



SE KWANG

No. : SEKWANG 2008-10

Date : 2008. 01. 21

SPECIFICATION

Product Name	ANTENNA
Customer	Telian
Model Name	K3000
Customer Code.	
Provider	SE KWANG
Part Code.	SKA801-0000AA

Buyer	Submitted	Checked		Approved
SE KWANG				
SE KWANG				



– Table of Contents –

1. Product History	-----	3
2. Electrical Feature	-----	4
2.1 Frequency Band		
2.2 Impedance		
2.3 Matching circuit		
2.4 VSWR		
2.5 Directivity		
2.6 Maximum Power		
3. Environment Test	-----	6
4. Electric Performance Data	-----	8
5. Drawing	-----	13
6. Packing	-----	14
7. Certification of RoHS	-----	15



1. Product History

LIST					
NO	Data	Front	After	Change	REV
1	2008.01.18			Approval	0
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

2. Electrical Feature

2.1. Frequency Band

BAND	GSM850		GSM900		DCS1800		PCS	
FREQUENCY	Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx
	824MHz ~ 849MHz	869MHz ~ 894MHz	880MHz ~ 915MHz	925MHz ~ 960MHz	1710MHz ~ 1785MHz	1805MHz ~ 1880MHz	1850MHz ~ 1910MHz	1930MHz ~ 1990MHz

2.2 Impedance

2.2.1 Input Impedance

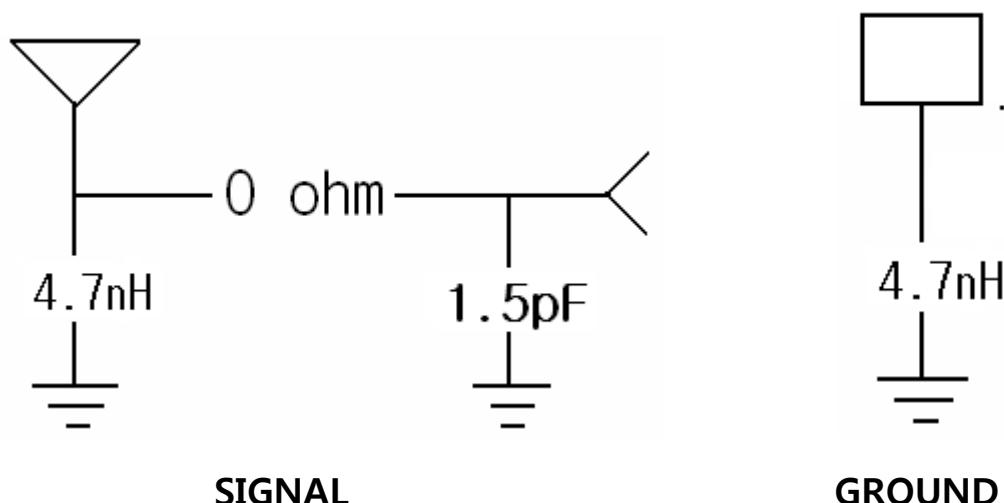
- $R = 50\Omega$

2.2.2 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.

2.3 Matching circuit

Matching Circuit is composed in free space of 2.1 frequency band while satisfying customer's requirements.



<Figure 2.3.1 Matching circuit>



2.4 VSWR

Impedance Matching optimization is performed under the below mentioned environment.

2.4.1 Free Space Environment

BAND	GSM850 GSM900		DCS1800	PCS
FREQ	824MHz	960MHz	1710MHz	1990MHz
DOWN	2.5.0:1	3.5:1	2.5:1	4.5:1
UP	5.0:1	3.0:1	3.5:1	5:1

2.4.2 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.

2.5 Directivity

Omni-directional (Horizontal)

BAND		GSM850	GSM900	DCS1800	PCS
DOWN	Avg.	-5.6 dBi	-6.1 dBi	-5.8 dBi	-8.0 dBi
	Peak	-2.3 dBi	-2.5 dBi	-1.7dBi	-3.8 dBi
UP	Avg.	-5.2 dBi	-3.5 dBi	-4.4 dBi	-6.3 dBi
	Peak	-2.7 dBi	-1.0 dBi	0.5 dBi	-2.6 dBi

2.6 Maximum Power

- P=2W Under



3. Environment Test

3.1 Operating Temperature Test

3.1.1 Test Condition

Temperature = -30°C, +80°C

Duration time = 1 hour

3.1.2 Requirements

After the test, the antenna must not have an outer damage, and also it must pass requirement shown in 2.4.

3.1.3 Measuring Method

Antenna is kept at -30°C for 1 hour and +80°C for 1 hour and than passed test of 2.4

3.2 Temperature Cycling Test

3.2.1 Test Condition

- Low cycling Temperature TLC = -40°C
- High cycling Temperature THC = +80°C
- 1Cycle = 4 hours
- Test number = 10Cycle

3.2.2 Requirements

After the test, the antenna must not have an outer damage, and also it must pass requirement shown in 2.4.

3.2.3 Measuring Method

Antenna is kept at low temperature -40°C for 2 hours and increase the temperature up to $+80^{\circ}\text{C}$ within 2 hour and kept for another 2 hours at the same temperature will be 1 cycle. As shown in Figure 3.2.1 repeat 10 cycle and kept for 2 hour in normal temperature.

