Summary (Added ~0.5dB due to DH2 RB THRU LOSS)
Linx	ANT-2.4-RCT-SS		-11.2dB at 2.4GHz and -10.5dB at 2.5GHz
Centurion	WCR2400SM		-8.9dB at 2.4GHz and -11.1dB at 2.5GHz
Nearson	S331AM-2450		-7.4dB at 2.4GHz and -9.4dB at 2.5GHz
Nearson	S141AM-2450		-9.8dB at 2.4GHz and -8.7dB at 2.5GHz

## 1.5 DH2 RB Installed in an RFU without iDEN RBs Measurements

















1.5.1 Install the DH2 Mechanical Mockup into an RFU.

1.5.2 Route the cable or cables connecting the Network Analyzer to the semi-rigid cable or cables thru the RF absorptive foam.

1.5.3 Install one antenna on the DH2 SMA connector closest to the RB edge connector and measure the return loss with the other terminated into 50 ohms.

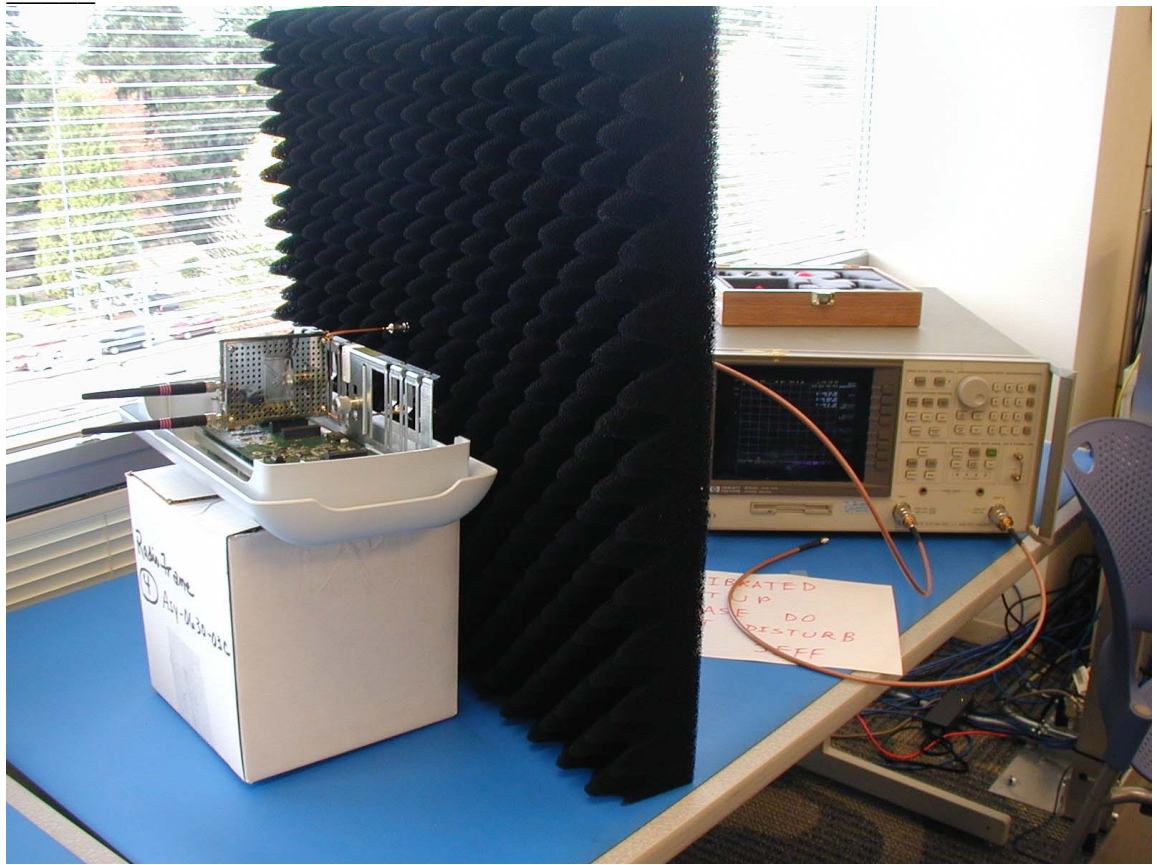


#### 1.5.3.1 Data Table

















Antenna Supplier	Antenna P/N	HP-GL Data Files (double-click on files to view)	Return Loss Data Summary
Linx	ANT-2.4-RCT-SS	Antenna #1:   Antenna #2:  	Antenna #1: -10.8dB at 2.4GHz and -16.6dB at 2.5GHz Antenna #2: -9.6dB at 2.4GHz and -19.5dB at 2.5GHz
Centurion	WCR2400SM	Antenna #1:   Antenna #2:  	Antenna #1: -12.2dB at 2.4GHz and -6.7dB at 2.5GHz Antenna #2: -13.5dB at 2.4GHz and -8.0dB at 2.5GHz
Nearson	S331AM-2450	Antenna #1:   Antenna #2:  	Antenna #1: -12.3dB at 2.4GHz and -11.1dB at 2.5GHz Antenna #2: -15.3dB at 2.4GHz and -10.0dB at 2.5GHz
