

To: M7 Systems Co., Ltd.

No. : EMW 2010-B2-002

Date : 2010. 01. 04

PRODUCT SPECIFICATION

Product Name : PCB ANTENNA

MODEL Name : STX-2-B/T

E.M.W. Antenna PART No. :

APPROVAL

* Requested approval for annexed sample.

A P P R O V A L	Submitted	Checked	Checked	Approved
				
	10.01.04		10.01.04	10.01.04

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1. Product History

No.	Date	Mark	Changes	Remark
1		-		
2				
3				
4				
5				
6				
7				
8				
9				

2. PART NUMBER LIST

No.	PART NO.	Color & Corrosiveness	E.M.W. Antenna Product Number	Remark
1				
2				
3				
4				
5				
6				
7				
8				

3. Product Summary & Terminology

3.1 Summary

This is the product specification of Antenna applied to Mobile Phone Set.

3.2 Product Number

E.M.W. Antenna Part Number:

3.3 Measuring Unit & Definition

SI unit will be used, unless any specialties are announced.

Tx	Transmit Band
Rx	Receive Band
PCB	Printed Circuit Board
VSWR	Voltage Standing Wave Ratio
dBi	Antenna gain in dB relative to a isotropic antenna
Room Temperature	+20 ± 3°C
CW	Clock Wise
g	Acceleration of gravity 9.82 m/s ²
RH	Relative Humidity
gf / kgf	Gram weight (1gf=980.665dyn) / Kilogram weight (1kgf=9.80665N)
Ph	Potential of hydrogen
F	Force
T	Torque

3.4 Frame of Reference

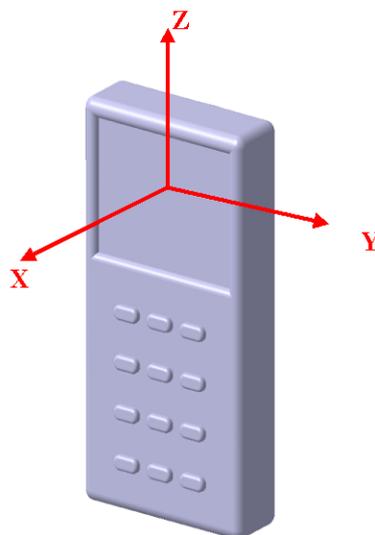


Figure 3.4.1 Coordinate within the Handset

4. Electrical Feature

4.1 Frequency Band

Service	BLUETOOTH
(MHz)	2400MHz ~ 2500MHz

4.2 Impedance

4.2.1 Input Impedance

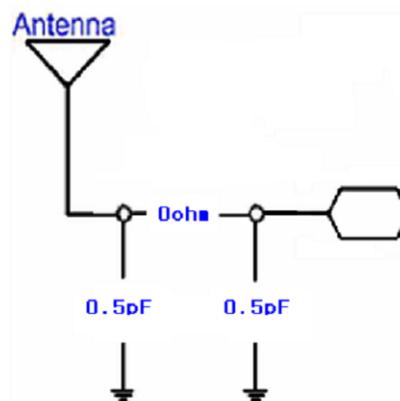
- $R = 50\Omega$

4.2.2 Measuring Method

By using Network Analyzer, connect the antenna installed handset to the reflection point of Analyzer and measure the impedance value within the designated frequency band.

4.3 Matching Circuit

Matching Circuit is composed in free space of 4.1 frequency band while satisfying customer's requirements.



4.4 V.S.W.R.

Impedance Matching optimization is performed under the below mentioned environment.

4.4.1 Free Space Environment

Mode \ Frequency	Rx			
	2400MHz	2450MHz	2480MHz	2500MHz
Slide Down (VSWR)	1.5 : 1	1.4 : 1	1.5 : 1	1.6 : 1
Slide Up (VSWR)	1.4 : 1	1.4 : 1	1.5 : 1	1.6 : 1

4.4.2 Measuring Method

Connect(soldering) 50Ω semi-rigid coaxial cable to the 50Ω spot in handset. To minimize the loss of transmission, semi-rigid coaxial cable is used. Including PCB, the handset shouldn't be different from the one, which will be used for mass production.

Specification should be the same for all frequency bands. Free Space means that Handset is put on the surface of no conducting plastic.

4.5 Directive ness

Omni-directional (Horizontal)

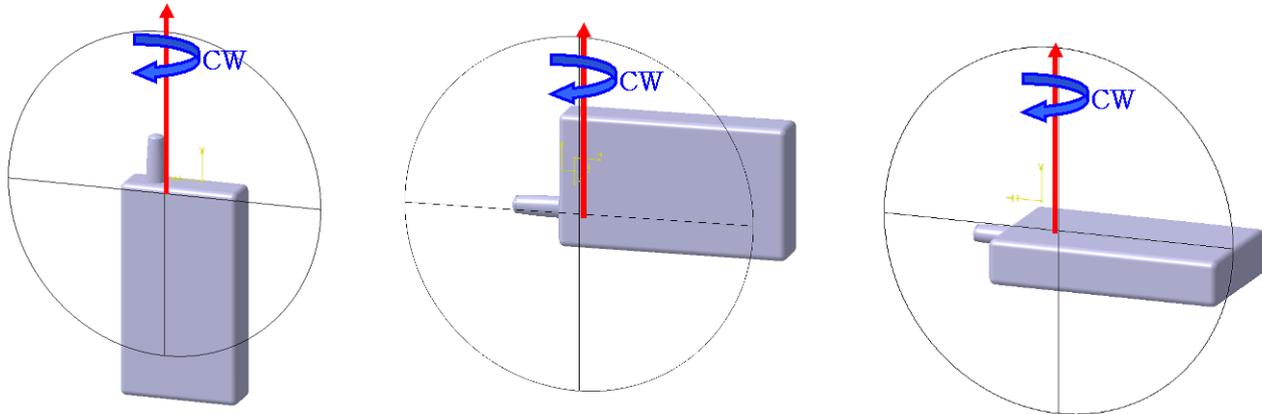
4.6 Gain

4.6.1 Gain Table

Set Conditions			Slide Down	Slide Up	
ITEM			SPEC		
Frequency Range [MHz]			2400 ~ 2500		
VSWR [Max]			1.6 : 1		
Bandwidth [MHz]			100		
Polarization			Linear		
Gain [dBi]	Total Gain (Peak / AVG.) [dBi]		-0.258 / -5.163	-0.193 / -6.140	
	H (XY-Plane)	Theta	Peak	-3.280	-4.353
			AVG.	-7.673	-8.792
		Phi	Peak	-5.492	-3.514
			AVG.	-10.544	-9.936
	E1 (XZ-Plane)	Theta	Peak	-4.164	-5.134
			AVG.	-8.812	-11.286
		Phi	Peak	-4.085	-4.244
			AVG.	-7.278	-6.842
	E2 (YZ-Plane)	Theta	Peak	-2.053	-0.371
			AVG.	-5.392	-6.363
		Phi	Peak	-12.200	-13.890
			AVG.	-16.703	-18.534

4.6.2 Measuring Method

Measure the radiation pattern in service band. As shown in the figure 4.6.1, put handset in the Shield Room and then radiate vertical polarization for the figure 4.6.1(a) as a source polarization and measure the receiving power level by changing horizontal angle. Measure the value of maximum gain and average value of average gain.



