# DataHost II RB Antenna Characterization

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# 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.

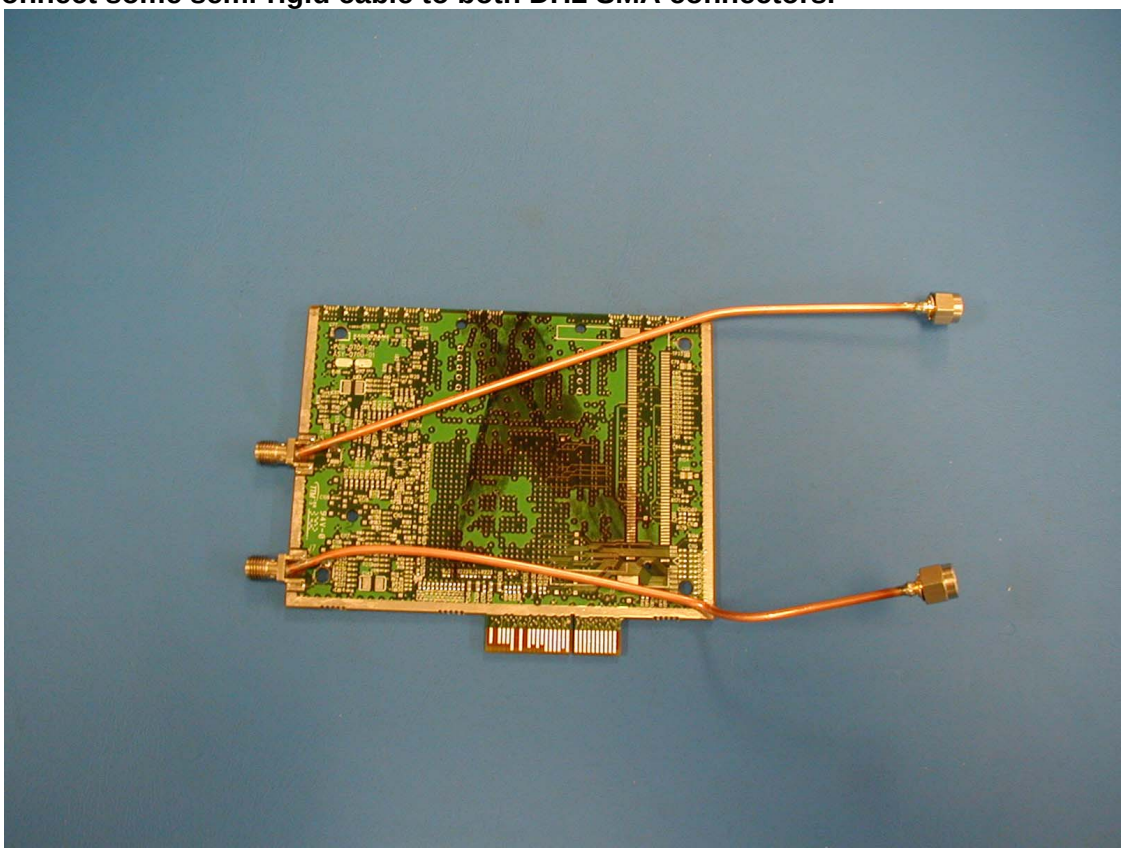
## 1.2 Required Equipment

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

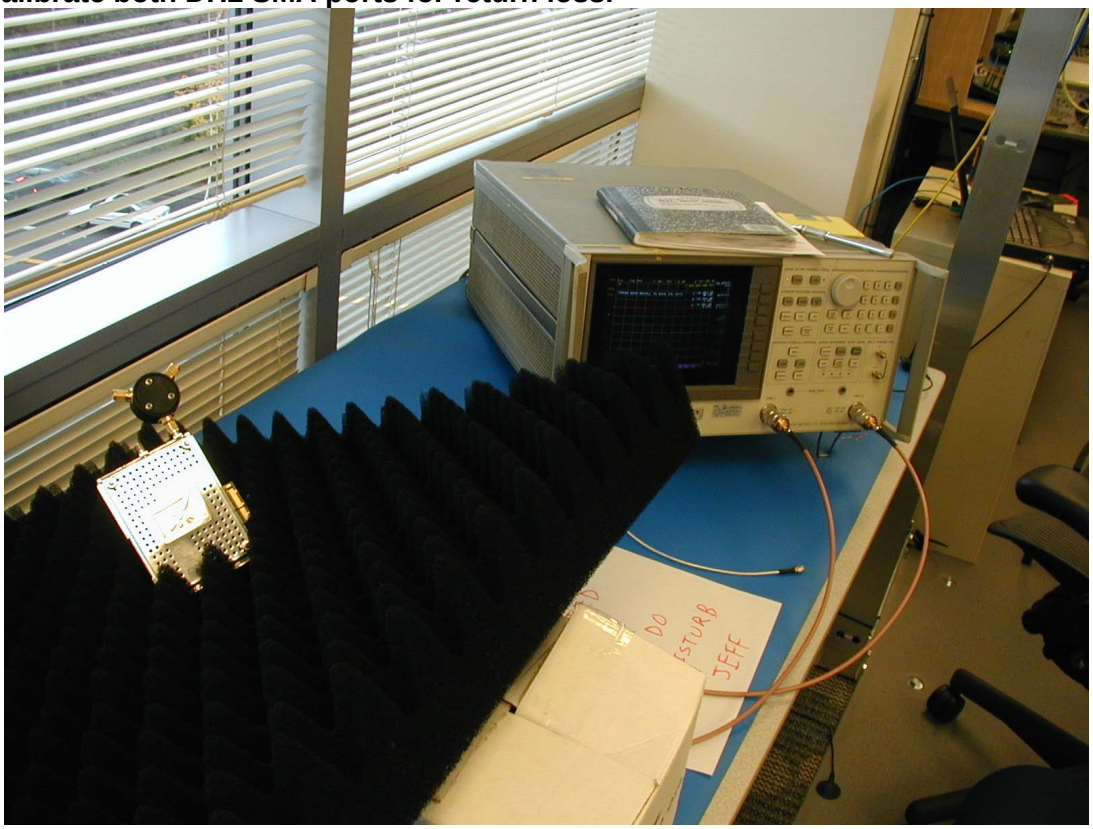
#### 1.3.1.1 Connect some semi-rigid cable to both DH2 SMA connectors.