Nearson	S141AM-2450	Antenna #1:   Antenna #2:  	Antenna #1: -9.6dB at 2.4GHz and -18.9dB at 2.5GHz Antenna #2: -11.3dB at 2.4GHz and -24.8dB at 2.5GHz

**1.5.4 Install one antenna on the DH2 SMA connector furthest from the RB edge connector and measure the return loss with the other terminated into 50 ohms.**









#### 1.5.4.1 Data Table

Antenna Supplier	Antenna P/N	HP-GL Data Files (double-click on files to view)	Return Loss Data Summary
Linx	ANT-2.4-RCT-SS	Antenna #1:   Antenna #2:  	Antenna #1: -11.0dB at 2.4GHz and -29.0dB at 2.5GHz Antenna #2: -10.0dB at 2.4GHz and -24.9dB at 2.5GHz
Centurion	WCR2400SM	Antenna #1:   Antenna #2:  	Antenna #1: -11.2dB at 2.4GHz and -5.8dB at 2.5GHz Antenna #2: -12.5dB at 2.4GHz and -6.4dB at 2.5GHz
Nearson	S331AM-2450	Antenna #1:   Antenna #2:  	Antenna #1: -11.8dB at 2.4GHz and -12.7dB at 2.5GHz Antenna #2: -14.9dB at 2.4GHz and -11.5dB at 2.5GHz
Nearson	S141AM-2450	Antenna #1:   Antenna #2:  	Antenna #1: -10.0dB at 2.4GHz and -17.9dB at 2.5GHz Antenna #2: -11.5dB at 2.4GHz and -21.3dB at 2.5GHz

**1.5.5 Install Antenna #1 on the DH2 SMA connector closest to the RB edge connector and Antenna #2 on the DH2 SMA connector furthest from the RB edge connector.**





**1.5.5.1 Measure the return loss at the DH2 SMA connector closest to the RB edge connector with the other terminated into 50 ohms.**