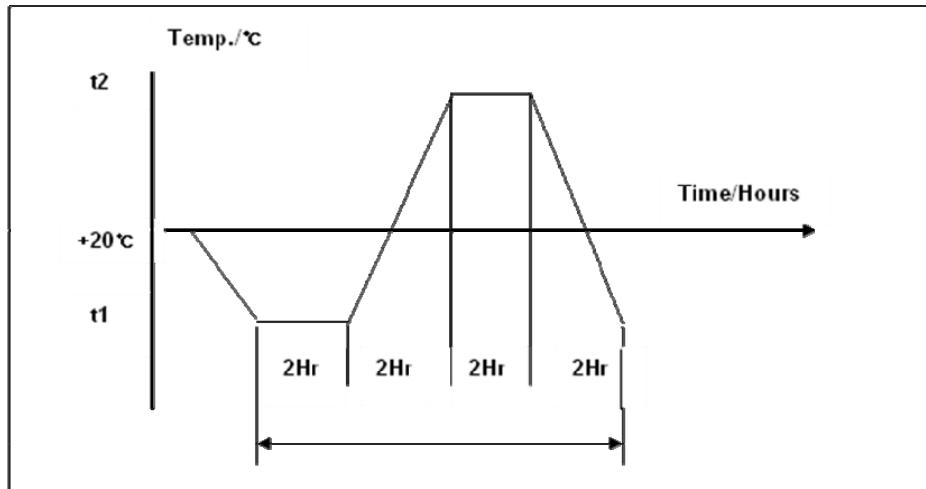


Figure 3.2.1 Temperature Cycling

3.3 Corrosion Resistance Test

3.3.1 Test Condition

- NaCl = 90%
- Water Temperature = 60°C
- Duration Time = 96 hours

3.3.2 Requirements

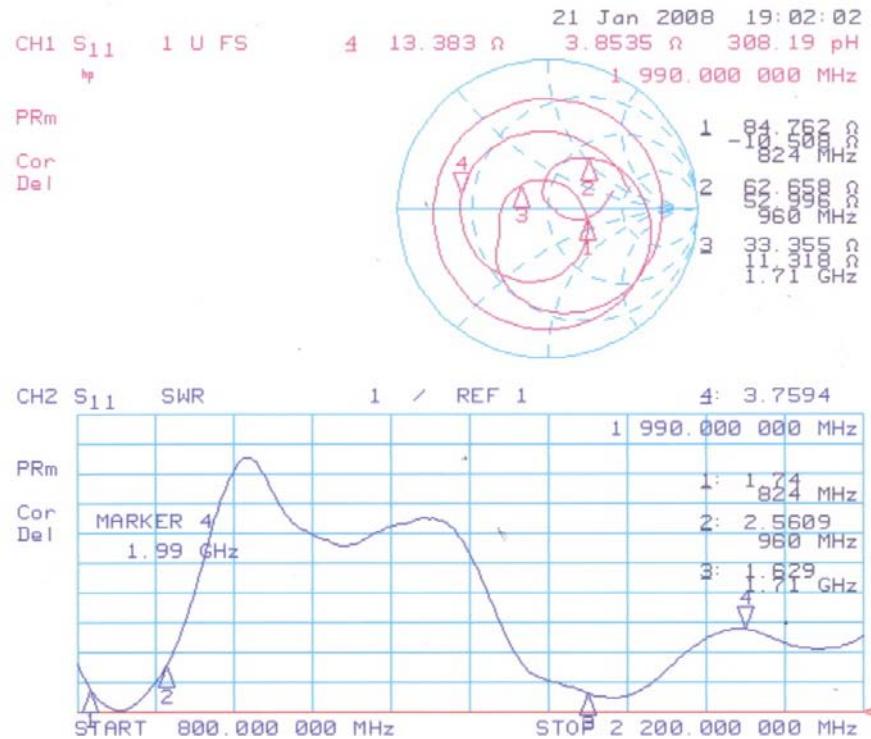
After the test, the antenna must not have an outer damage, and also it must pass requirement shown in 2.4.

3.3.3 Measuring Method

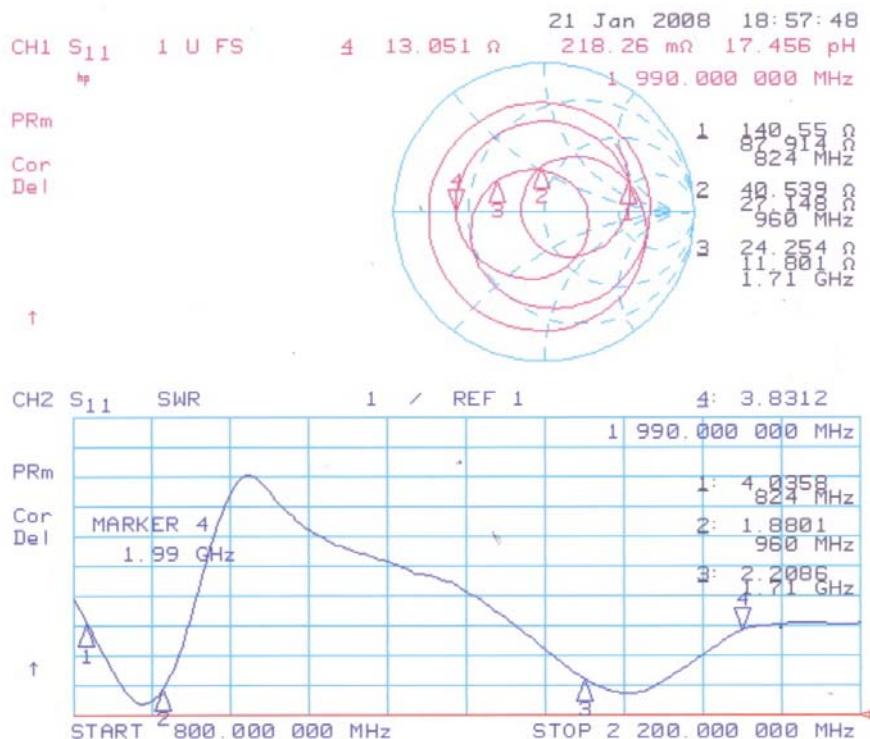
Antenna is soaked in sodium chloride solution at temperature $+60^{\circ}\text{C}$ and 90%(NaCl) for 96 hours and dry out.