(a) H-Pattern (XY-Plane)

(b) E1-Pattern (XZ-Plane)

(c) E2-Pattern (YZ-Plane)

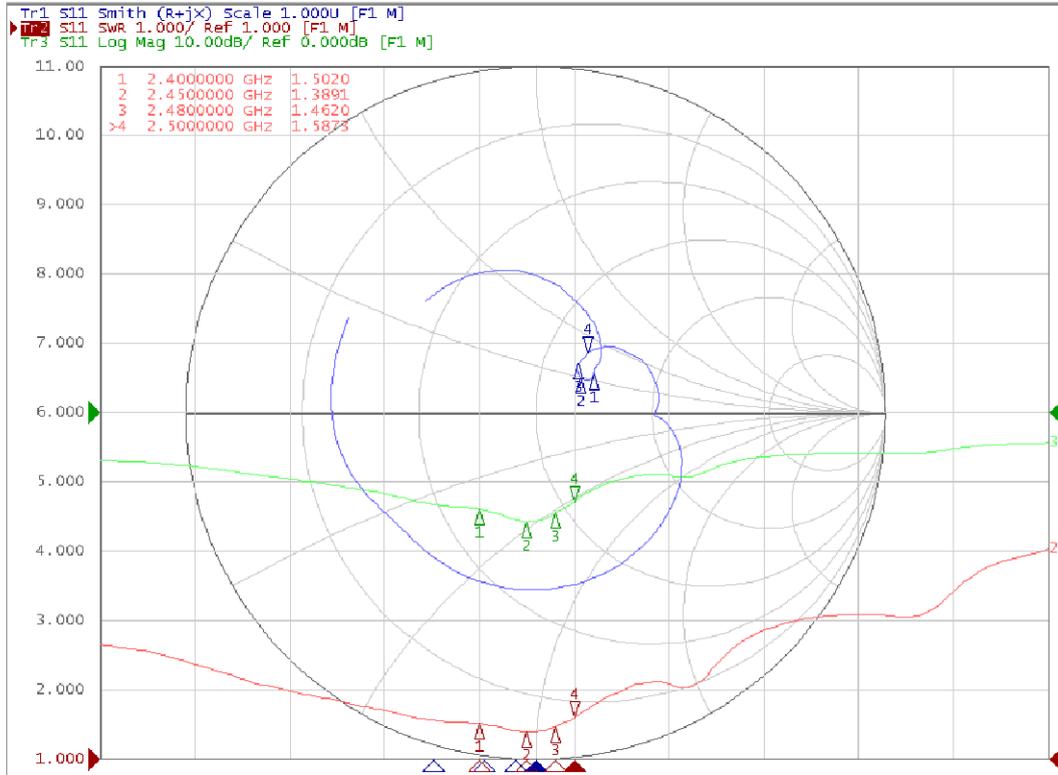
Figure 4.6.1 Gain Measurement Position

4.7 Maximum Power

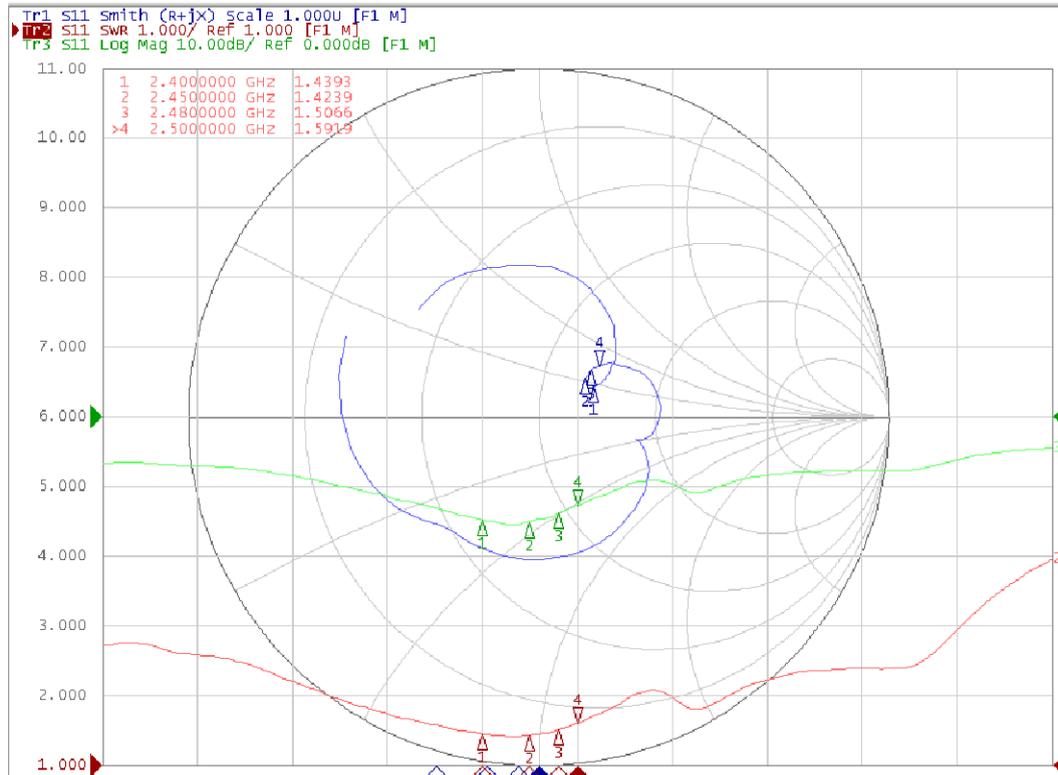
- $P = 2W$ under

5. Electric Performance Data