**1.5.5.1.1 Data Table**

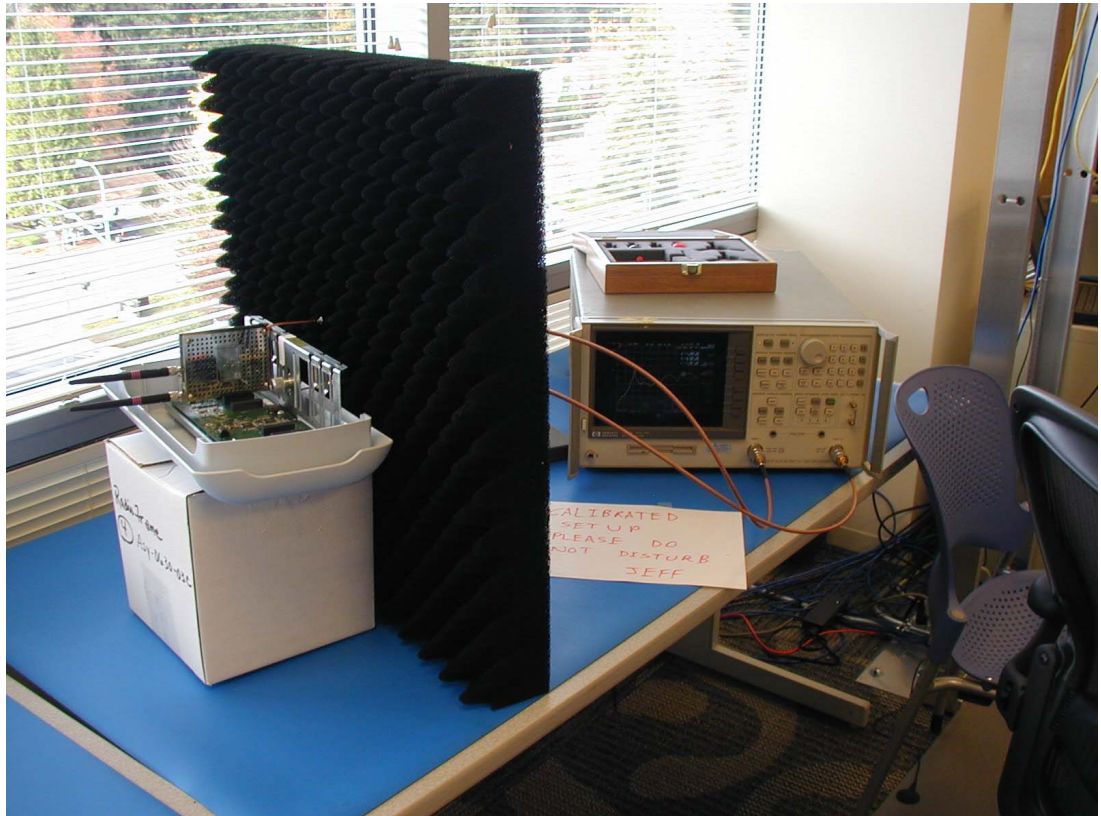
Antenna Supplier	Antenna P/N	HP-GL Data Files (double-click on files to view)	Return Loss Data Summary
Linx	ANT-2.4-RCT-SS		-12.9dB at 2.4GHz and -12.2dB at 2.5GHz
Centurion	WCR2400SM		-9.7dB at 2.4GHz and -5.9dB at 2.5GHz
Nearson	S331AM-2450		-19.8dB at 2.4GHz and -8.3dB at 2.5GHz
Nearson	S141AM-2450		-10.0dB at 2.4GHz and -19.9dB at 2.5GHz

**1.5.5.2 Measure the return loss at the DH2 SMA connector furthest from the RB edge connector with the other terminated into 50 ohms.**





**1.5.5.2.1 Data Table**

Antenna Supplier	Antenna P/N	HP-GL Data Files (double-click on files to view)	Return Loss Data Summary
Linx	ANT-2.4-RCT-SS		-14.3dB at 2.4GHz and -16.5dB at 2.5GHz
Centurion	WCR2400SM		-10.4dB at 2.4GHz and -5.6dB at 2.5GHz
Nearson	S331AM-2450		-26.5dB at 2.4GHz and -8.3dB at 2.5GHz
Nearson	S141AM-2450		-11.0dB at 2.4GHz and -27.3dB at 2.5GHz

### 1.5.5.3 Measure the thru loss between the two DH2 SMA connectors.



1.5.5.3.1 Data Table

Antenna Supplier	Antenna P/N	HP-GL Data Files (double-click on files to view)	Thru Loss Data Summary (Added ~0.5dB due to DH2 RB THRU LOSS)
Linx	ANT-2.4-RCT-SS		-11.1dB at 2.4GHz and -10.4dB at 2.5GHz
Centurion	WCR2400SM		-10.2dB at 2.4GHz and -11.9dB at 2.5GHz
Nearson	S331AM-2450		-7.4dB at 2.4GHz and -10.0dB at 2.5GHz
Nearson	S141AM-2450		-9.2dB at 2.4GHz and -8.7dB at 2.5GHz

## 1.6 DH2 RB Installed in an RFU with iDEN RBs Measurements

















1.6.1 Install the 2 iDEN RBs into the adjacent slots around the DH2 RB in the RFU.

1.6.2 Install one antenna on the DH2 SMA connector closest to the RB edge connector and measure the return loss with the other terminated into 50 ohms.