4. Electric Performance Data

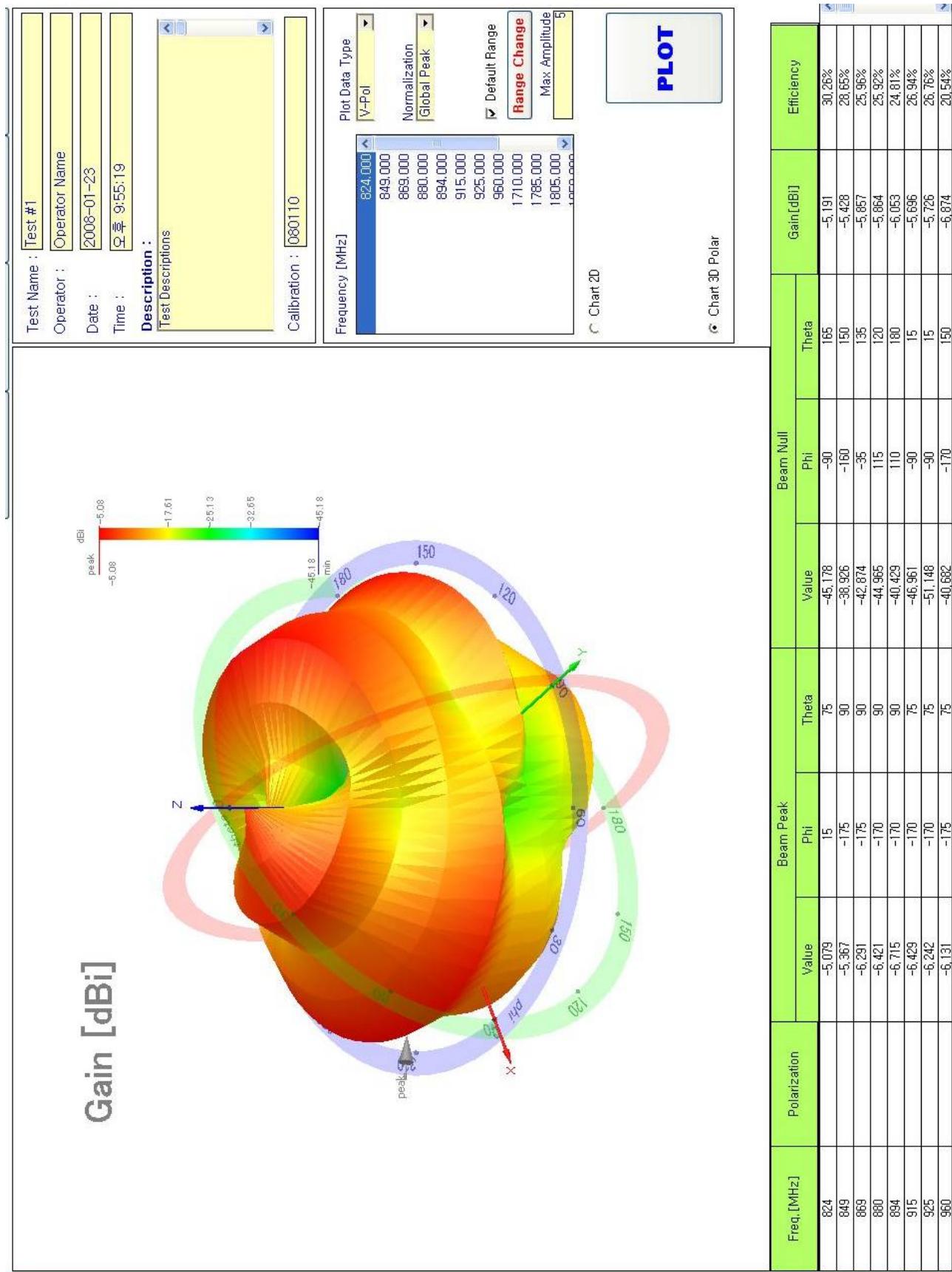
4.1.1. Smith Chart & VSWR (Slide Down)