5.1.1 Smith-Chart & V.S.W.R. & S11 (Slide Down)

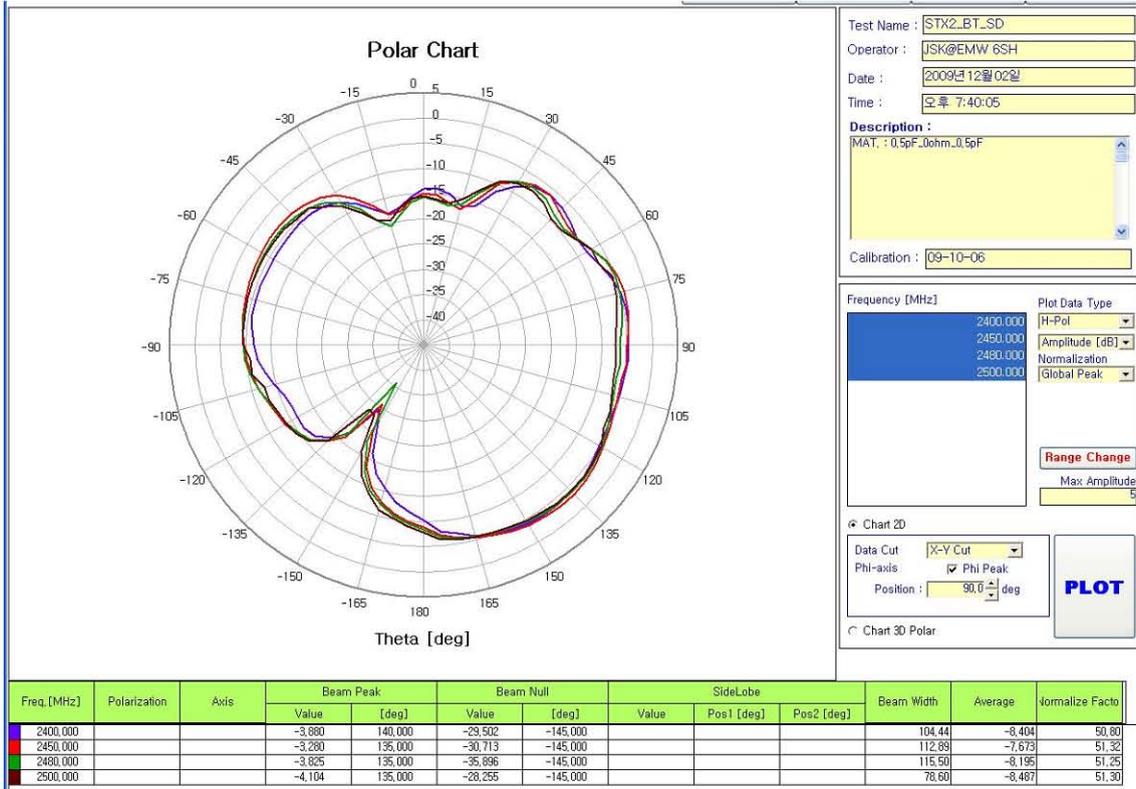


5.1.2 Smith-Chart & V.S.W.R. & S11 (Slide Up)

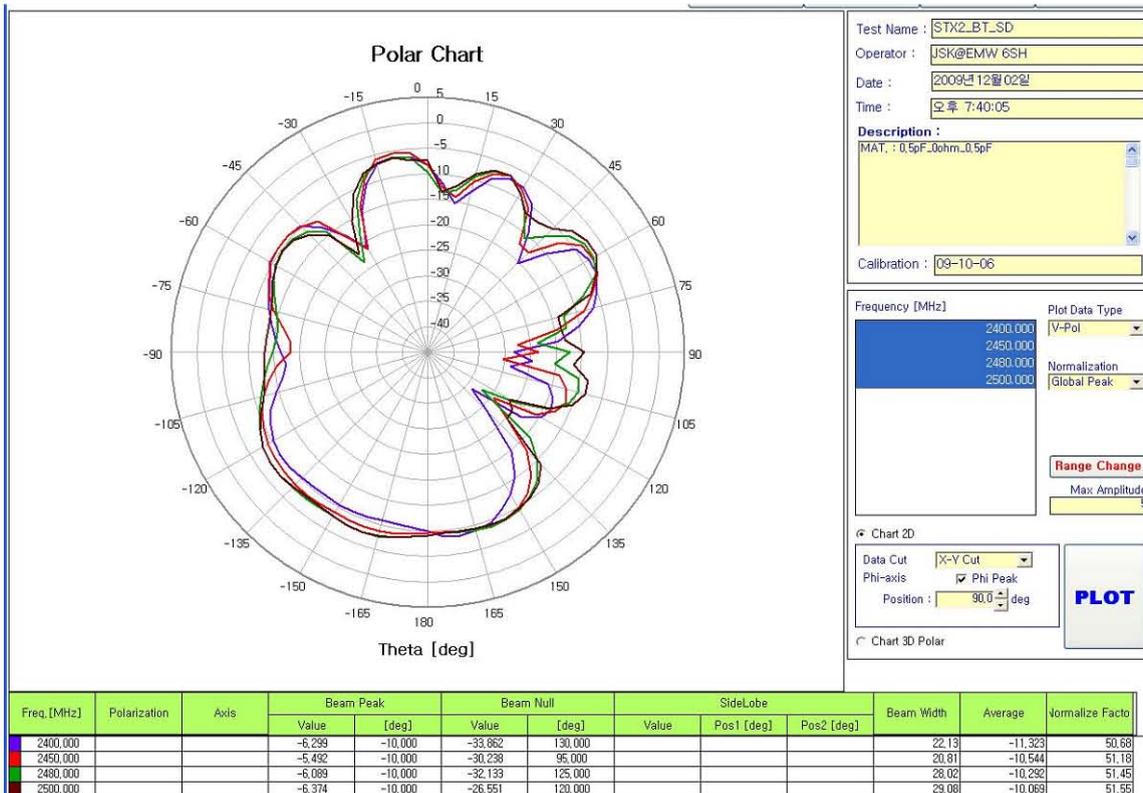


5.2.1 Slide Down Radiation Pattern

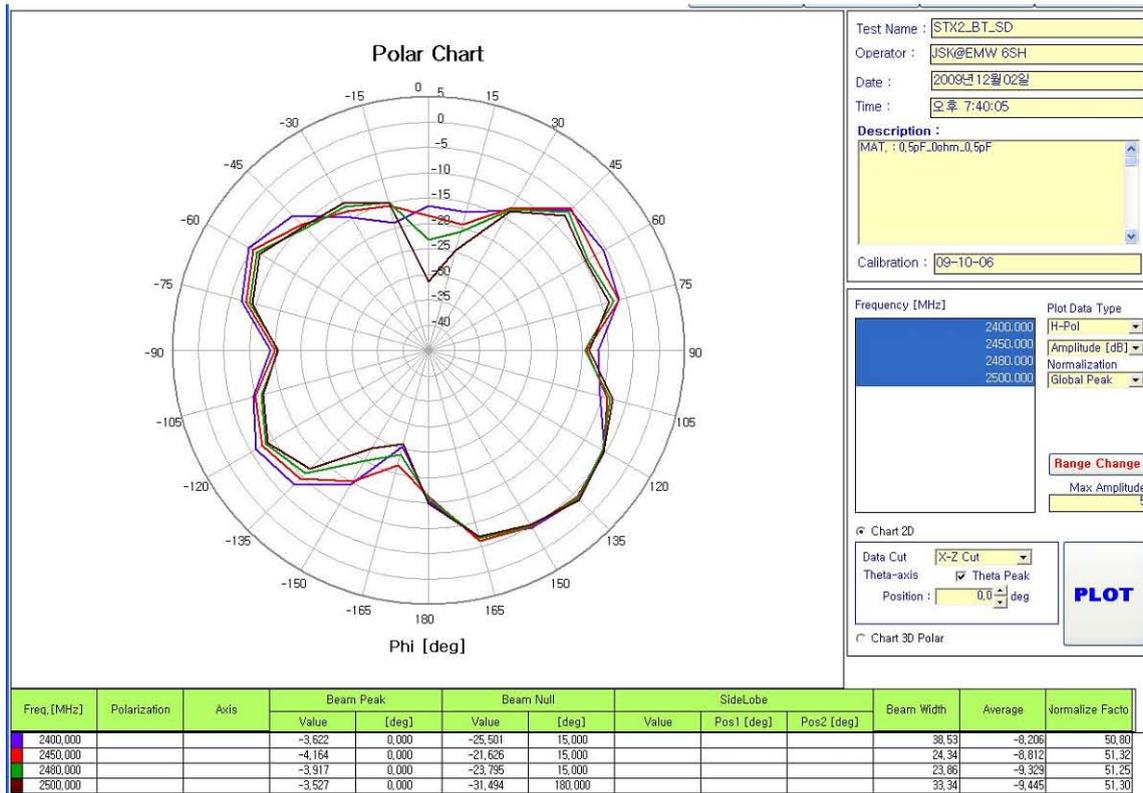
5.2.1.1.1 H - Theta (XY-Plane)



