

Saturn PEBL H550  
BT Mono Headset  
Antenna Return Loss  
& Radiation Pattern Test Comparison Report

Version: 0.1

**Project Name: Saturn PEBL H526**

**Test Date: July 11, 2006**

**Specification: Saturn Specification X13**

**Tested by: Chris Huang, Foxlink**

**& A Test Lab Techno Corp.**

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Document History

Rev.	Date	Author	Reason for Changes
0.1	2006/7/11	Wanson Hsu	<ul style="list-style-type: none"><li>• First Release</li><li>• H/W: MBT-9121, V5R4</li><li>• Housing: Saturn PEBL H526 T4</li></ul>

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# 1 TEST SETUP

## 1.1 Test Unit

1. Hardware Version: MBT-9121, V5R4
2. Housing: Saturn PEBL H526 T4
3. F/W: H526\_Beta\_build\_HSV4R\_PSKEY\_ver2.psr
4. Speaker: HUNG TSE
5. Microphone: MARQUESS

## 1.2 Return Loss (VSWR) Test

### 1.2.1 Test Equipment

1. Vector Network Analyzer, Anritsu

### 1.2.2 Test Architecture

Vector Network Analyzer



#### 1.2.2.1 Test Procedure

1. Calibrate the vector network analyzer for one port reflection calibration with frequency range from 1GHz to 6GHz.
2. Solder a 50-ohm RF cable with a SMA connector on PCBA and assemble all the accessories and the housing.
3. Connect the network analyzer cable to the DUT through an SMA connector to antenna.
4. Measure and record S11 (return loss).

## 1.3 Radiation Pattern (Gain) Test

### 1.3.1 Test Equipment

1. AMS-8500 System
  - ◆ Rectangular anechoic chamber
  - ◆ Multi-Axis Positioning System (MAPS)
  - ◆ EMQuest EMQ-100 Data Acquisition and Analysis Software

- ◆ ETS-Lindgren EMCO 3164-04 dual-polarized quad-ridged horn antenna
- 2. Network Analyzer: Agilent PNA, 300kHz ~ 6GHz
- 3. Signal Generator: R&S SMT6, 5kHz ~ 6GHz
- 4. Spectrum Analyzer: R&S FSP, 9kHz ~ 13.6GHz
- 5. Phantom Head: IEEE SCC34 "SAM" phantom per IEEE 1528-2002 specifications.