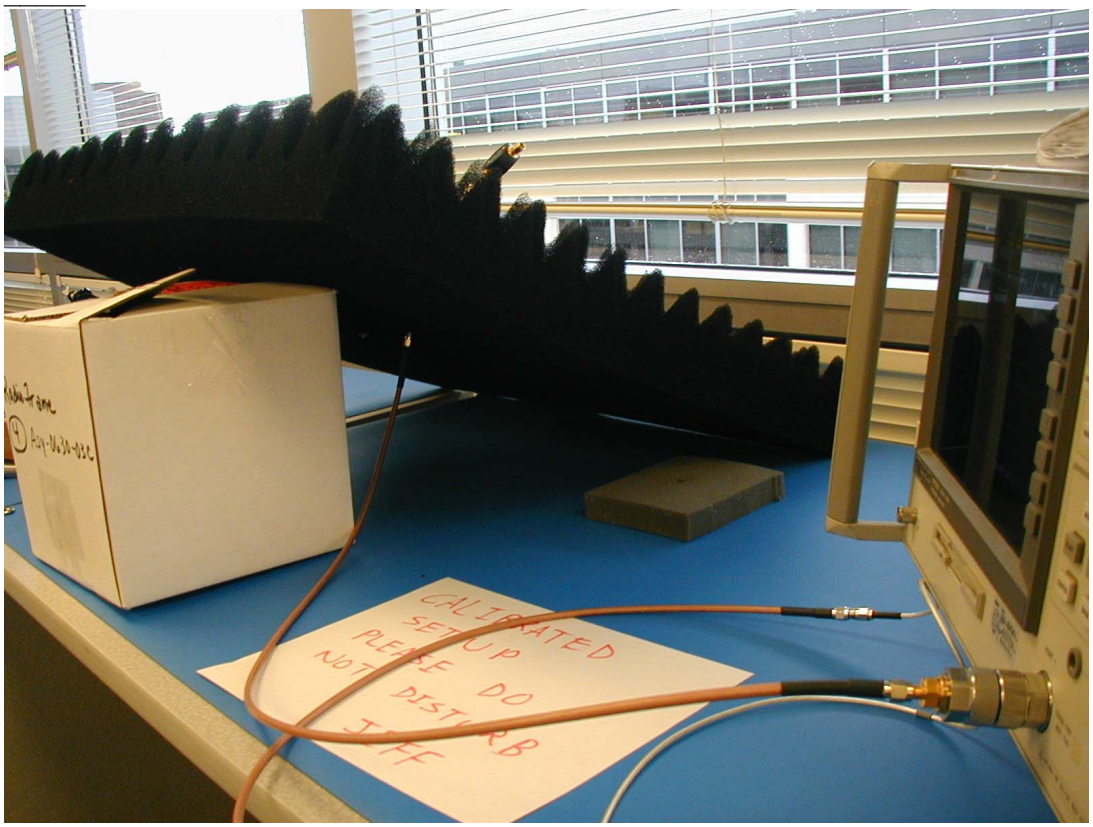


**1.3.1.2 Install the shield on the DH2 so that it can be removed again if needed. Route the semi-rigid cable connected to the DH2 SMA connector closest to the RB edge connector so that it exits from the corner of the RB closest to the edge connector. Route the semi-cable connected to the DH2 SMA connector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

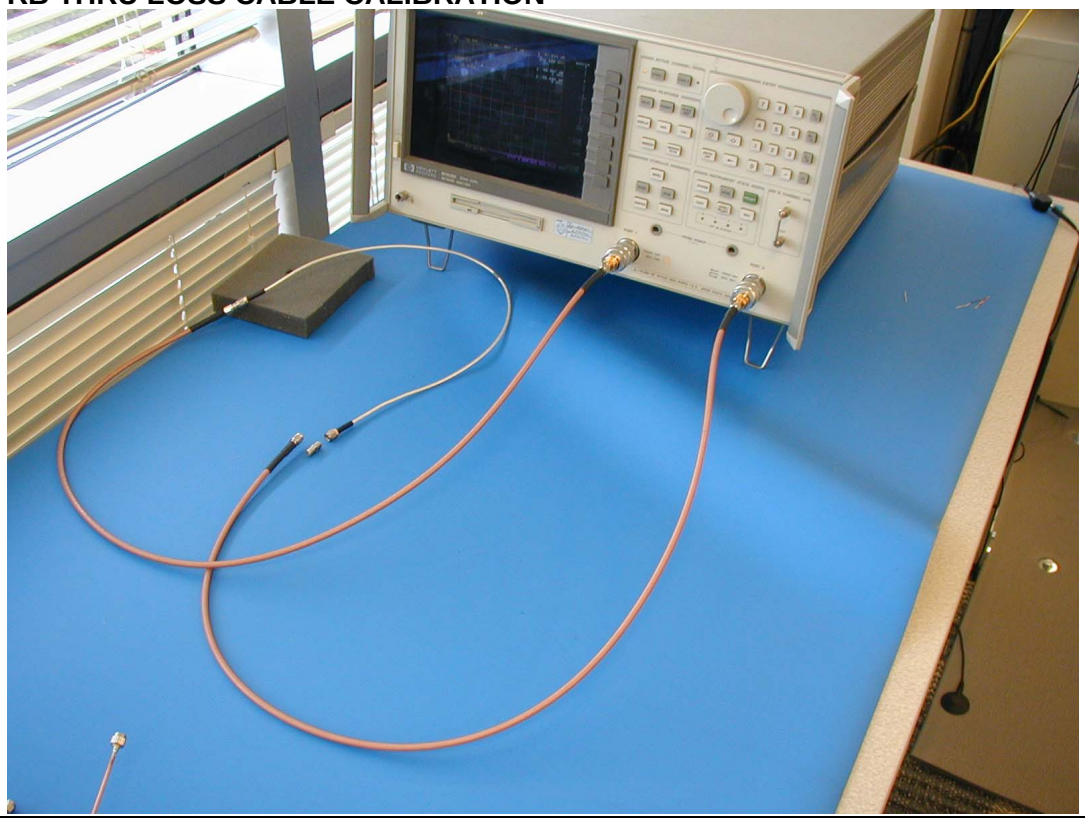
### 1.3.2 Calibrate the DH2 RB Mechanical Mockup