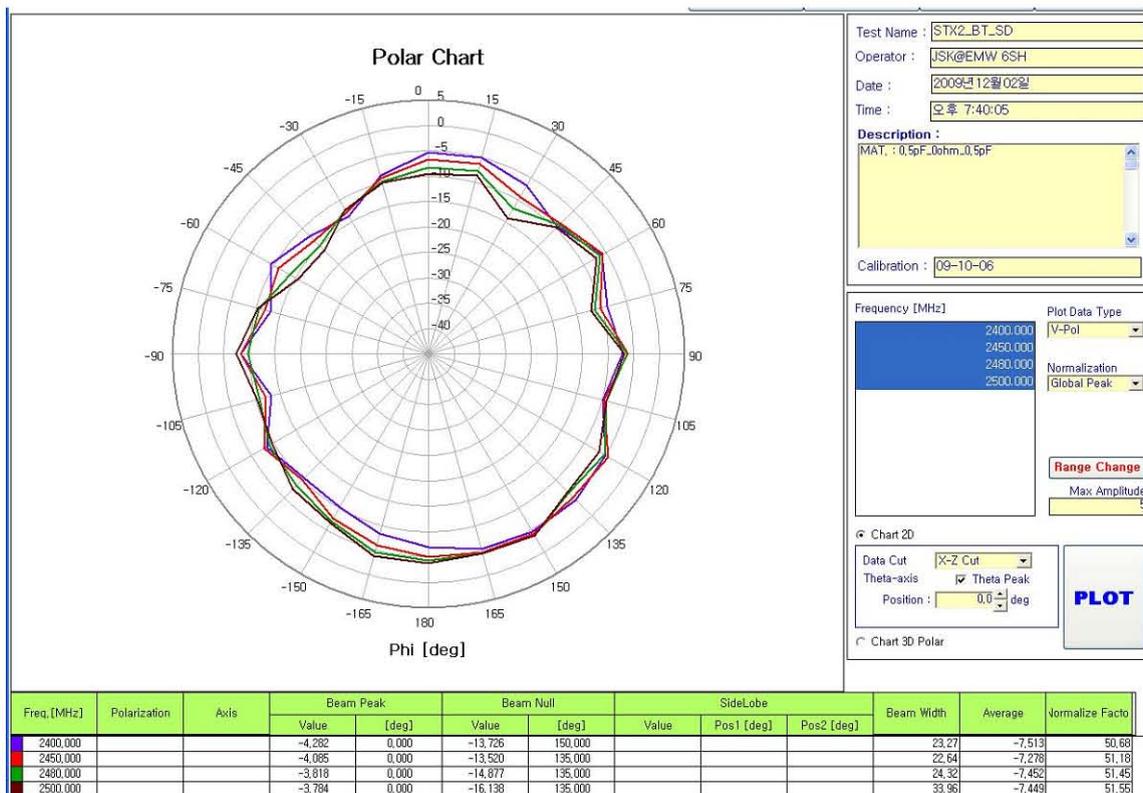
5.2.1.1.2 H - Phi (XY-Plane)



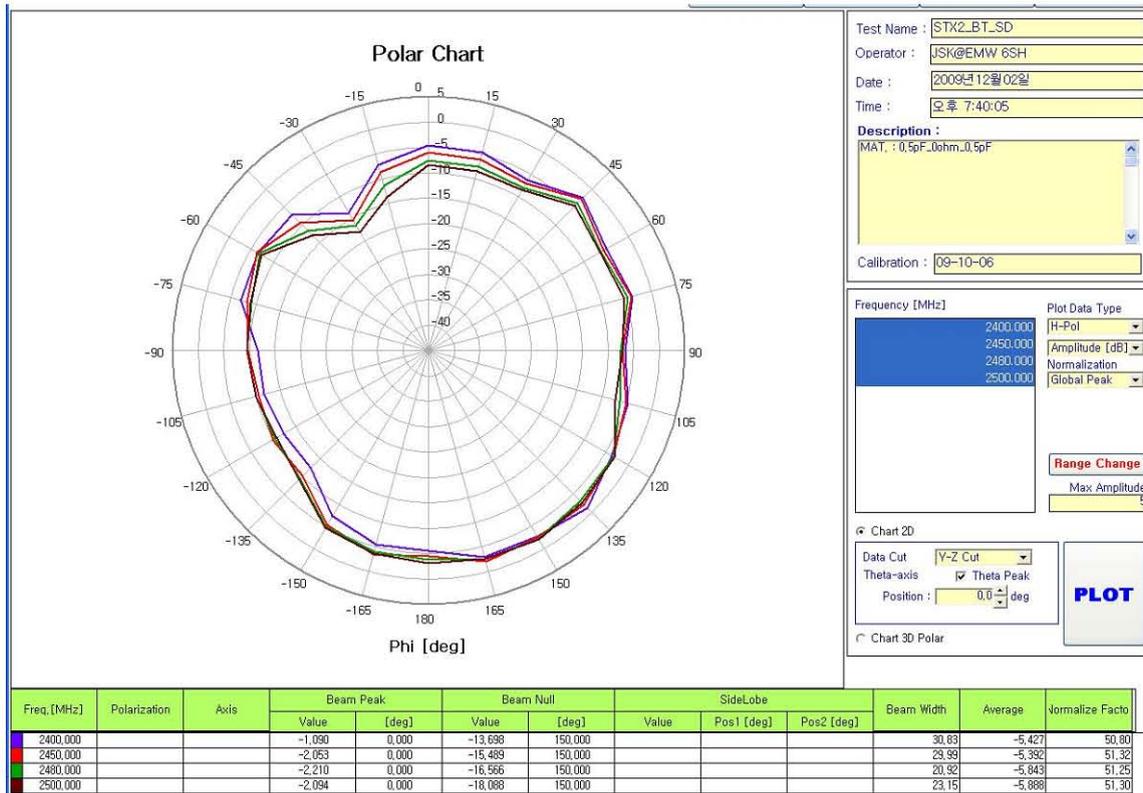
5.2.1.2.1 E1 - Theta (XZ-Plane)