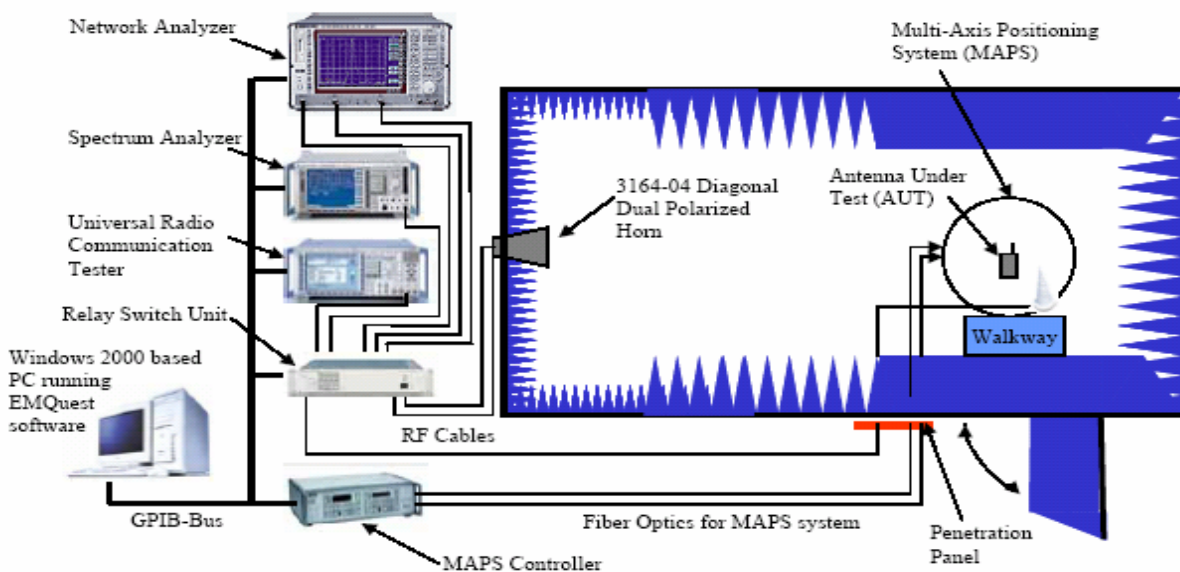


1.3.2 Test Lab & Method:

- 1. Test Lab: Foxlink RTC Lab
- 2. Test Method: 3D radiation pattern

1.3.3 Test Architecture

## Typical AMS-8500 System Schematic



## 2 TEST RESULT AND SUMMARY

### 2.1 Return Loss Test Summary

Unit	Style	2402 MHz	2441MHz	2480 MHz
Limit	Free Space	<= -6 [dB]	<= -8 [dB]	<= -6 [dB]
	Phantom	<= -6 [dB]	<= -7 [dB]	<= -6 [dB]
Unit1	Free Space	-14.27	-14.19	-15.21
	Phantom	-22.37	-21.40	-24.88
Unit2	Free Space	-13.57	-13.02	-13.26
	Phantom	-17.85	-16.60	-18.60
Unit3	Free Space	-15.06	-14.47	-14.90
	Phantom	-16.39	-16.02	-17.96
Unit4	Free Space	-13.51	-12.98	-13.06
	Phantom	-15.98	-16.04	-18.24
Unit5	Free Space	-18.06	-16.98	-16.30
	Phantom	-24.25	-22.32	-20.28

Unit: dB

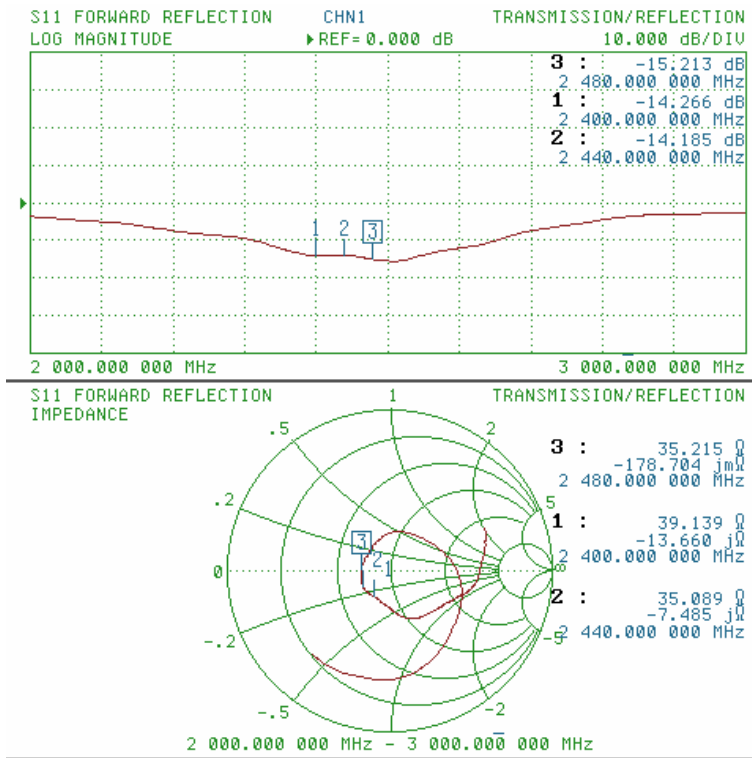
### 2.2 Radiation Pattern at 2441MHz

Unit	Style	Peak Gain (dBi)	Average Gain (dBi)
Limit	Free Space	>= 0 [dBi]	>= -3 [dBi]
	Phantom	>= -2 [dBi]	>= -5 [dBi]
Unit1	Free Space	2.75	-0.78
	Phantom	3.52	-4.35
Unit2	Free Space	2.67	-0.99
	Phantom	3.34	-4.56
Unit3	Free Space	2.97	-0.78
	Phantom	3.57	-4.29
Unit4	Free Space	2.79	-0.87
	Phantom	3.44	-4.42
Unit5	Free Space	2.62	-0.83
	Phantom	3.56	-4.37