**1.3.2.1 Calibrate both DH2 SMA ports for return loss.**

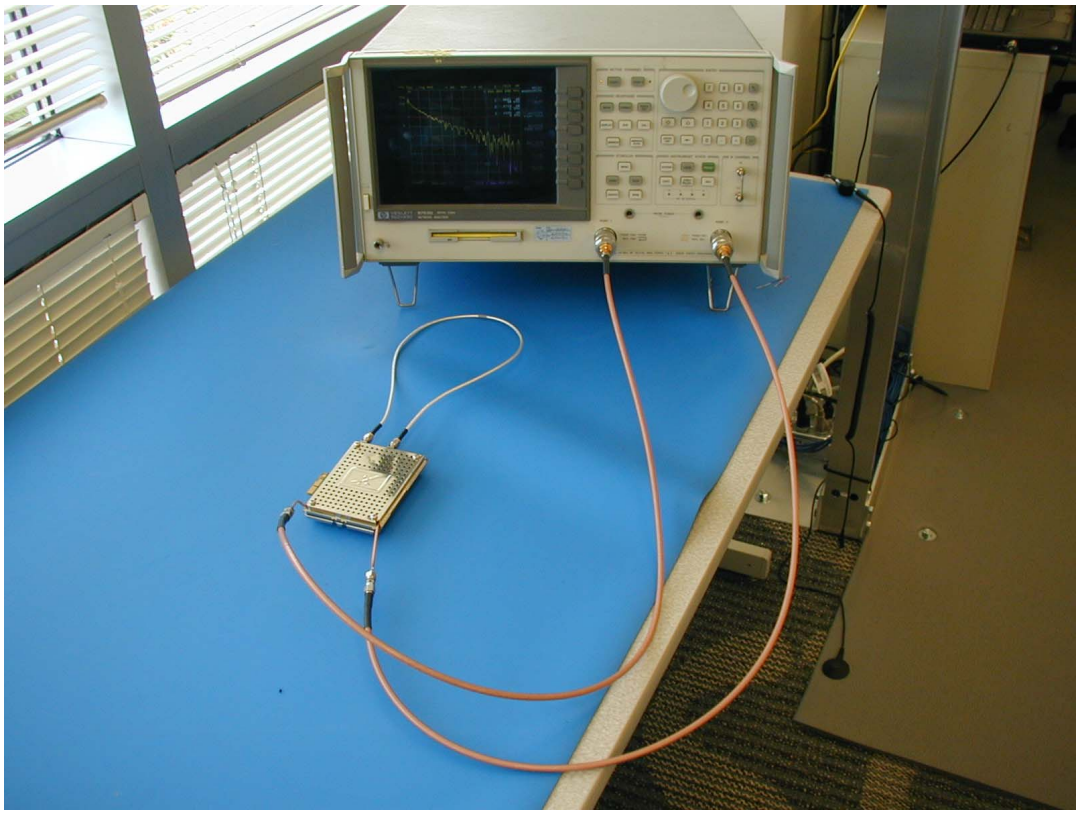




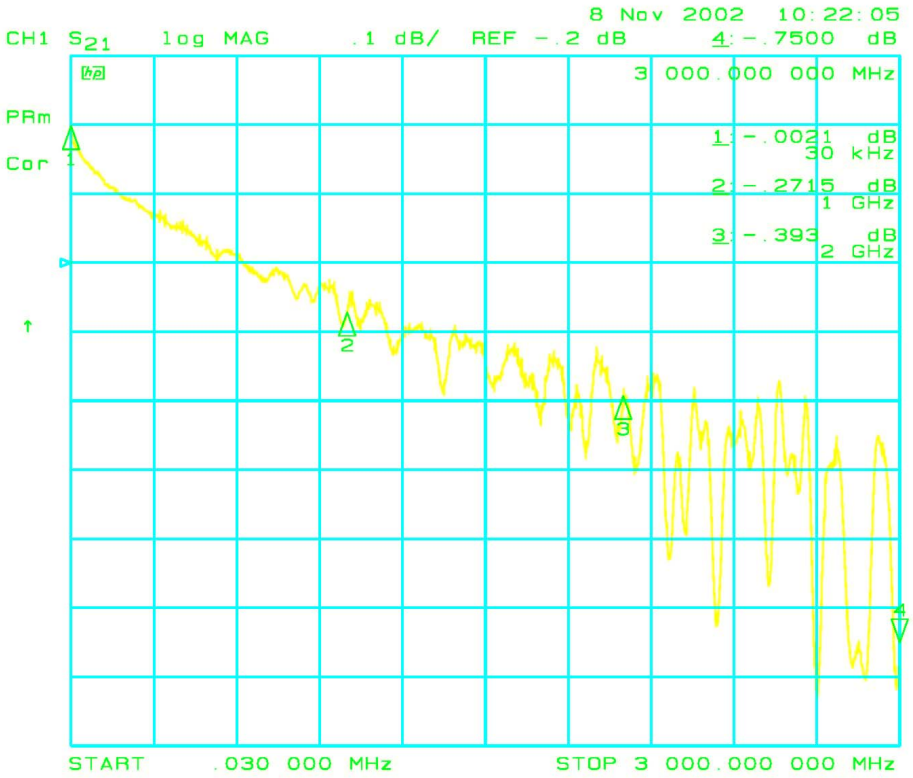

**1.3.2.2 Calibrate both DH2 SMA ports for thru loss. DH2 RB THRU LOSS CABLE CALIBRATION**



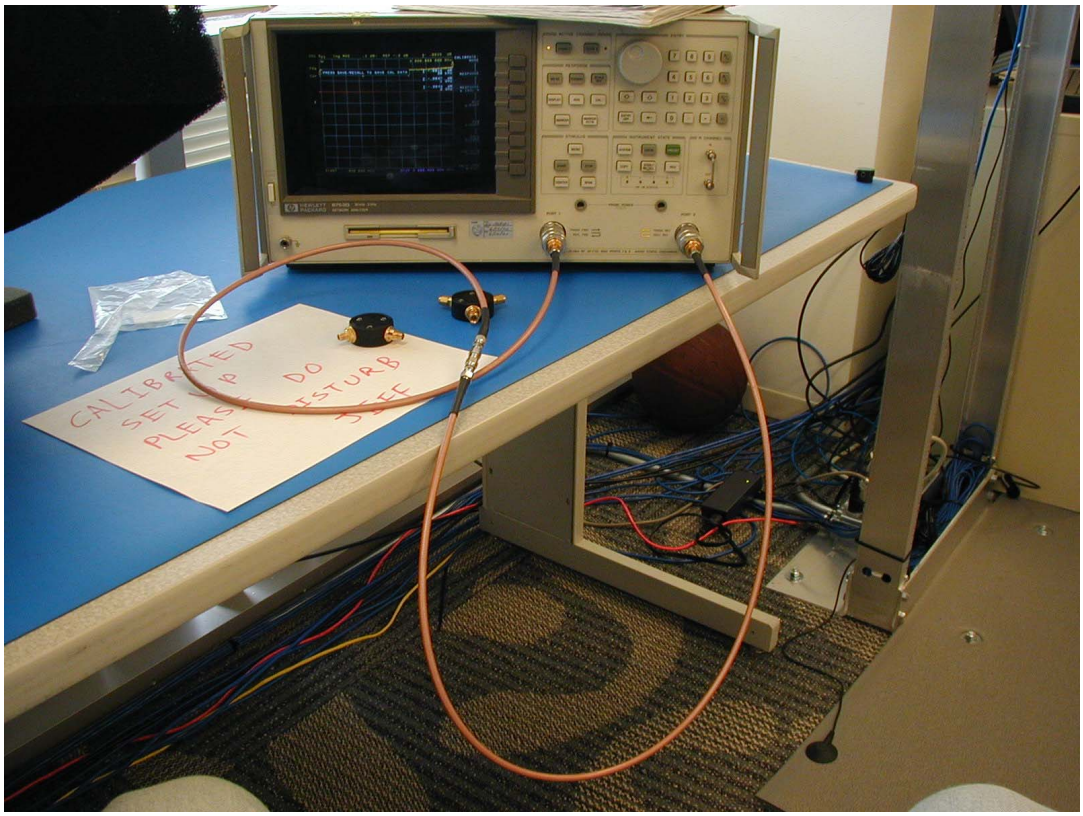
**DH2 RB THRU LOSS SETUP**



**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.

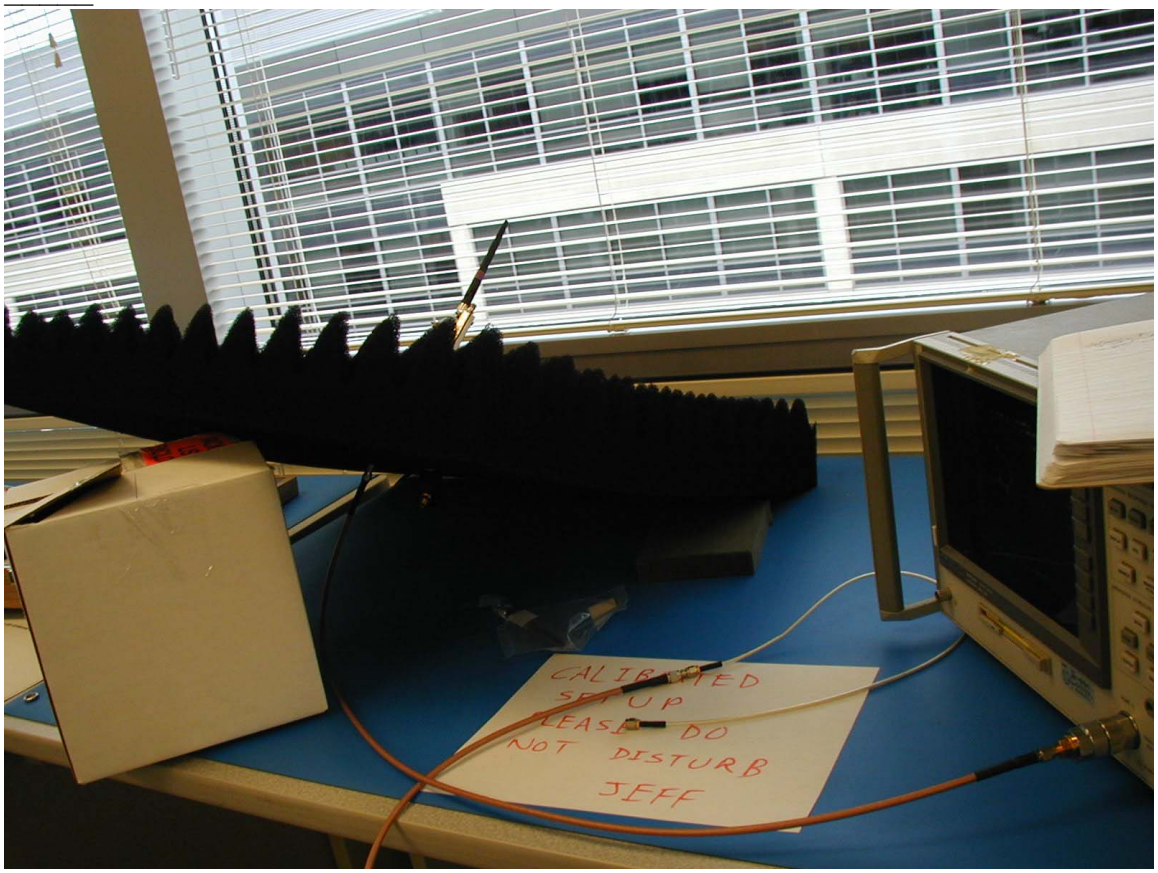
### 1.4.2 Install one antenna on the DH2 SMA connector closest to the RB edge connector and measure the return loss with the other terminated into 50 ohms.

#### 1.4.2.1 Data Table

| Antenna Supplier | Antenna P/N | HP-GL Data Files (Unzip and install this HP-GL viewer-> hpglview-SS_WinGS_NT_zip. Then double-click on files to view.) | Return Loss Data Summary |
|---|---|---|---|
| Linx | ANT-2.4-RCT-SS | Antenna #1: S11_LOG_RBonly_LINX_ANT-2.4-RCT-SS_ S11_SC_RBonly_LINX_ANT-2.4-RCT-SS_A<br>Antenna #2: S11_LOG_RBonly_LINX_ANT-2.4-RCT-SS_A S11_SC_RBonly_LINX_ANT-2.4-RCT-SS_AI | Antenna #1: -15.0dB at 2.4GHz and –21.3dB at 2.5GHz<br>Antenna #2: -14.3dB at 2.4GHz and –21.8dB at 2.5GHz |