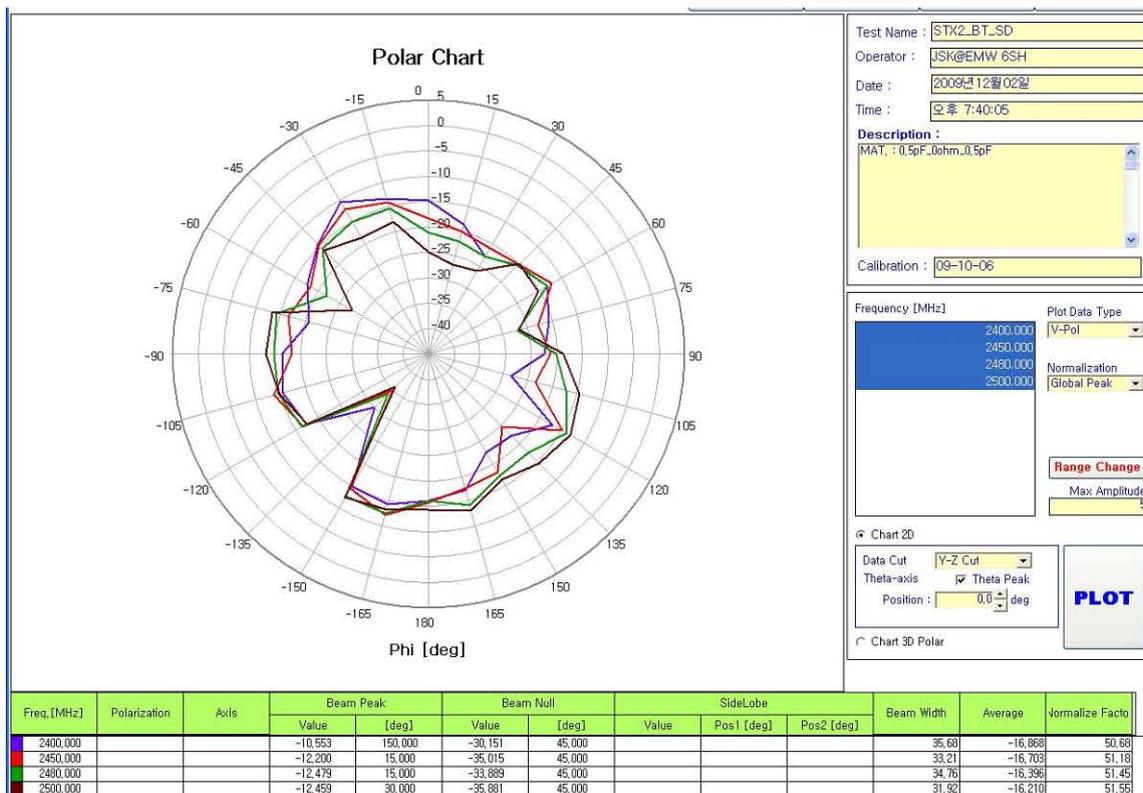
5.2.1.2.2 E1 - Phi (XZ-Plane)



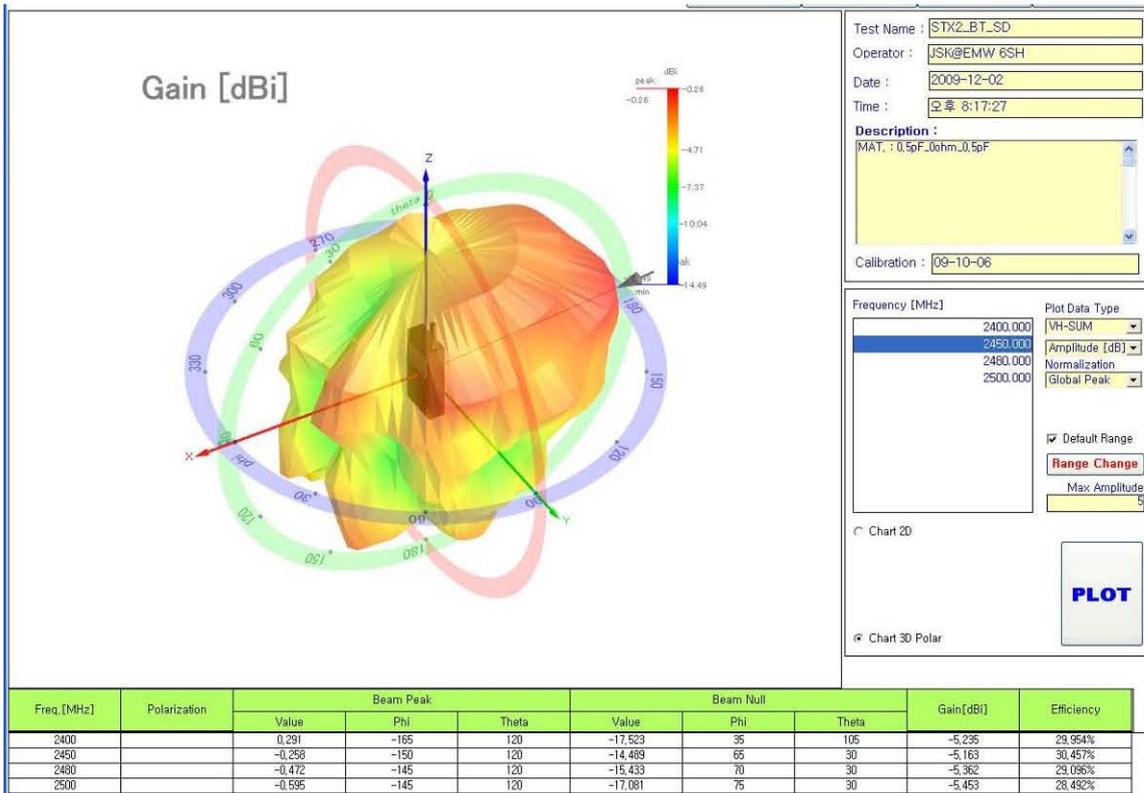
5.2.1.3.1 E2 - Theta (YZ-Plane)