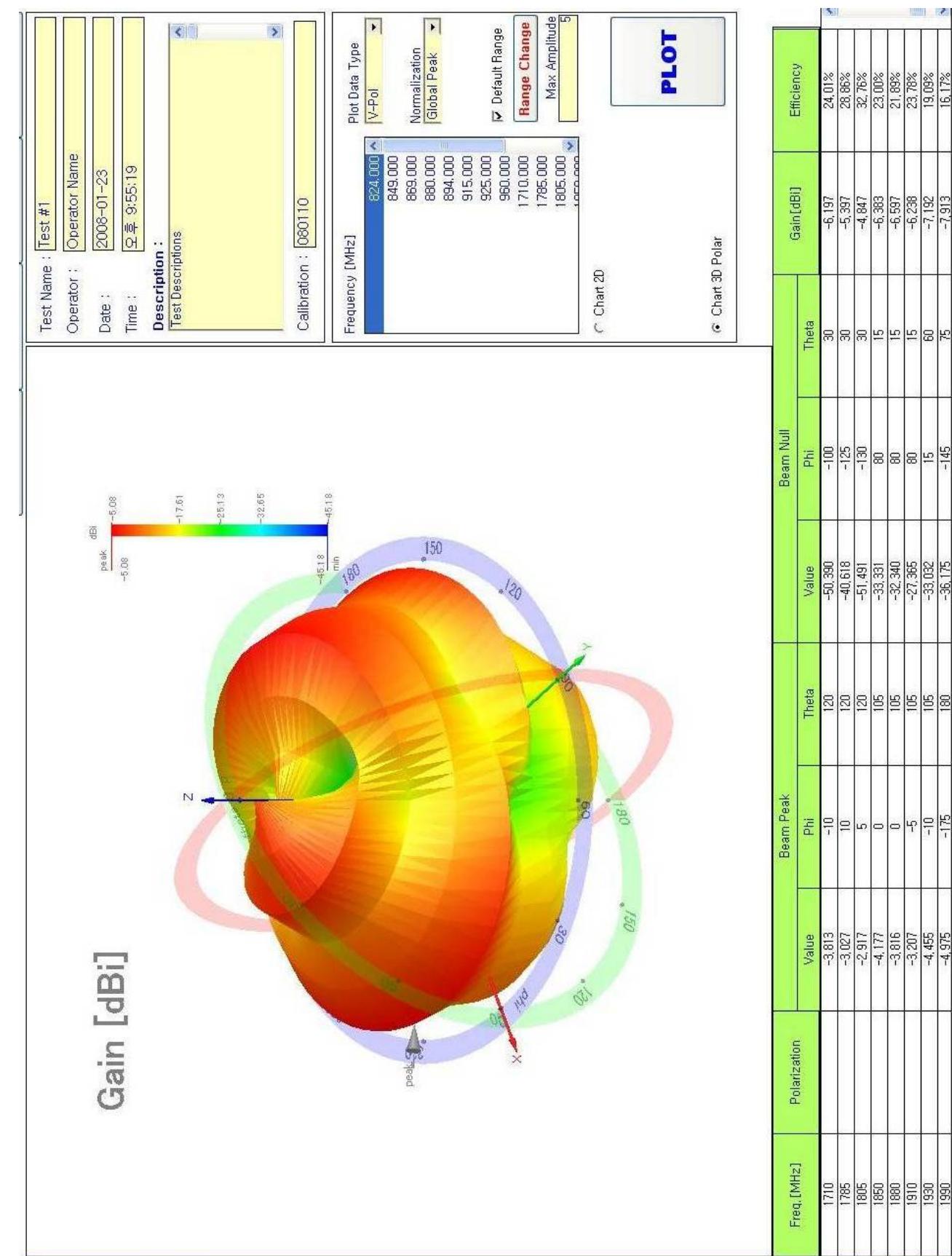


4.1.2. Smith Chart & VSWR (Slide Up)