## 3 RETURN LOSS AND RADIATION PATTERN RESULTS (SAMPLE 1)

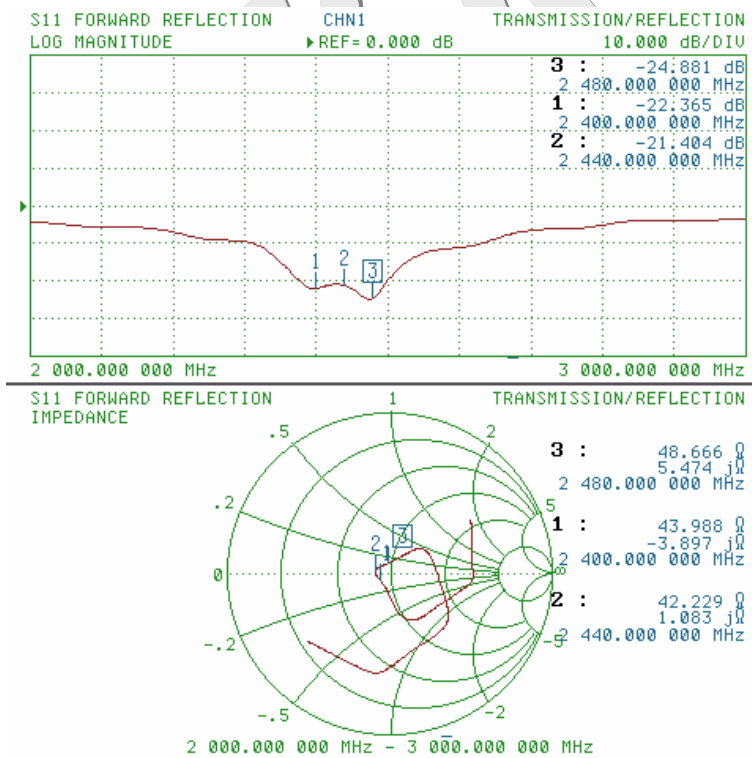
### 3.1.1 Return Loss Result

Free Space:



- TRACE MEMORY CHANNEL 1
- VIEW
- ▶ DATA
- MEMORY
- DATA AND MEMORY
- DATA (/) MEMORY
- SELECT TRACE MATH
- STORE DATA TO MEMORY (STORED )
- DISK OPERATIONS
- RETURN

Phantom Head:



- CH 1 - S11 REFERENCE PLANE 8.7077 cm
- 1: 2.400000000 GHz -22.365 dB
- 2: 2.440000000 GHz -21.404 dB
- 3: 2.480000000 GHz -24.881 dB
- 4: OFF
- MARKER TO PEAK
- MORE

**3.1.2 3D Radiation Pattern @ 2441MHz**

**Free Space:**



"3D Gain\_2441\_Free  
Space\_C1.pdf"

**Phantom Head:**



"3D  
Gain\_2441\_Talking Ri

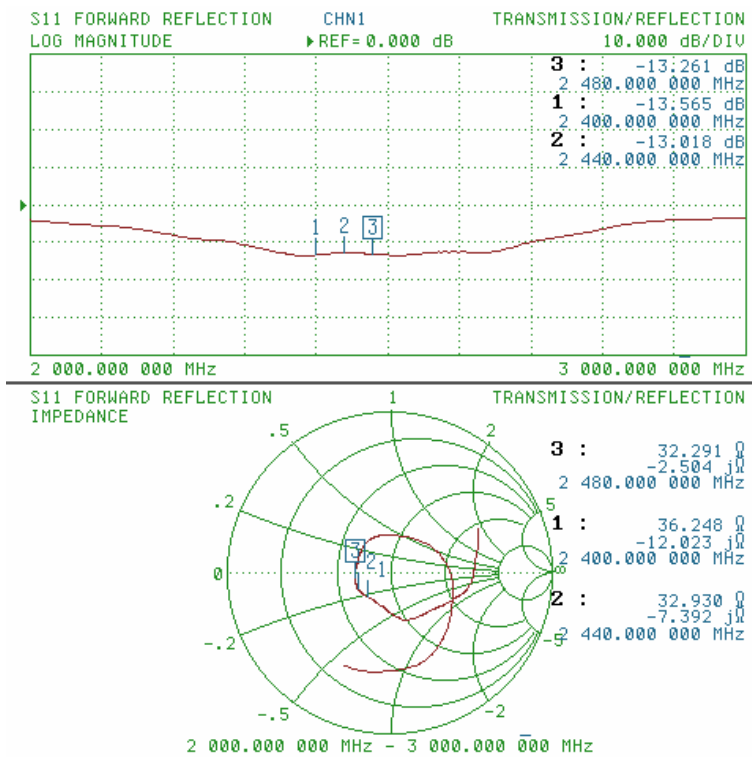
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## 4 RETURN LOSS AND RADIATION PATTERN RESULTS (SAMPLE 2)