5.2.1.3.2 E2 - Phi (YZ-Plane)

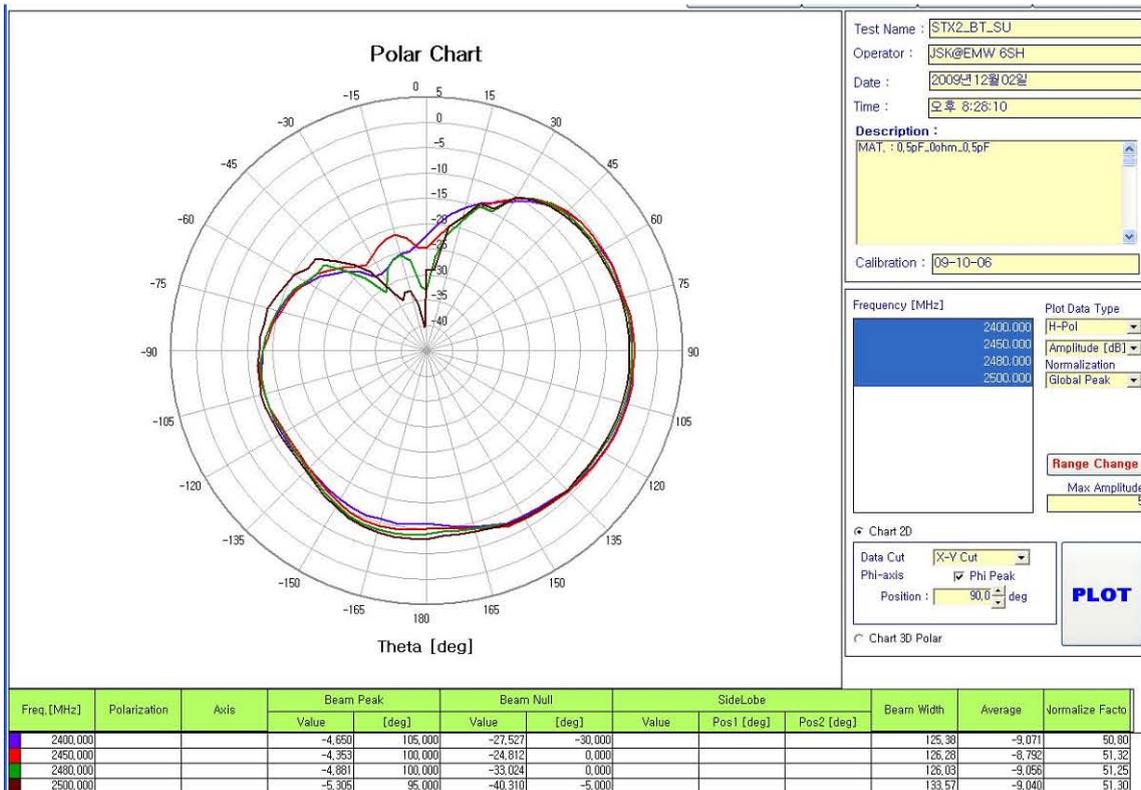


5.2.1.4 3D

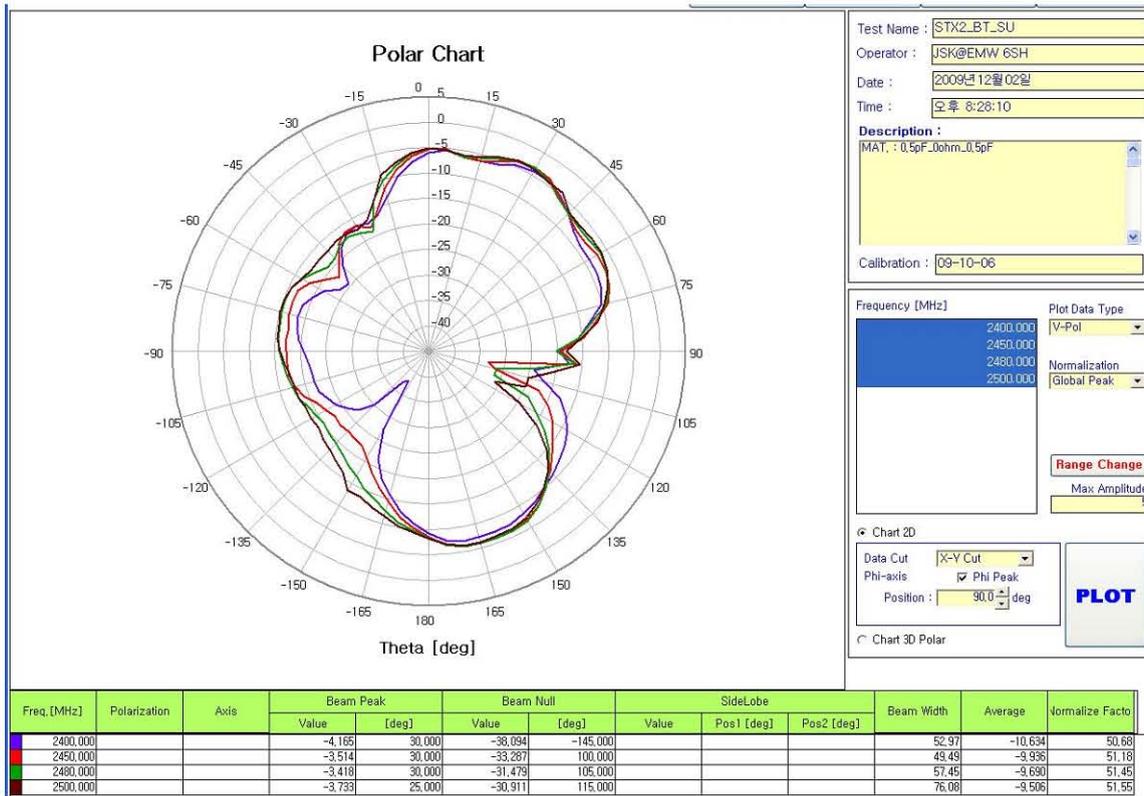


5.2.2 Slide Up Radiation Pattern

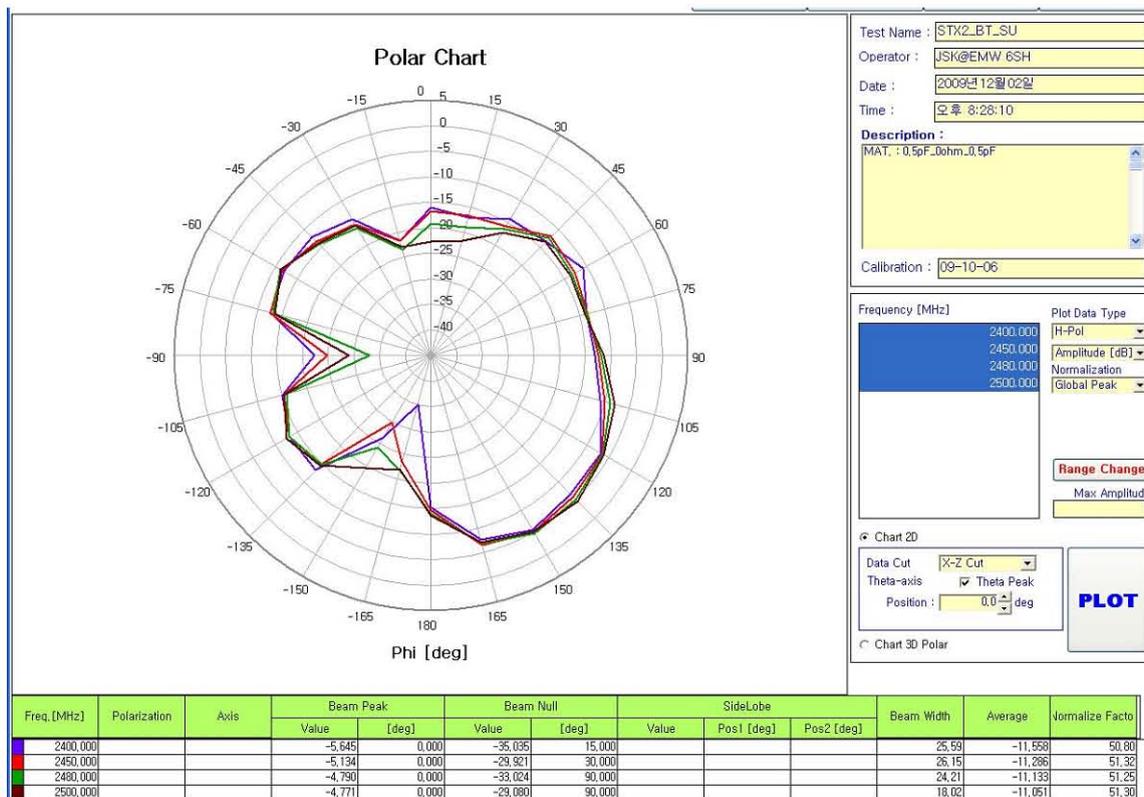
5.2.2.1.1 H - Theta (XY-Plane)