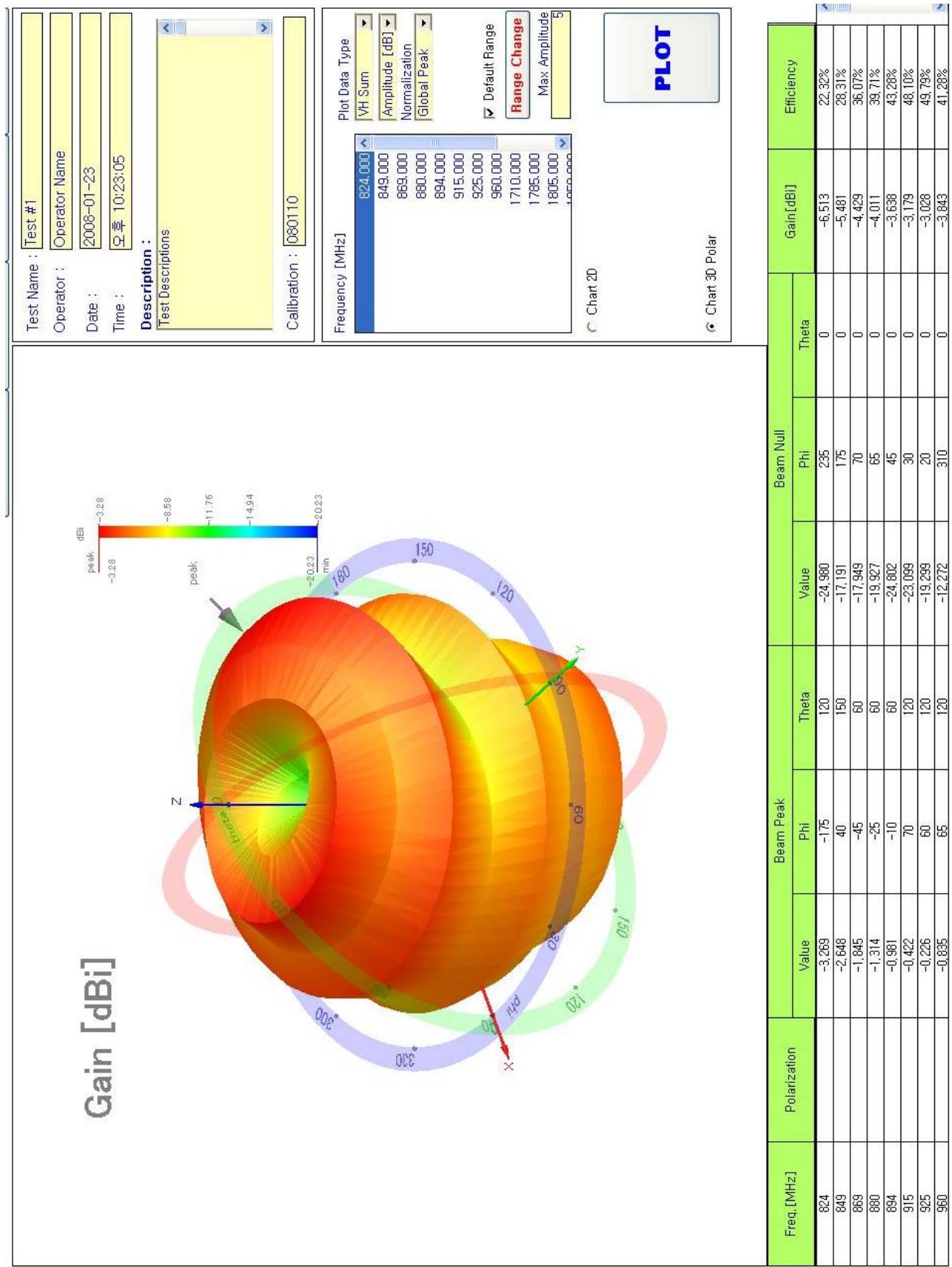


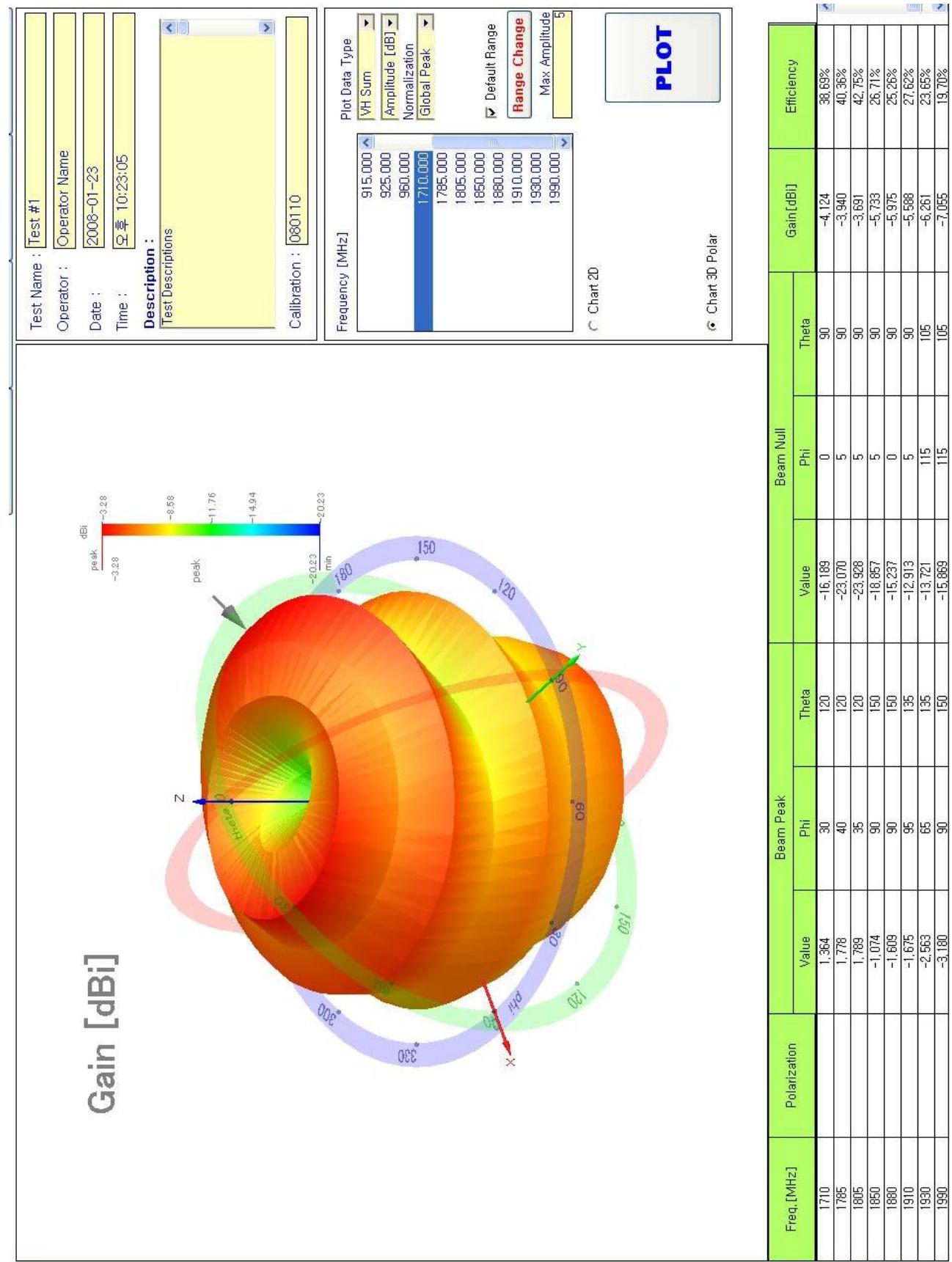
4.2.1. GAIN DATA (Slide Down)