| Centurion | WCR2400SM | Antenna #1: S11_LOG_RBonly_CENTURION_WCR2400I S11_SC_RBonly_CENTURION_WCR2400SM<br>Antenna #2: S11_LOG_RBonly_CENTURION_WCR2400 S11_SC_RBonly_CENTURION_WCR2400SM | Antenna #1: -14.2dB at 2.4GHz and –8.5dB at 2.5GHz<br>Antenna #2: -16.6dB at 2.4GHz and –9.7dB at 2.5GHz |
| Nearson | S331AM-2450 | Antenna #1: S11_LOG_RBonly_NEARSON_S331AM-2450 S11_SC_RBonly_NEARSON_S331AM-2450_<br>Antenna #2: S11_LOG_RBonly_NEARSON_S331AM-2450 S11_SC_RBonly_NEARSON_S331AM-2450 | Antenna #1: -11.4dB at 2.4GHz and –11.8dB at 2.5GHz<br>Antenna #2: -13.8dB at 2.4GHz and –11.0dB at 2.5GHz |
| Nearson | S141AM-2450 | Antenna #1: S11_LOG_RBonly_NEARSON_S141AM-2450 S11_SC_RBonly_NEARSON_S141AM-2450_ | Antenna #1: -10.2dB at 2.4GHz and –14.4dB at 2.5GHz |

| | | | |
|---|---|---|---|
| | | Antenna #2: S11_LOG_RBonly_NEARSON_S331AM-245 S11_SC_RBonly_NEARSON_S331AM-2450 | Antenna #2: -12.6dB at 2.4GHz and –18.5dB at 2.5GHz |