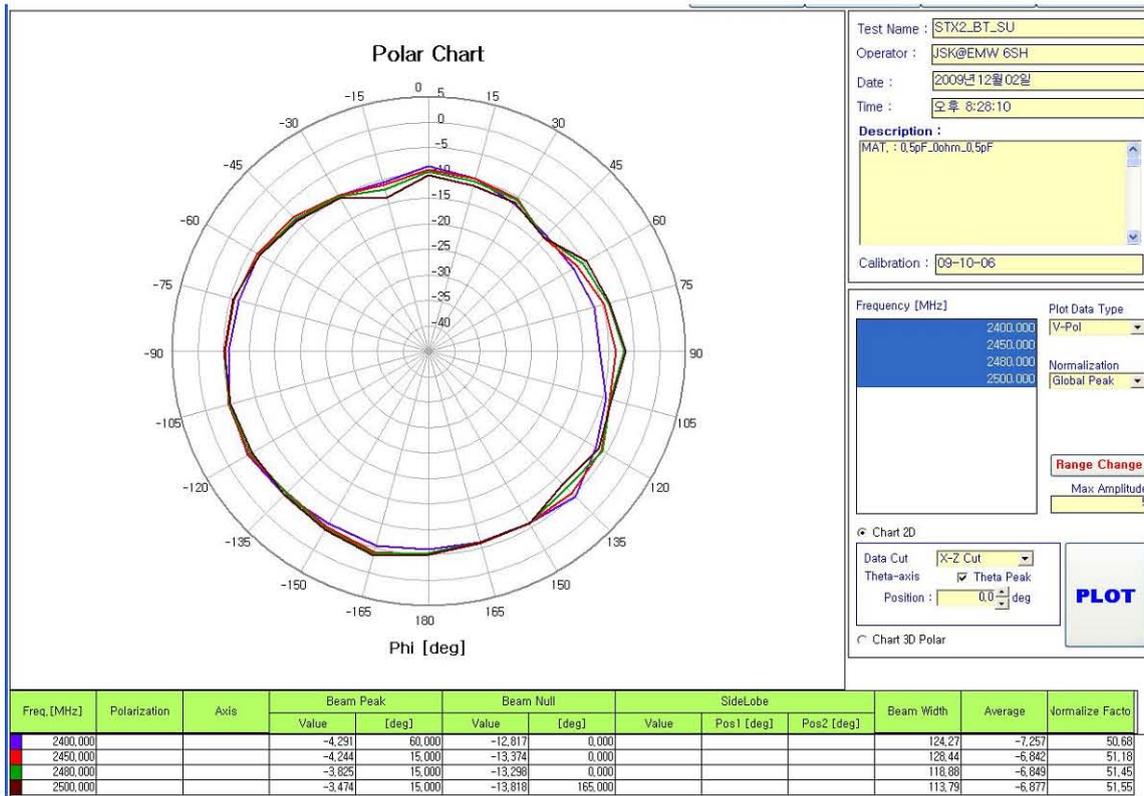
5.2.2.1.2 H - Phi (XY-Plane)



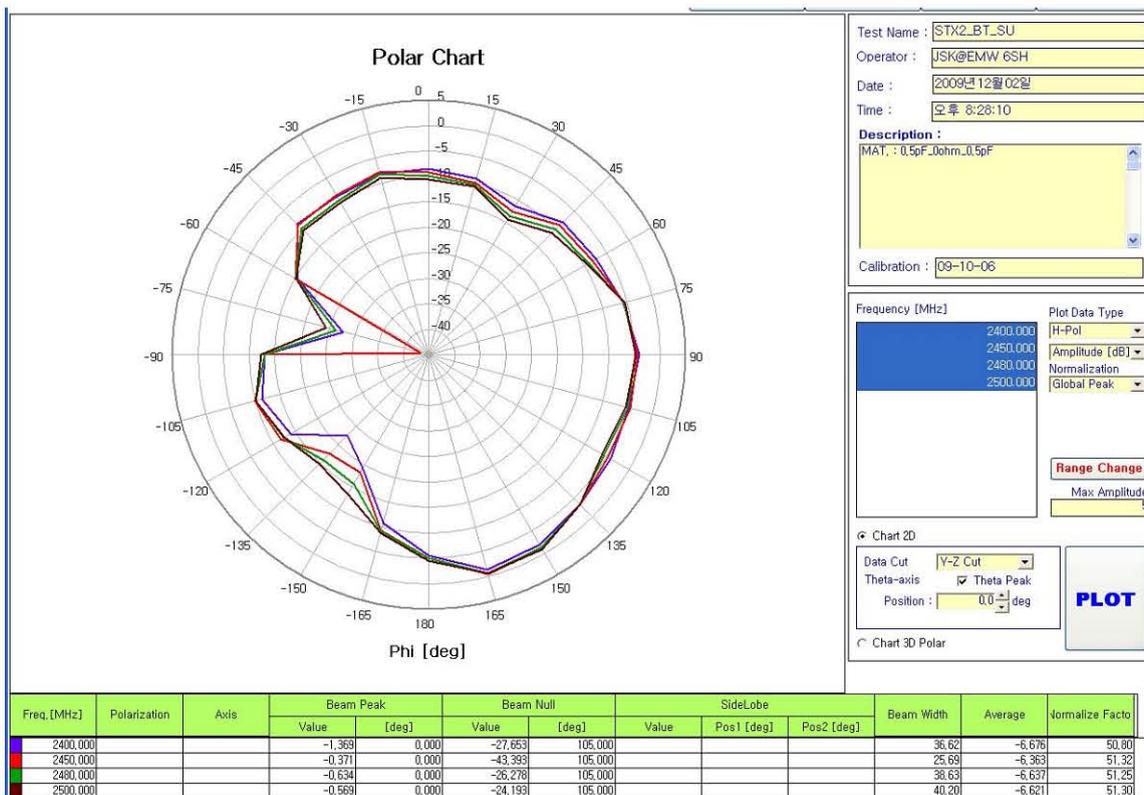
5.2.2.2.1 E1 - Theta (XZ-Plane)