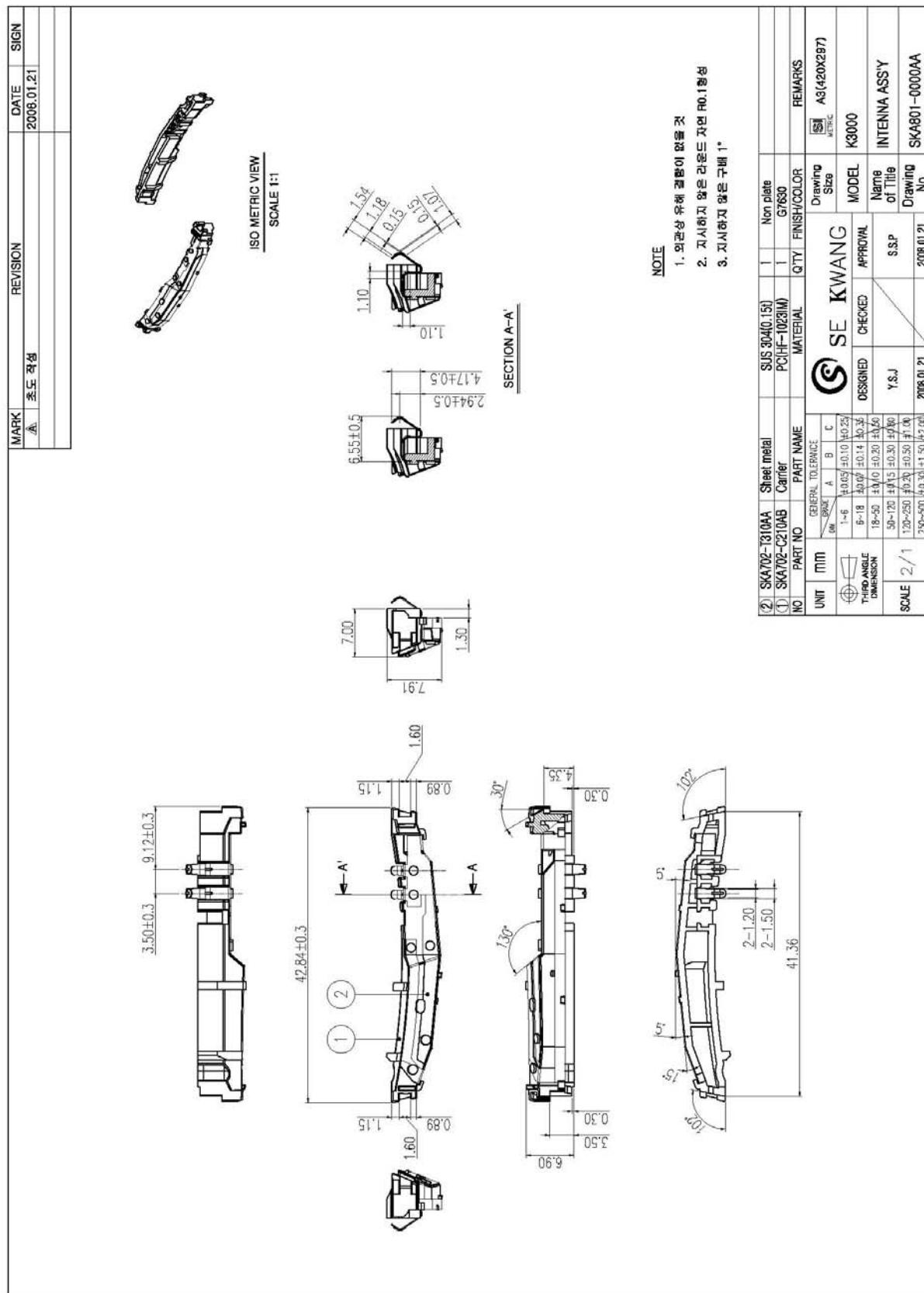
4.2.1. GAIN DATA (Slide Up)