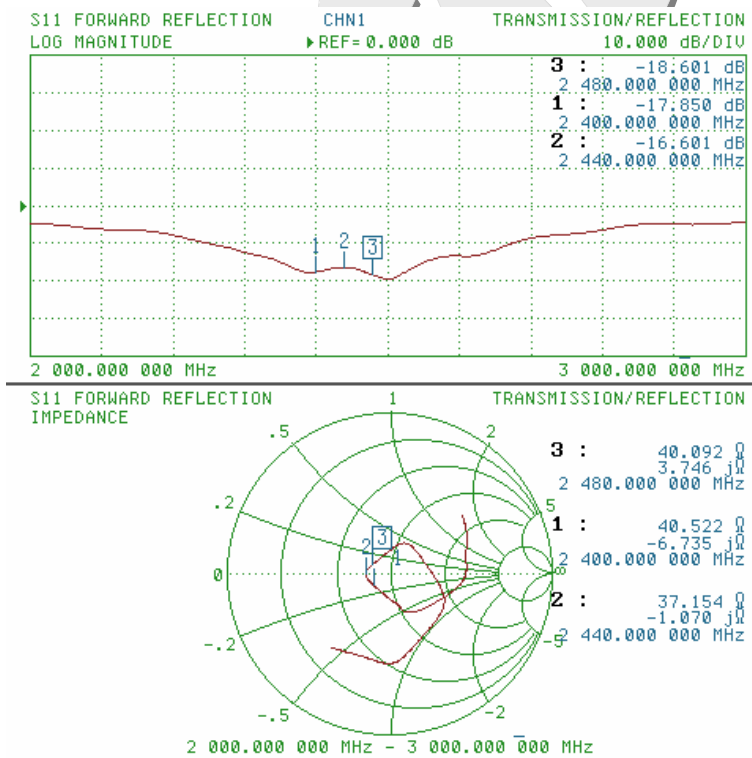
### 4.1.1 Return Loss Result

#### Free Space:



TRACE MEMORY CHANNEL 1  
 VIEW  
 DATA  
 MEMORY  
 DATA AND MEMORY  
 DATA (/) MEMORY  
 SELECT TRACE MATH  
 STORE DATA TO MEMORY (STORED )  
 DISK OPERATIONS  
 RETURN

#### Phantom Head:



CH 1 - S11 REFERENCE PLANE 8.7077 cm

1: 2.400000000 GHz -17.850 dB  
 2: 2.440000000 GHz -16.601 dB  
 3: 2.480000000 GHz -18.601 dB  
 4: OFF

MARKER TO PEAK  
 MORE

**4.1.2 3D Radiation Pattern @ 2441MHz**

**Free Space:**



"3D Gain\_2441\_Free  
Space\_C2.pdf"