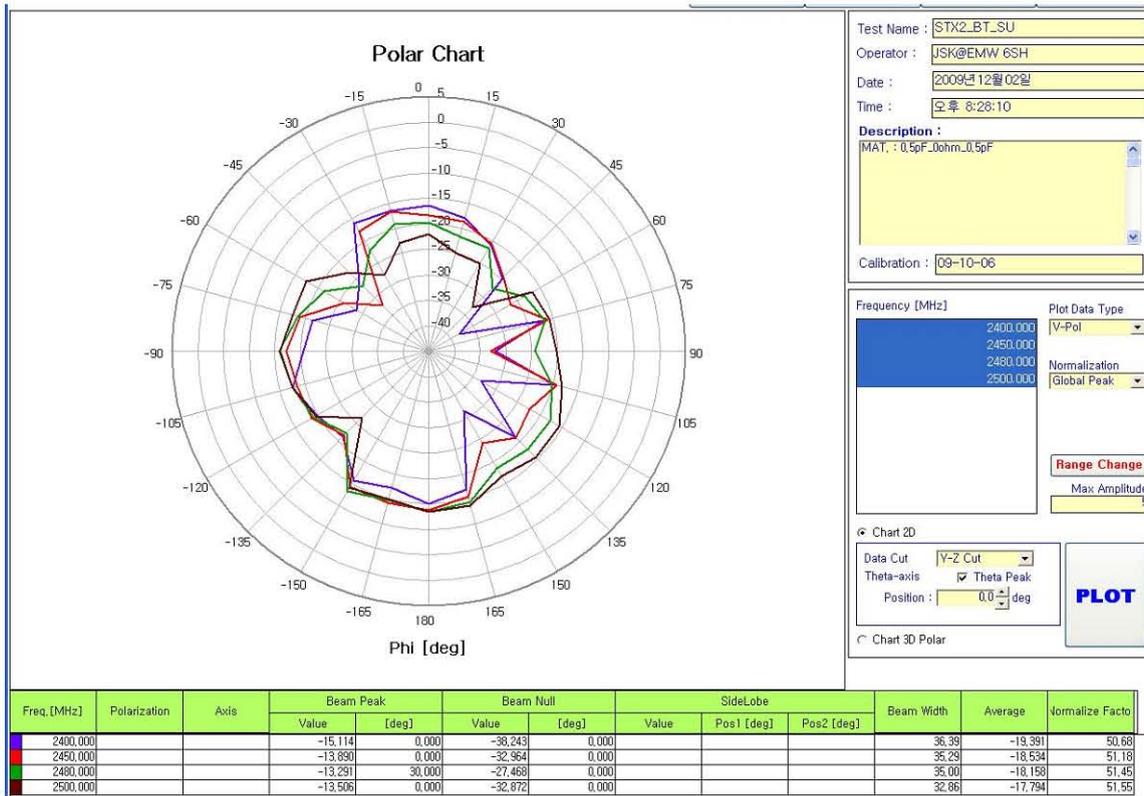
5.2.2.2.2 E1 - Phi (XZ-Plane)



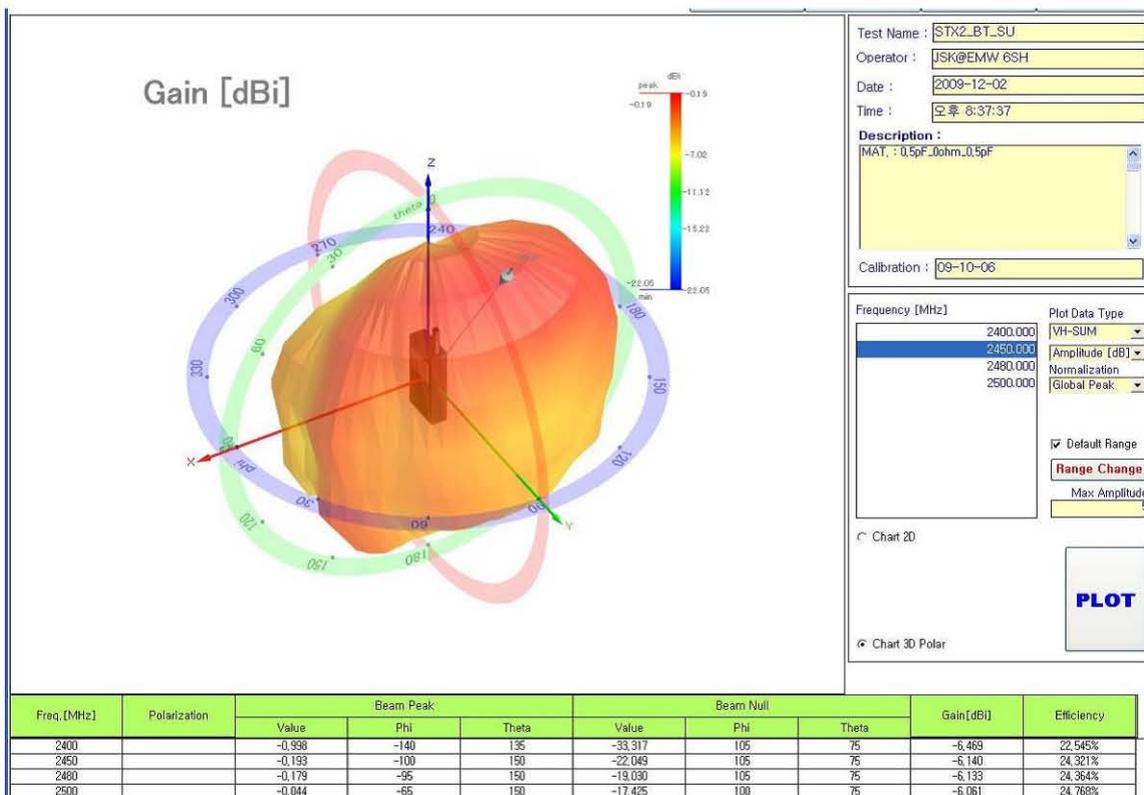
5.2.2.3.1 E2 - Theta (YZ-Plane)



5.2.2.3.2 E2 - Phi (YZ-Plane)



5.2.2.4 3D



6. Test Conditions

6.1 Network Test

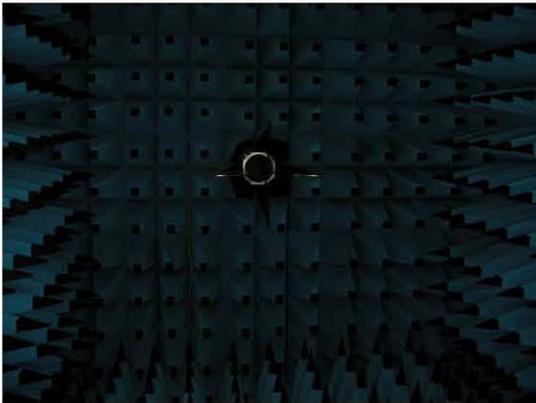
Slide Down



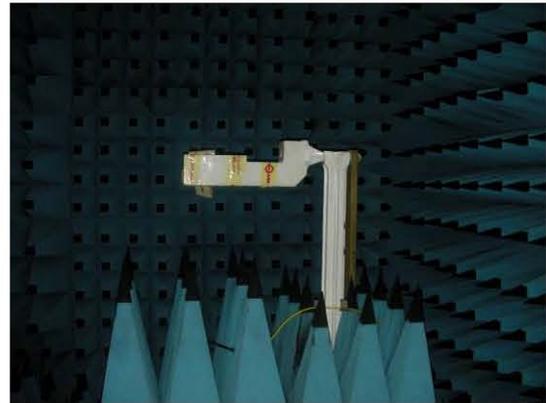
Slide Up



6.2 Anechoic Chamber



Source Antenna



Set Test JIG