### 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_LOG_RBonly_LINX_ANT-2.4-RCT-SS_ S11_SC_RBonly_LINX_ANT-2.4-RCT-SS_r<br>Antenna #2: S11_LOG_RBonly_LINX_ANT-2.4-RCT-SS_ S11_SC_RBonly_LINX_ANT-2.4-RCT-SS_r | Antenna #1: -13.0dB at 2.4GHz and –21.3dB at 2.5GHz<br>Antenna #2: -12.8dB at 2.4GHz and –21.2dB at 2.5GHz |
| Centurion | WCR2400SM | Antenna #1: S11_LOG_RBonly_CENTURION_WCR2400 S11_SC_RBonly_CENTURION_WCR2400SM<br>Antenna #2: S11_LOG_RBonly_CENTURION_WCR2400 S11_SC_RBonly_CENTURION_WCR2400SM | Antenna #1: -9.6dB at 2.4GHz and –5.7dB at 2.5GHz<br>Antenna #2: -10.3dB at 2.4GHz and –6.3dB at 2.5GHz |
| Nearson | S331AM-2450 | Antenna #1: S11_LOG_RBonly_NEARSON_S331AM-245 S11_SC_RBonly_NEARSON_S331AM-2450<br>Antenna #2: S11_LOG_RBonly_NEARSON_S331AM-245 S11_SC_RBonly_NEARSON_S331AM-2450 | Antenna #1: -12.0dB at 2.4GHz and –12.7dB at 2.5GHz<br>Antenna #2: -14.5dB at 2.4GHz and –11.7dB at 2.5GHz |

| | | | |
|---|---|---|---|
| Nearson | S141AM-2450 | Antenna #1: <br>Antenna #2: | Antenna #1: -10.1dB at 2.4GHz and –16.5dB at 2.5GHz<br>Antenna #2: -12.5dB at 2.4GHz and –21.9dB at 2.5GHz |

## 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

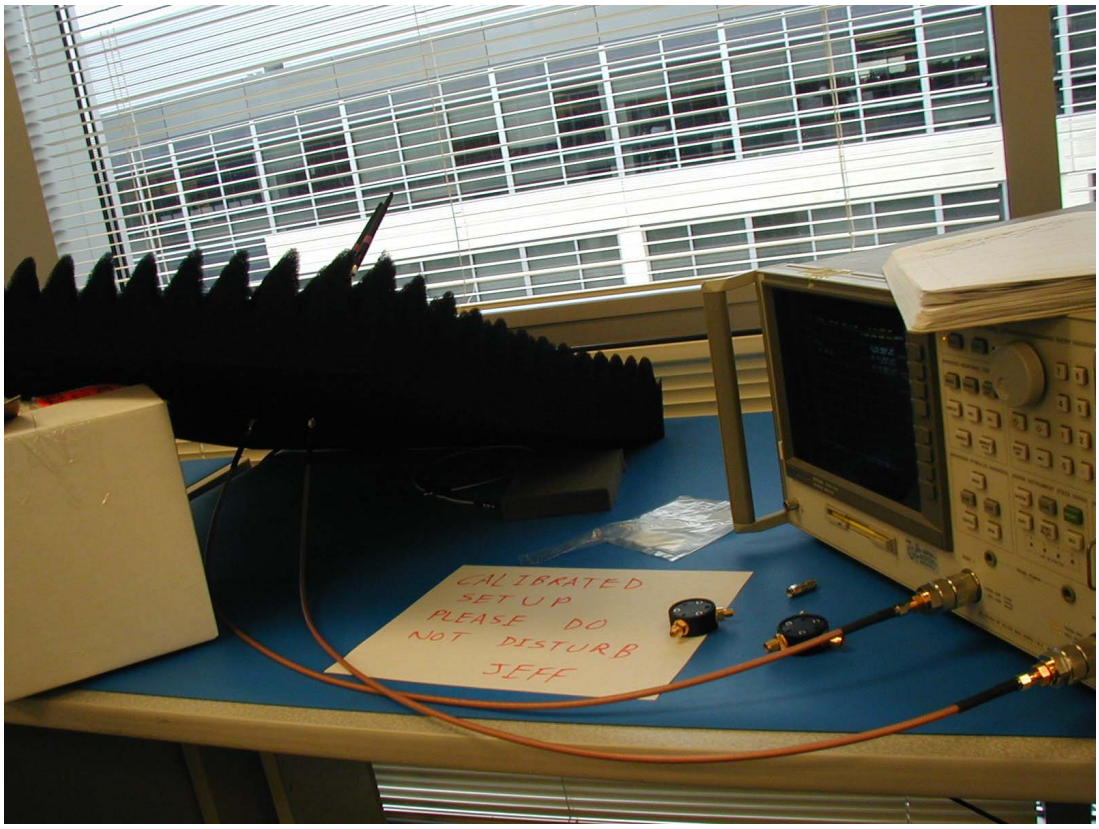
| Antenna Supplier | Antenna P/N | HP-GL Data Files (double-click on files to view) | Return Loss Data Summary |
|---|---|---|---|
| Linx | ANT-2.4-RCT-SS | | -16.8dB at 2.4GHz and –13.4dB at 2.5GHz |
| Centurion | WCR2400SM | | -10.0dB at 2.4GHz and –7.8dB at 2.5GHz |
| Nearson | S331AM-2450 | | -19.4dB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

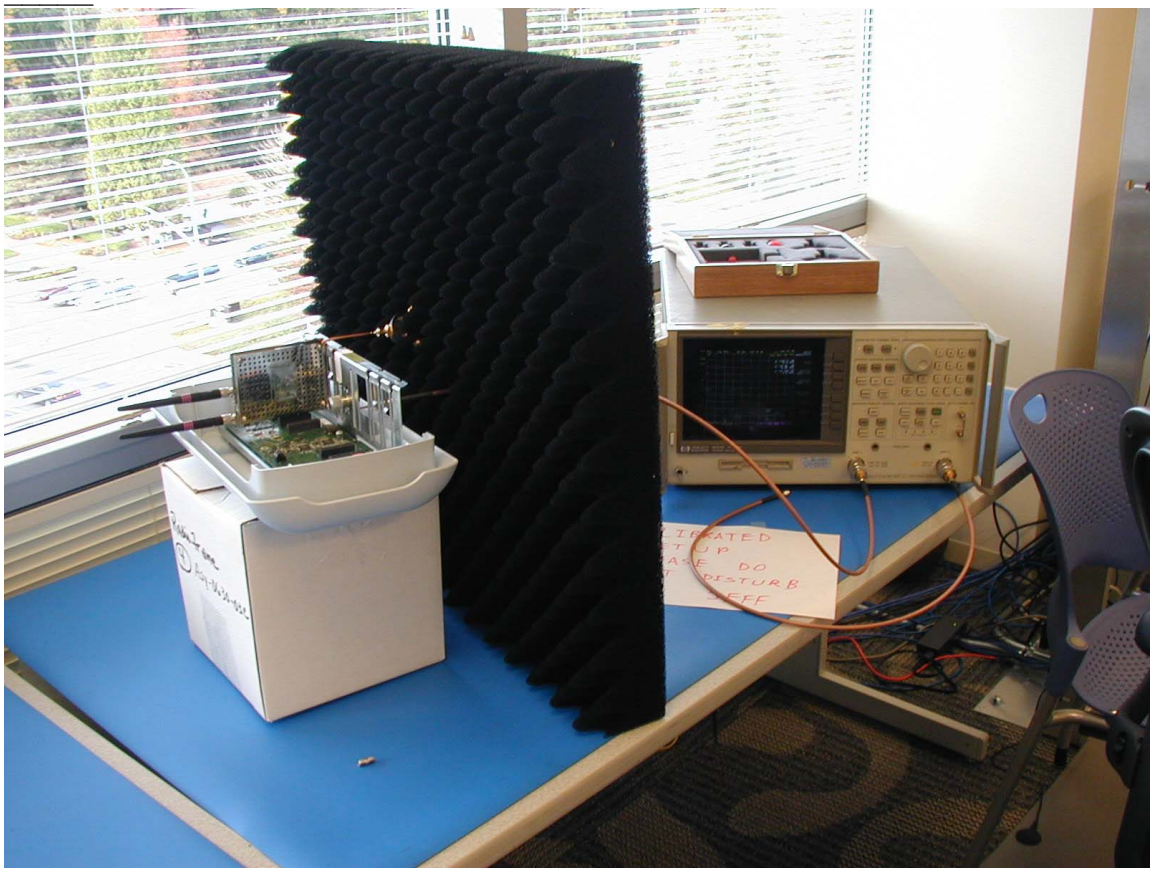
| Antenna Supplier | Antenna P/N | HP-GL Data Files (double-click on files to view) | Thru Loss Data Summary (Added ~0.5dB due to DH2 RB THRU LOSS) |
|---|---|---|---|
| Linx | ANT-2.4-RCT-SS | S21_LOG_TWO_ANT S_Rilanty_LINX_ANT | -11.2dB at 2.4GHz and –10.5dB at 2.5GHz |
| Centurion | WCR2400SM | S21_LOG_TWO_ANT S_Rilanty_CENTURIO | -8.9dB at 2.4GHz and –11.1dB at 2.5GHz |
| Nearson | S331AM-2450 | S21_LOG_TWO_ANT S_Rilanty_NEARSON_ | -7.4dB at 2.4GHz and –9.4dB at 2.5GHz |
| Nearson | S141AM-2450 | S21_LOG_TWO_ANT S_Rilanty_NEARSON_ | -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.