**Phantom Head:**



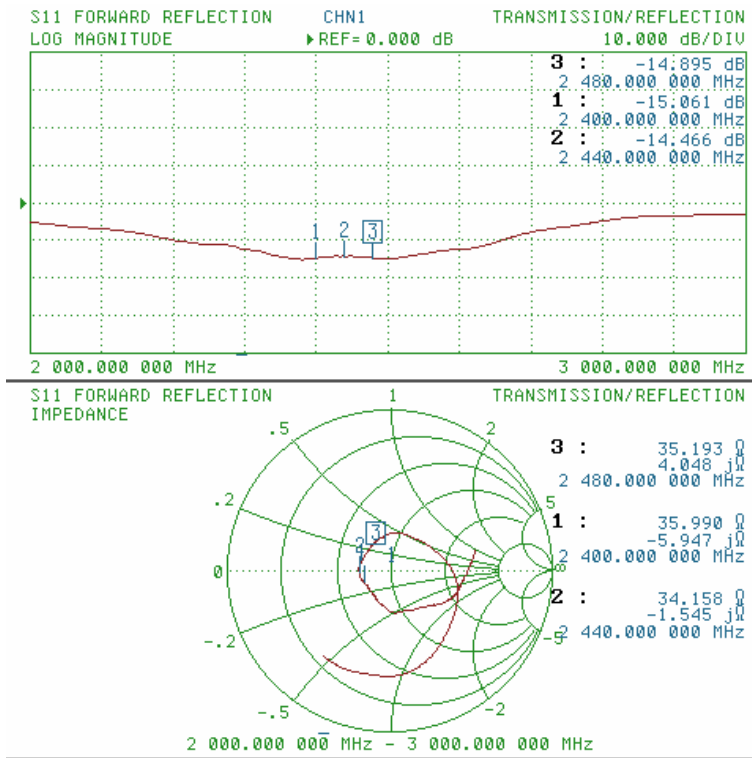
"3D  
Gain\_2441\_Talking Ri

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## 5 RETURN LOSS AND RADIATION PATTERN RESULTS (SAMPLE 3)

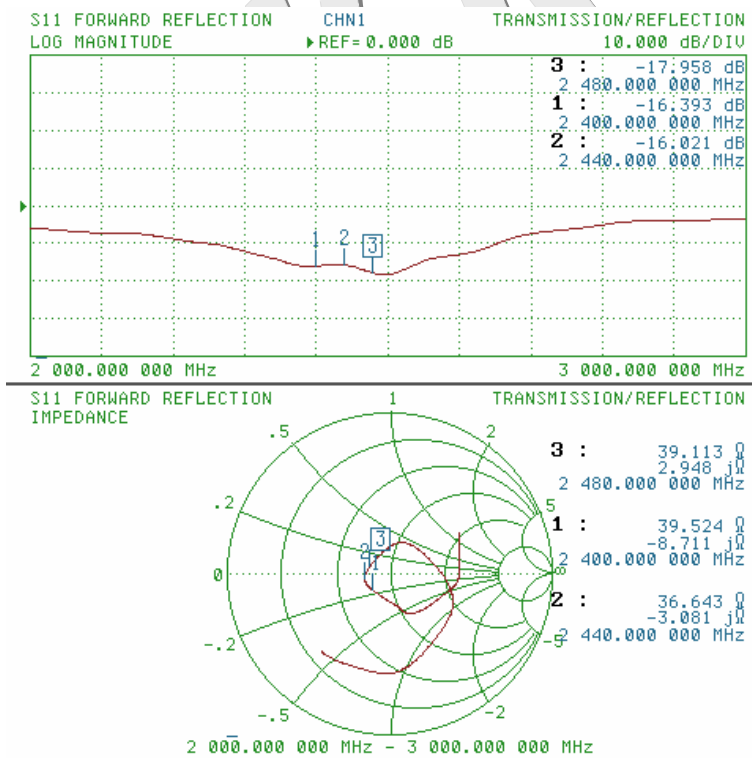
### 5.1.1 Return Loss Result

Free Space:



TRACE MEMORY CHANNEL 1  
 VIEW  
 DATA  
 MEMORY  
 DATA AND MEMORY  
 DATA (/) MEMORY  
 SELECT TRACE MATH  
 STORE DATA TO MEMORY (STORED )  
 DISK OPERATIONS  
 RETURN

Phantom Head:



CH 1 - S11 REFERENCE PLANE 8.7077 cm

1: 2.400000000 GHz -16.393 dB  
 2: 2.440000000 GHz -16.021 dB  
 3: 2.480000000 GHz -17.958 dB  
 4: OFF

MARKER TO PEAK  
 MORE

## 5.1.2 3D Radiation Pattern @ 2441MHz

### Free Space:



"3D Gain\_2441\_Free  
Space\_C3.pdf"