1.6.2.1 Data Table

















Antenna Supplier	Antenna P/N	HP-GL Data Files (double-click on files to view)	Return Loss Data Summary



Linx	ANT-2.4-RCT-SS	Antenna #1:   Antenna #2:  	Antenna #1: -9.1dB at 2.4GHz and -16.9dB at 2.5GHz Antenna #2: -7.9dB at 2.4GHz and -20.9dB at 2.5GHz
Centurion	WCR2400SM	Antenna #1:   Antenna #2:  	Antenna #1: -9.3dB at 2.4GHz and -6.1dB at 2.5GHz Antenna #2: -10.3dB at 2.4GHz and -6.7dB at 2.5GHz
Nearson	S331AM-2450	Antenna #1:   Antenna #2:  	Antenna #1: -11.7dB at 2.4GHz and -10.4dB at 2.5GHz Antenna #2: -14.6dB at 2.4GHz and -9.3dB at 2.5GHz
Nearson	S141AM-2450	Antenna #1:   Antenna #2:  	Antenna #1: -9.7dB at 2.4GHz and -20.1dB at 2.5GHz Antenna #2: -11.2dB at 2.4GHz and -28.7dB at 2.5GHz

**1.6.3 Install one antenna on the DH2 SMA connector furthest from the RB edge connector and measure the return loss with the other terminated into 50 ohms.**





**1.6.3.1 Data Table**



Antenna Supplier	Antenna P/N	HP-GL Data Files (double-click on files to view)	Return Loss Data Summary
Linx	ANT-2.4-RCT-SS	Antenna #1:   Antenna #2:  	Antenna #1: -11.0dB at 2.4GHz and -21.0dB at 2.5GHz Antenna #2: -9.1dB at 2.4GHz and -25.0dB at 2.5GHz
Centurion	WCR2400SM	Antenna #1:   Antenna #2:  	Antenna #1: -9.9dB at 2.4GHz and -5.1dB at 2.5GHz Antenna #2: -11.1dB at 2.4GHz and -5.5dB at 2.5GHz
Nearson	S331AM-2450	Antenna #1:   Antenna #2:  	Antenna #1: -10.0dB at 2.4GHz and -14.1dB at 2.5GHz Antenna #2: -11.8dB at 2.4GHz and -12.9dB at 2.5GHz
Nearson	S141AM-2450	Antenna #1:   Antenna #2:  	Antenna #1: -9.9dB at 2.4GHz and -18.0dB at 2.5GHz Antenna #2: -11.5dB at 2.4GHz and -23.0dB at 2.5GHz

**1.6.4 Install Antenna #1 on the DH2 SMA connector closest to the RB edge connector and Antenna #2 on the DH2 SMA connector furthest from the RB edge connector.**

**1.6.4.1 Measure the return loss at the DH2 SMA connector closest to the RB edge connector with the other terminated into 50 ohms.**





**1.6.4.1.1 Data Table**

Antenna Supplier	Antenna P/N	HP-GL Data Files (double-click on files to view)	Return Loss Data Summary
Linx	ANT-2.4-RCT-SS	 	-11.5dB at 2.4GHz and -13.0dB at 2.5GHz
Centurion	WCR2400SM	 	-8.5dB at 2.4GHz and -5.7dB at 2.5GHz