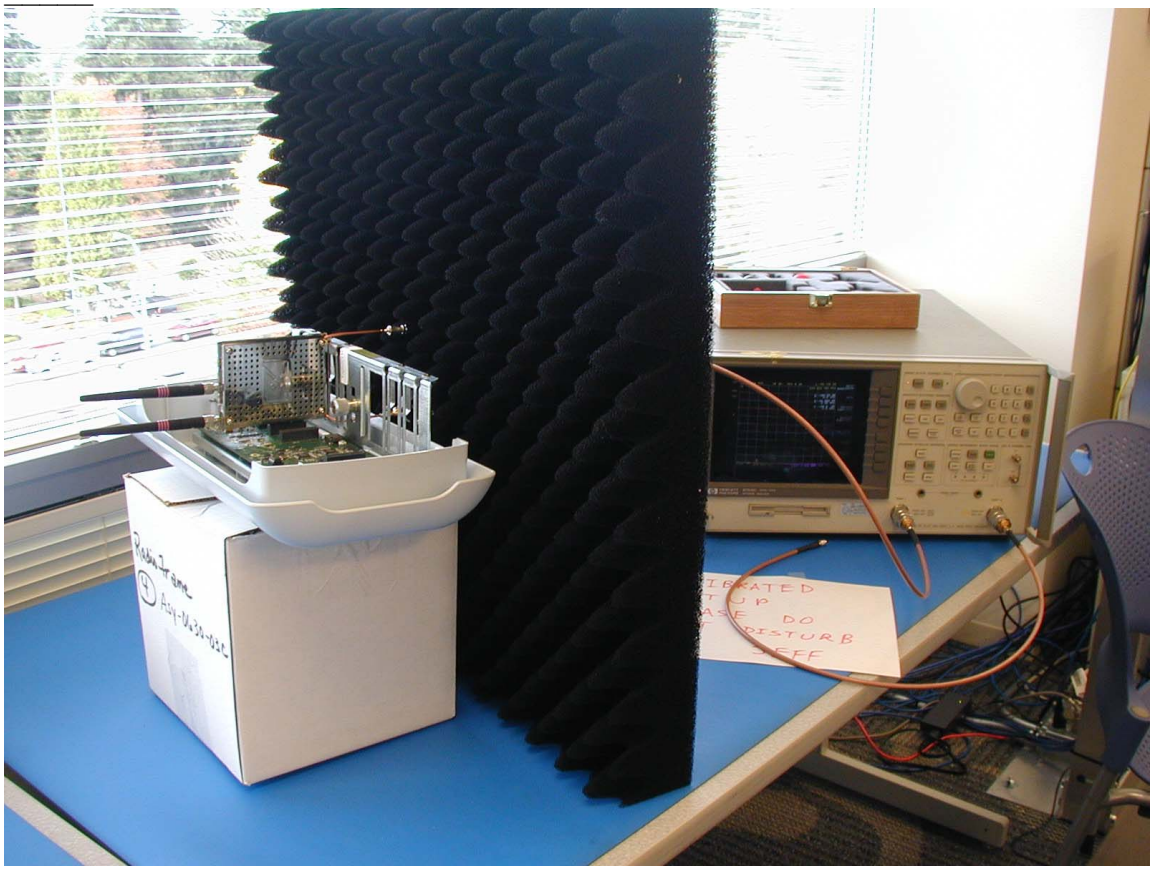
### 1.5.3 Install one antenna on the DH2 SMA connector closest to the RB edge connector and measure the return loss with the other terminated into 50 ohms.