### Phantom Head:



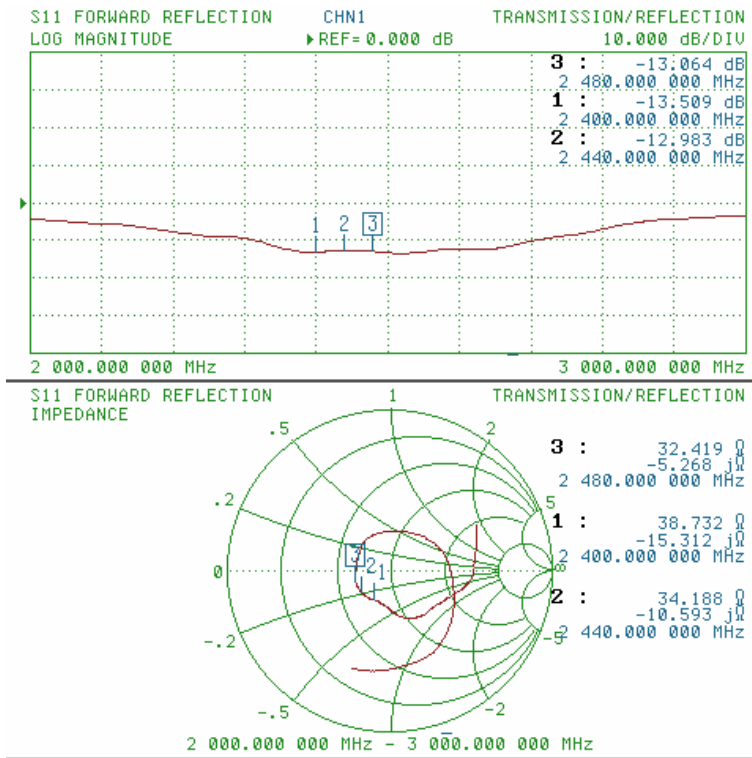
"3D Gain\_  
2441\_Talking Right\_C"

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## 6 RETURN LOSS AND RADIATION PATTERN RESULTS (SAMPLE 4)

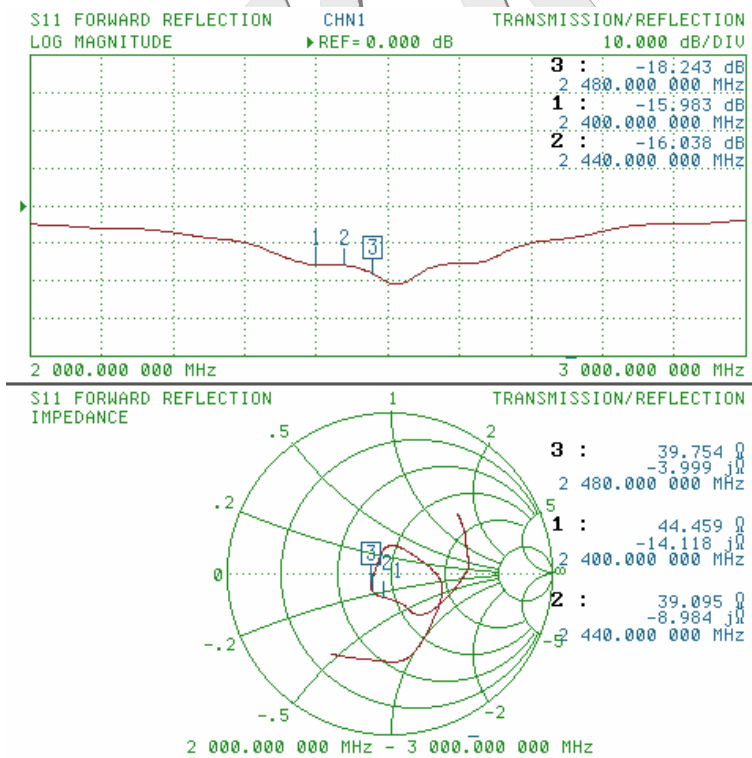
### 6.1.1 Return Loss Result

Free Space:



- TRACE MEMORY CHANNEL 1
- VIEW
- ▶ DATA
- MEMORY
- DATA AND MEMORY
- DATA (/) MEMORY
- SELECT TRACE MATH
- STORE DATA TO MEMORY (STORED )
- DISK OPERATIONS
- RETURN

Phantom Head:



- CH 1 - S11 REFERENCE PLANE 8.7077 cm
- 1: 2.400000000 GHz -15.983 dB
- 2: 2.440000000 GHz -16.038 dB
- 3: 2.480000000 GHz -18.243 dB
- 4: OFF
- MARKER TO PEAK
- MORE

**6.1.2 3D Radiation Pattern @ 2441MHz**

**Free Space:**



"3D Gain\_2441\_Free  
Space\_C4.pdf"