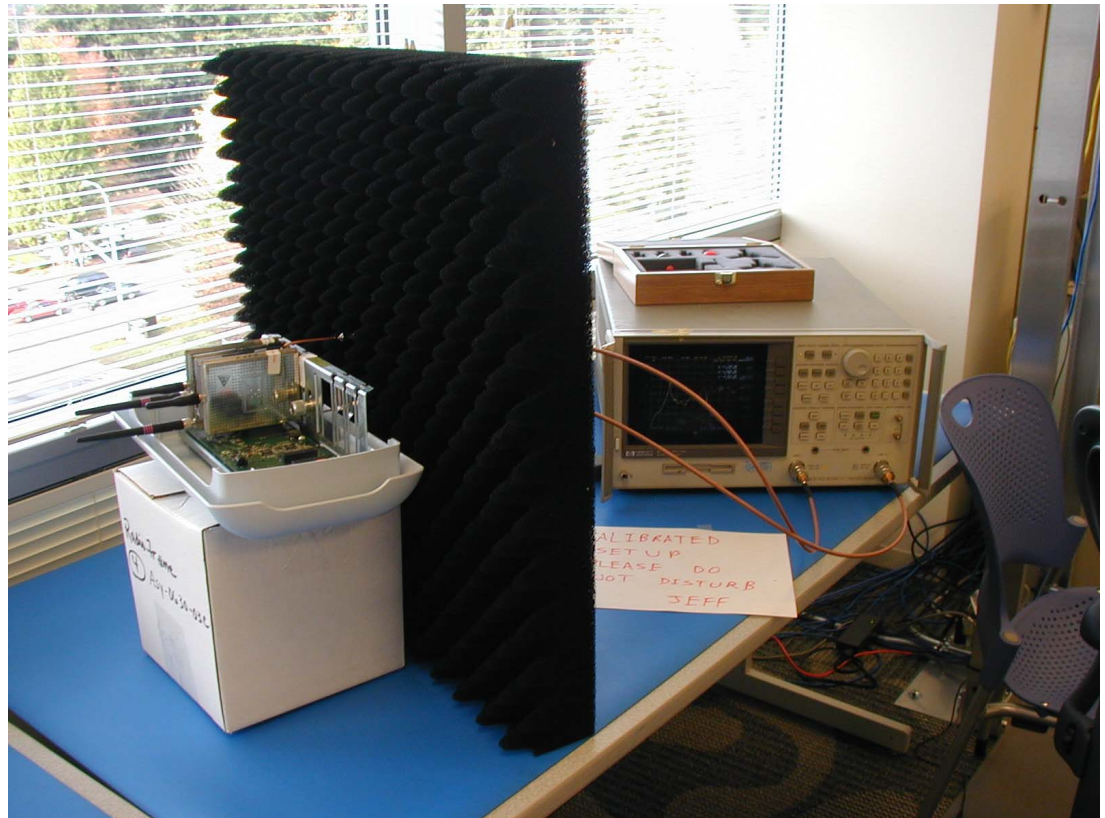
Nearson	S331AM-2450		-19.5dB at 2.4GHz and -8.4dB at 2.5GHz
Nearson	S141AM-2450		-10.3dB at 2.4GHz and -19.8dB at 2.5GHz

#### 1.6.4.2 Measure the return loss at the DH2 SMA connector furthest from the RB edge connector with the other terminated into 50 ohms.

1.6.4.2.1 Data Table





Antenna Supplier	Antenna P/N	HP-GL Data Files (double-click on files to view)	Return Loss Data Summary
Linx	ANT-2.4-RCT-SS		-11.7dB at 2.4GHz and -15.2dB at 2.5GHz
Centurion	WCR2400SM		-10.4dB at 2.4GHz and -5.1dB at 2.5GHz
Nearson	S331AM-2450		-18.3dB at 2.4GHz and -9.2dB at 2.5GHz
Nearson	S141AM-2450		-10.9dB at 2.4GHz and -23.6dB at 2.5GHz

#### 1.6.4.3 Measure the thru loss between the two DH2 SMA connectors.



1.6.4.3.1 Data Table

Antenna Supplier	Antenna P/N	HP-GL Data Files (double-click on files to view)	Thru Loss Data Summary (Added ~0.5dB due to DH2 RB THRU LOSS)
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Linx	ANT-2.4-RCT-SS		-9.9dB at 2.4GHz and -9.4dB at 2.5GHz
Centurion	WCR2400SM		-10.4dB at 2.4GHz and -12.4dB at 2.5GHz
Nearson	S331AM-2450		-7.2dB at 2.4GHz and -10.2dB at 2.5GHz
Nearson	S141AM-2450		-9.2dB at 2.4GHz and -8.9dB at 2.5GHz