#### 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: S11_LOG_RBWRFUseDENRBs_LINX_ANT S11_SC_RBWRFUseDENRBs_LINX_ANT-<br>Antenna #2: S11_LOG_RBWRFUseDENRBs_LINX_AN S11_SC_RBWRFUseDENRBs_LINX_ANT- | Antenna #1: -10.8dB at 2.4GHz and -16.6dB at 2.5GHz<br>Antenna #2: -9.6dB at 2.4GHz and –19.5dB at 2.5GHz |
| Centurion | WCR2400SM | Antenna #1: S11_LOG_RBWRFUseDENRBs_CENTURI S11_SC_RBWRFUseDENRBs_CENTURION<br>Antenna #2: S11_LOG_RBWRFUseDENRBs_CENTURI S11_SC_RBWRFUseDENRBs_CENTURION | Antenna #1: -12.2dB at 2.4GHz and –6.7dB at 2.5GHz<br>Antenna #2: -13.5dB at 2.4GHz and –8.0dB at 2.5GHz |
| Nearson | S331AM-2450 | Antenna #1: S11_LOG_RBWRFUseDENRBs_NEARSON S11_SC_RBWRFUseDENRBs_NEARSON_<br>Antenna #2: S11_LOG_RBWRFUseDENRBs_NEARSON S11_SC_RBWRFUseDENRBs_NEARSON_ | Antenna #1: -12.3dB at 2.4GHz and –11.1dB at 2.5GHz<br>Antenna #2: -15.3dB at 2.4GHz and –10.0dB at 2.5GHz |
| Nearson | S141AM-2450 | Antenna #1: S11_LOG_RBWRFUseDENRBs_NEARSON S11_SC_RBWRFUseDENRBs_NEARSON_<br>Antenna #2: S11_LOG_RBWRFUseDENRBs_NEARSON S11_SC_RBWRFUseDENRBs_NEARSON_ | Antenna #1: -9.6dB at 2.4GHz and –18.9dB at 2.5GHz<br>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: S11_LOG_RBWRFUnd DEMARBL_LINX_ANT S11_SC_RBWRFUnwd DEMARBL_LINX_ANT-<br>Antenna #2: S11_LOG_RBWRFUnd DEMARBL_LINX_ANT S11_SC_RBWRFUnwd DEMARBL_LINX_ANT-0 | Antenna #1: -11.0dB at 2.4GHz and –29.0dB at 2.5GHz<br>Antenna #2: -10.0dB at 2.4GHz and –24.9dB at 2.5GHz |
| Centurion | WCR2400SM | Antenna #1: S11_LOG_RBWRFUnd DEMARBL_CENTURIE S11_SC_RBWRFUnwd DEMARBL_CENTURIEOF<br>Antenna #2: S11_LOG_RBWRFUnd DEMARBL_CENTURIO S11_SC_RBWRFUnwd DEMARBL_CENTURIOF | Antenna #1: -11.2dB at 2.4GHz and –5.8dB at 2.5GHz<br>Antenna #2: -12.5dB at 2.4GHz and –6.4dB at 2.5GHz |
| Nearson | S331AM-2450 | Antenna #1: S11_LOG_RBWRFUnd DEMARBL_NEARSON S11_SC_RBWRFUnwd DEMARBL_NEARSON_(<br>Antenna #2: S11_LOG_RBWRFUnd DEMARBL_NEARSON S11_SC_RBWRFUnwd DEMARBL_NEARSON_( | Antenna #1: -11.8dB at 2.4GHz and –12.7dB at 2.5GHz<br>Antenna #2: -14.9dB at 2.4GHz and –11.5dB at 2.5GHz |
| Nearson | S141AM-2450 | Antenna #1: S11_LOG_RBWRFUnd DEMARBL_NEARSON S11_SC_RBWRFUnwd DEMARBL_NEARSON_(<br>Antenna #2: S11_LOG_RBWRFUnd DEMARBL_NEARSON S11_SC_RBWRFUnwd DEMARBL_NEARSON_0 | Antenna #1: -10.0dB at 2.4GHz and –17.9dB at 2.5GHz<br>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

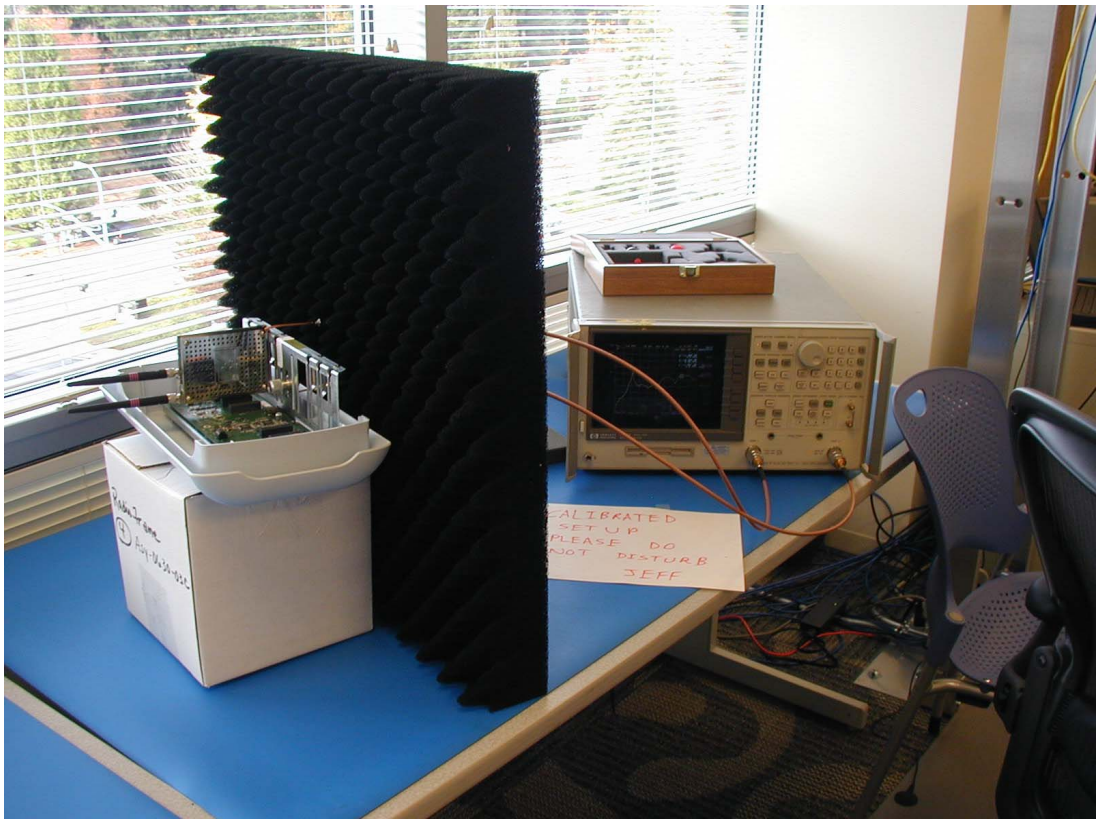
| Antenna Supplier | Antenna P/N | HP-GL Data Files (double-click on files to view) | Return Loss Data Summary |
|---|---|---|---|
| Linx | ANT-2.4-RCT-SS | S11_LOG_20MHRFLow ckDENRBL_TWO_ANT S11_SC_20MHRFUseol DENRBL_TWO_ANTS | -12.9dB at 2.4GHz and –12.2dB at 2.5GHz |
| Centurion | WCR2400SM | S11_LOG_20MHRFLow ckDENRBL_TWO_ANT S11_SC_20MHRFUseol DENRBL_TWO_ANTS | -9.7dB at 2.4GHz and –5.9dB at 2.5GHz |
| Nearson | S331AM-2450 | S11_LOG_20MHRFLow ckDENRBL_TWO_ANT S11_SC_20MHRFUseol DENRBL_TWO_ANTS | -19.8dB at 2.4GHz and –8.3dB at 2.5GHz |
| Nearson | S141AM-2450 | S11_LOG_20MHRFLow ckDENRBL_TWO_ANT S11_SC_20MHRFUseol DENRBL_TWO_ANTS | -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 | S11_LOG_20MHRFLow ckDENRBL_TWO_ANT S11_SC_20MHRFUseol DENRBL_TWO_ANTS | -14.3dB at 2.4GHz and –16.5dB at 2.5GHz |
| Centurion | WCR2400SM | S11_LOG_20MHRFLow ckDENRBL_TWO_ANT S11_SC_20MHRFUseol DENRBL_TWO_ANTS | -10.4dB at 2.4GHz and –5.6dB at 2.5GHz |
| Nearson | S331AM-2450 | S11_LOG_20MHRFLow ckDENRBL_TWO_ANT S11_SC_20MHRFUseol DENRBL_TWO_ANTS | -26.5dB at 2.4GHz and –8.3dB at 2.5GHz |
| Nearson | S141AM-2450 | S11_LOG_20MHRFLow ckDENRBL_TWO_ANT S11_SC_20MHRFUseol DENRBL_TWO_ANTS | -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<br>(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:<br>Antenna #2: | Antenna #1: -9.1dB at 2.4GHz and –16.9dB at 2.5GHz<br>Antenna #2: -7.9dB at 2.4GHz and –20.9dB at 2.5GHz |
| Centurion | WCR2400SM | Antenna #1:<br>Antenna #2: | Antenna #1: -9.3dB at 2.4GHz and –6.1dB at 2.5GHz<br>Antenna #2: -10.3dB at 2.4GHz and –6.7dB at 2.5GHz |
| Nearson | S331AM-2450 | Antenna #1:<br>Antenna #2: | Antenna #1: -11.7dB at 2.4GHz and –10.4dB at 2.5GHz<br>Antenna #2: -14.6dB at 2.4GHz and –9.3dB at 2.5GHz |
| Nearson | S141AM-2450 | Antenna #1:<br>Antenna #2: | Antenna #1: -9.7dB at 2.4GHz and –20.1dB at 2.5GHz<br>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:<br>Antenna #2: | Antenna #1: -11.0dB at 2.4GHz and –21.0dB at 2.5GHz<br>Antenna #2: -9.1dB at 2.4GHz and –25.0dB at 2.5GHz |
| Centurion | WCR2400SM | Antenna #1:<br>Antenna #2: | Antenna #1: -9.9dB at 2.4GHz and –5.1dB at 2.5GHz<br>Antenna #2: -11.1dB at 2.4GHz and –5.5dB at 2.5GHz |
| Nearson | S331AM-2450 | Antenna #1:<br>Antenna #2: | Antenna #1: -10.0dB at 2.4GHz and –14.1dB at 2.5GHz<br>Antenna #2: -11.8dB at 2.4GHz and –12.9dB at 2.5GHz |
| Nearson | S141AM-2450 | Antenna #1:<br>Antenna #2: | Antenna #1: -9.9dB at 2.4GHz and –18.0dB at 2.5GHz<br>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 |