**Phantom Head:**



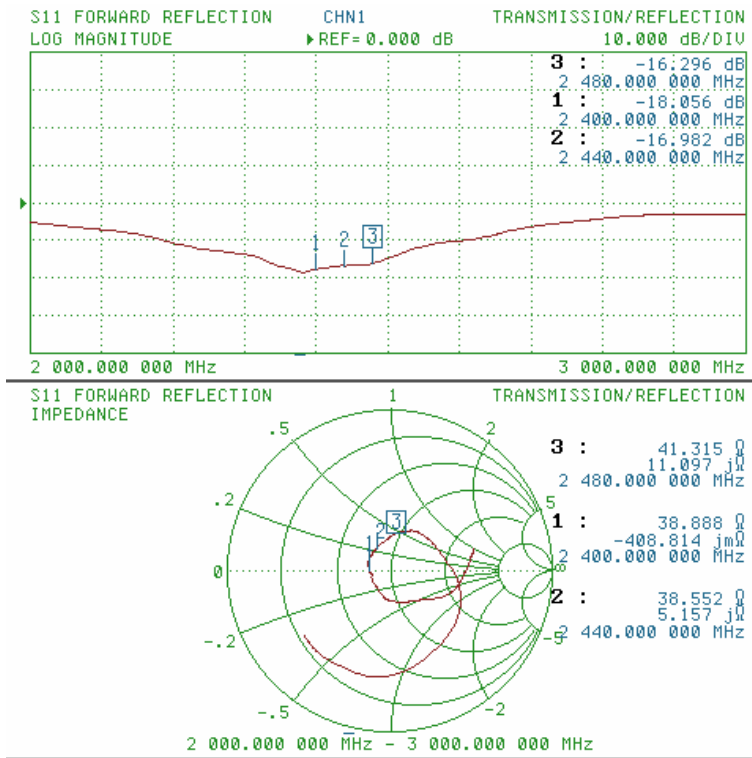
"3D  
Gain\_2441\_Talking Ri

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## 7 RETURN LOSS AND RADIATION PATTERN RESULTS (SAMPLE 5)

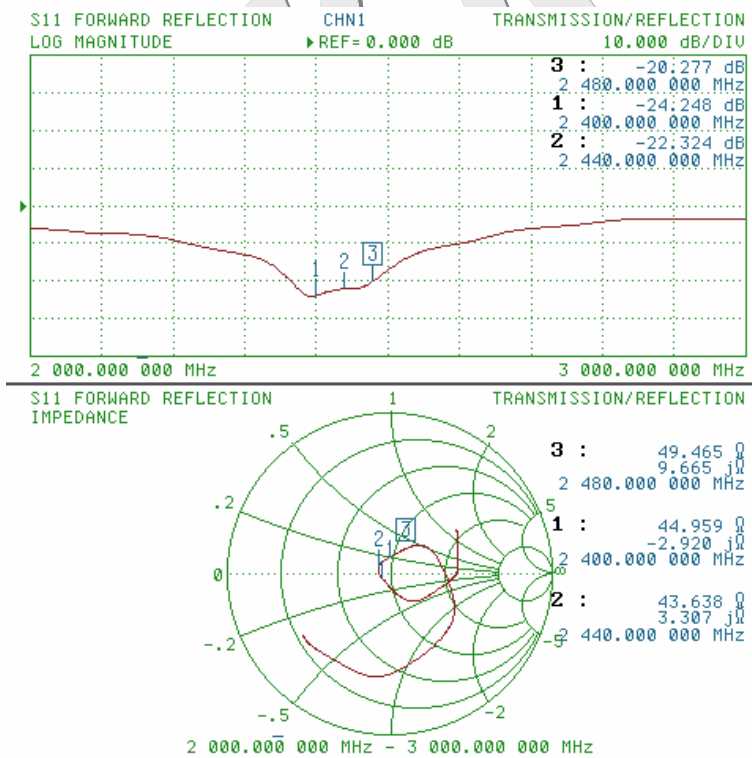
### 7.1.1 Return Loss Result

Free Space:



- TRACE MEMORY CHANNEL 1
- VIEW
- ▶ DATA
- MEMORY
- DATA AND MEMORY
- DATA (/) MEMORY
- SELECT TRACE MATH
- STORE DATA TO MEMORY (STORED )
- DISK OPERATIONS
- RETURN

Phantom Head:



- CH 1 - S11 REFERENCE PLANE 8.7077 cm
- 1: 2.400000000 GHz -24.248 dB
- 2: 2.440000000 GHz -22.324 dB
- 3: 2.480000000 GHz -20.277 dB
- 4: OFF
- MARKER TO PEAK
- MORE

**7.1.2 3D Radiation Pattern @ 2441MHz**

**Free Space:**



"3D Gain\_2441\_Free  
Space\_C5.pdf"

**Phantom Head:**



"3D  
Gain\_2441\_Talking Ri

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