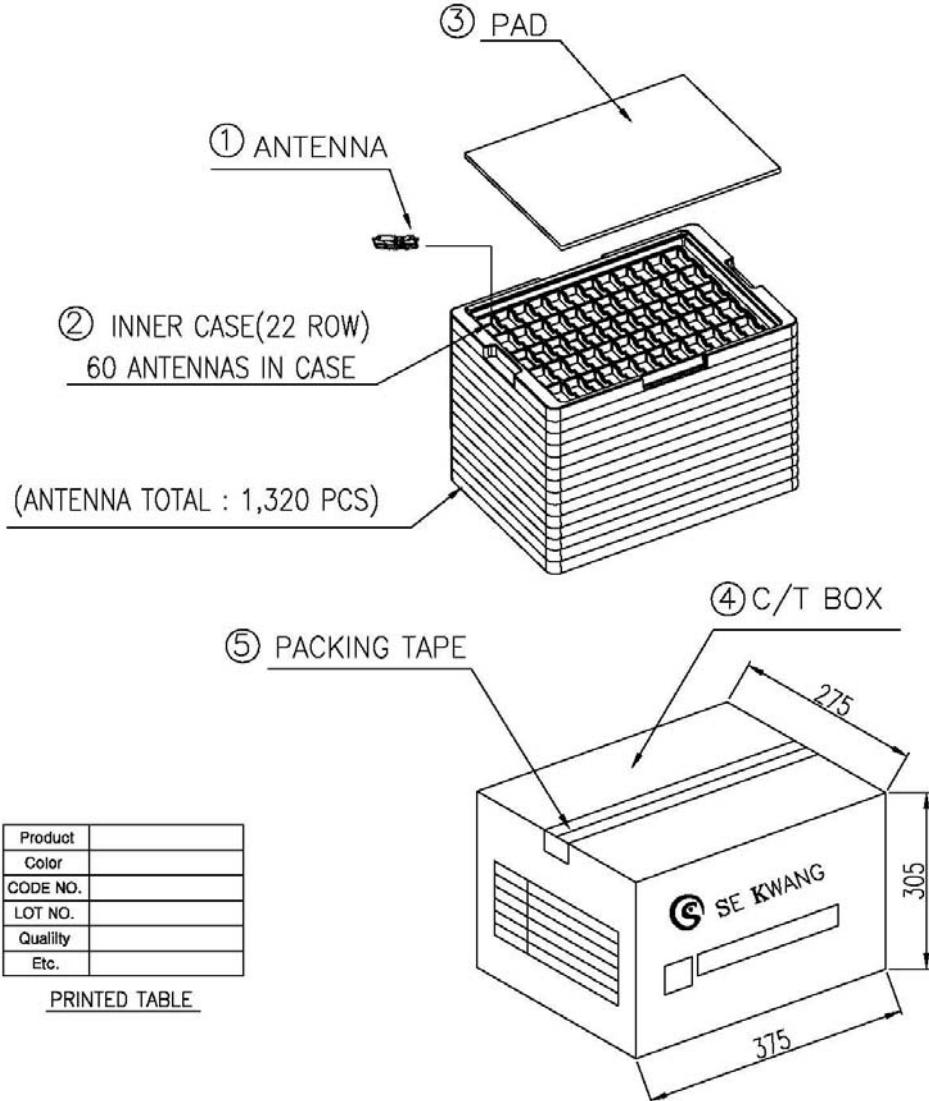


5. Drawing





6. Packing



NO	PART NAME	MATERIAL	Q'TY	REMARKS			
				DESIGNED	CHECKED	APPROVAL	Drawing Size SI METRIC A4(210X297)
⑤	PACKING TAPE		—	—			
④	C/T BOX	SW2	1				
③	PAD	SW1	1				
②	INNER CASE	P.S	22				
①	ANTENNA	—	1,320				
UNIT	MM	GENERAL TOLERANCE					
THIRD ANGLE DIMENSION		DIM	A	B	C		
		1~6	±0.05	±0.10	±0.25		
		6~18	±0.07	±0.14	±0.35		
		18~50	±0.10	±0.20	±0.50		
SCALE	1 / 2	50~120	±0.15	±0.30	±0.80		
		120~250	±0.20	±0.50	±1.00		
		250~500	±0.30	±1.50	±2.00		
						PARK.S.S	
						Model	PACKING
						Name of Title	
						Drawing No.	—



7. Certification of RoHS

7.1. CARRIER(PC HF-1023IM)

	CHEIL INDUSTRIES	ECO-013162 starex				
Result of RoHS						
Company	DAE SANG PRECISION					
Grade/Color	HF-1023IM/G7630					
Application	ANTENNA					
Organization	Chemicals R&D Center of Samsung Cheil Industries Inc.					
Material						
Section	Material	Remark				
Grade	HF-1023IM					
Color	G7630	A101,A502,CW01,DK04				
CHEIL INDUSTRIES Test Results						
Test Items	Test Method	Analyzer	Unit(ppm)	M.D.L	Contents	
Heavy Metals	Cd	EN 1122	ICP-AES	mg/kg	0.5	N.D
	Pb	US EPA 3050B	ICP-AES	mg/kg	5	N.D
	Hg	US EPA7473	Hg Analyzer	mg/kg	0.03	N.D
Flame Retardants	Cr ⁶⁺	USEPA 3060A	UV/VIS	mg/kg	1	N.D
	PBB	Cheil Method	GC/MS	mg/kg	5	N.D
	PBDE	Cheil Method	GC/MS	mg/kg	5	N.D

* This results are not violated Eu regulations * M.D.L : Method Detection Limit * ND : Not Detected

Charger : Choi, Sooman *Choi Sooman*, Approver : Han, Yeonjong *Y. J. Han*

Published Date : January 02, 2008

Approved Date : January 01, 2008

Quality Management Team



SE KWANG

7-2. SHEET METAL(STS 304)



Test Report No. F690501/LF-CTSAYA07-25042

Issued Date: November 14, 2007 Page 1 of 4

To: TAIHAN STAINLESS STEEL CO., LTD
603 Seonggok-dong
Danwon-gu
Ansan-city
GYEONGGI-DO
Korea

The following merchandise was submitted and identified by the client as :

Product Name : STS304
SGS File No. : AYA07-25042
Received Date : November 08, 2007
Test Performing Date : November 09, 2007
Test Performed : SGS Testing Korea tested the sample(s) selected by applicant with following results
Test Results : For further details, please refer to following page(s)
Buyer(s) : LG, SAMSUNG

SGS Testing Korea Co. Ltd.