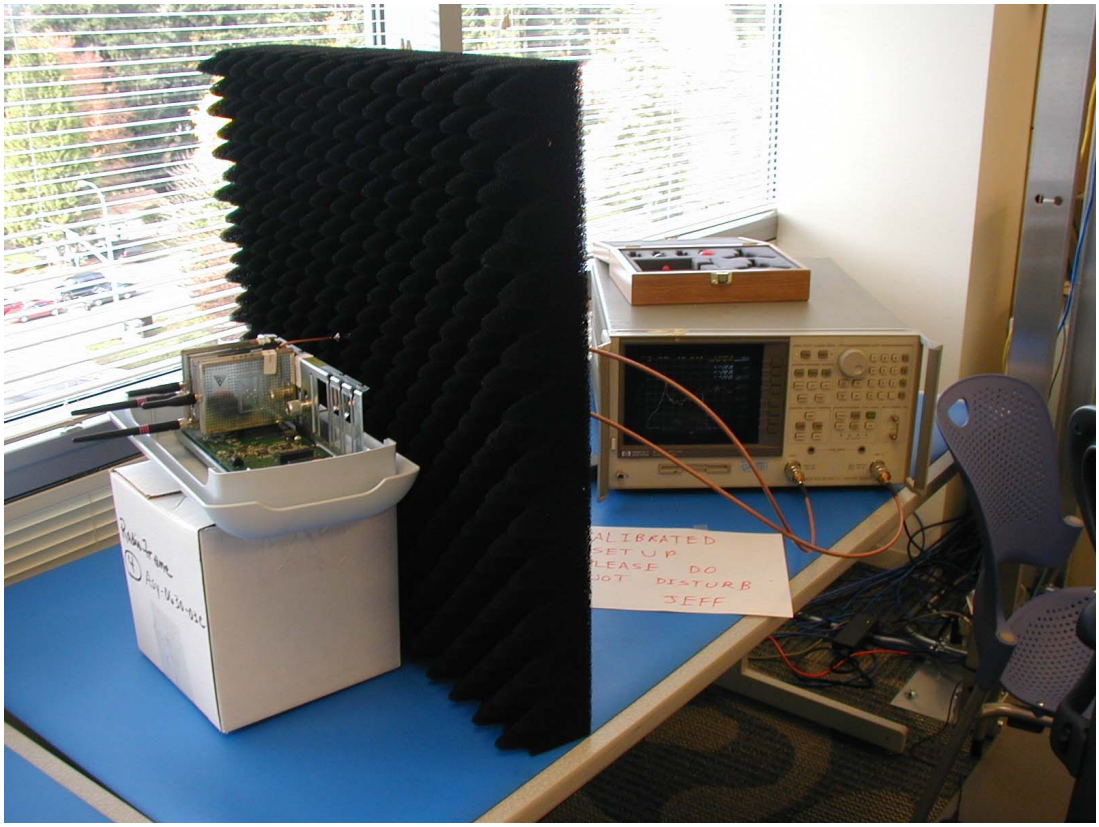
| | | | |
|---|---|---|---|
| Nearson | S331AM-2450 | | -19.5dB at 2.4GHz and –8.4dB at 2.5GHz |
| Nearson | S141AM-2450 | | -10.3dB at 2.4GHz and –19.8dB at 2.5GHz |

### 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<br>(Added ~0.5dB due to DH2 RB THRU LOSS) |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Linx | ANT-2.4-RCT-SS | S21_LDG_TWO_ANT S_RBmWFGwattNDEN | -9.9dB at 2.4GHz and –9.4dB at 2.5GHz |
| Centurion | WCR2400SM | S21_LDG_TWO_ANT S_RBmWFGwattNDEN | -10.4dB at 2.4GHz and –12.4dB at 2.5GHz |
| Nearson | S331AM-2450 | S21_LDG_TWO_ANT S_RBmWFGwattNDEN | -7.2dB at 2.4GHz and –10.2dB at 2.5GHz |
| Nearson | S141AM-2450 | S21_LDG_TWO_ANT S_RBmWFGwattNDEN | -9.2dB at 2.4GHz and –8.9dB at 2.5GHz |