Pluto Kim
Monet Jeong
Billy Oh / Testing Person

Jeff Jang / Chemical Lab Mgr

This document is issued by the Company subject to its General Conditions of Service printed overleaf or available on request and accessible at www.sgs.com. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. This document cannot be reproduced except in full, without prior approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this report is unlawful and offenders may be prosecuted to the fullest extent of the law.

F052 Version2

**Test Report No. F690501/LF-CTSAYA07-25042**

Issued Date: November 14, 2007 Page 2 of 4

Sample No. : AYA07-25042.001

Sample Description : STS304

Style/Item No. : N/A

Comments : Material is stainless steel.

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	0.5	N.D.
Lead (Pb)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	5	N.D.
Mercury (Hg)	mg/kg	US EPA 3052(1996), US EPA 6010B(1996), ICP	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	US EPA 3060A(1996), US EPA 7196A(1992), UV	1	N.D.

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Dibromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tribromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tetrabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Pentabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Hexabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Heptabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Octabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Nonabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Decabromobiphenyl	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Monobromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Dibromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tribromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Tetrabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Pentabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Hexabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Heptabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Octabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Nonabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.
Decabromodiphenyl ether	mg/kg	US EPA 3540C, GC/MS	5	N.D.

NOTE: (1) N.D. = Not detected.(<MDL)

(2) mg/kg = ppm

(3) MDL = Method Detection Limit

(4) - = No regulation

(5) ** = Qualitative analysis (No Unit)

(6) Negative = Undetectable / Positive = Detectable

This document is issued by the Company subject to its General Conditions of Service printed overleaf or available on request and accessible at www.sgs.com. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. Unless otherwise stated the results shown in this test report refer only to the sample (s) tested. This document cannot be reproduced except in full, without prior approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this report is unlawful and offenders may be prosecuted to the fullest extent of the law.

F052 Version2



SE KWANG



Test Report No. F690501/LF-CTSAYA07-25042

Issued Date: November 14, 2007 Page 3 of 4

Picture of Sample as Received:

Sample Color : Silver



NOTE:

- (1) N.D. = Not detected.(<MDL)
- (2) mg/kg = ppm
- (3) MDL = Method Detection Limit
- (4) - = No regulation
- (5) ** = Qualitative analysis (No Unit)
- (6) Negative = Undetectable / Positive = Detectable

This document is issued by the Company subject to its General Conditions of Service printed overleaf or available on request and accessible at www.sgs.com. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. Unless otherwise stated the results shown in this test report refer only to the sample (s) tested. This document cannot be reproduced except in full, without prior approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this report is unlawful and offenders may be prosecuted to the fullest extent of the law.

F052 Version2



SE KWANG

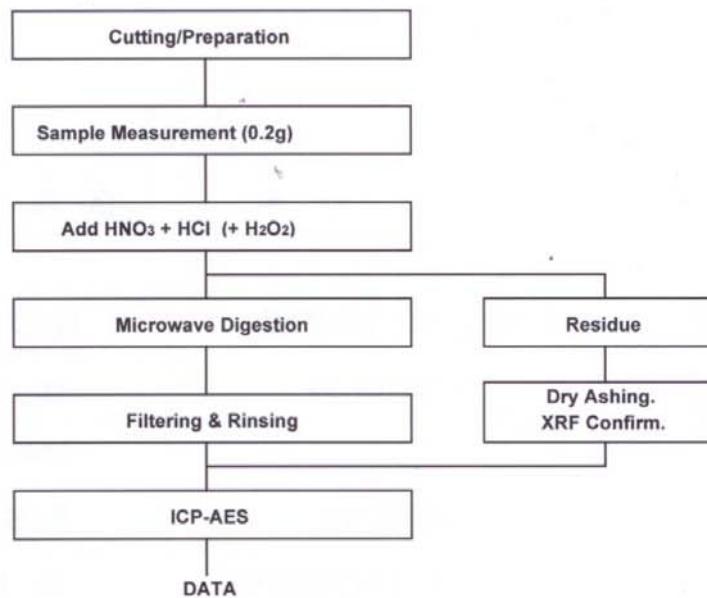
SGS

Test Report No. F690501/LF-CTSAYA07-25042

Issued Date: November 14, 2007 Page 4 of 4

Flow Chart of Digestion

(EPA 3052 for Cd, Pb)



The samples were dissolved totally by pre-conditioning method according to above flow chart.

Operator Dami Yeom

Section Chief Jeff Jang

*** End ***

NOTE: (1) N.D. = Not detected.(<MDL)
(2) mg/kg = ppm
(3) MDL = Method Detection Limit
(4) - = No regulation
(5) ** = Qualitative analysis (No Unit)
(6) Negative = Undetectable / Positive = Detectable

This document is issued by the Company subject to its General Conditions of Service printed overleaf or available on request and accessible at www.sgs.com. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. This document cannot be reproduced except in full, without prior approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this report is unlawful and offenders may be prosecuted to the fullest extent of the law.

F052 Version2