No. : SEKWANG 2008-02

Date :2008. 01. 18

SPECIFICATION

Product Name	ANTENNA
Customer	EZZEMOBILE
Model Name	MEGA3(900)
Customer Code.	
Provider	SE KWANG
Part Code.	SKE708-0000AA

Buyer	Submitted	Checked		Approved
SE KWANG	Submitted	Checked	Checked	Approved
				

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2.1 Frequency Band
2.2 Impedance
2.3 Matching circuit
2.4 VSWR
2.5 Directivity
2.6 Maximum Power

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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	GSM900		DCS1800		PCS	
FREQUENCY	Tx	Rx	Tx	Rx	Tx	Rx
	880MHz ~ 915MHz	925MHz ~ 960MHz	1710MHz ~ 1785MHz	1805MHz ~ 1880MHz	1850MHz ~ 1910MHz	1930MHz ~ 1990MHz

2.2 Impedance

2.2.1 Input Impedance

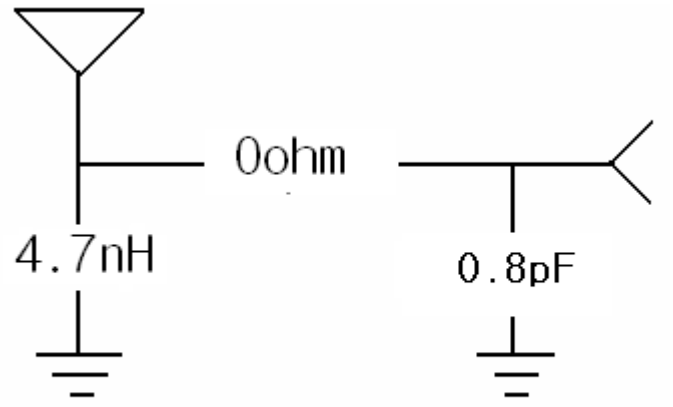
- R =50Ω

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	GSM900		DCS1800	PCS
FREQ	880MHz	960MHz	1710MHz	1990MHz
Down	2.5:1	5:1	3.5:1	5.5:1
Up	2.5:1	3:1	3:1	4.5:1

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		GSM900	DCS1800	PCS
Down	Avg.	-4.9dBi	-5.0dBi	-6.1dBi
	Peak	-2.2dBi	-1.0dBi	-1.5dBi
Up	Avg.	-2.3dBi	-4.3dBi	-5.8dBi
	Peak	0dBi	-1.0dBi	-2.5dBi

2.6 Maximum Power

- **P=2W Under**

3. Environment Test

3.1 Operating Temperature Test

3.1.1 Test Condition

Temperature = -30℃, +80℃

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℃ for 1 hour and +80℃ 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℃
- High cycling Temperature THC = +80℃
- 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℃ for 2 hours and increase the temperature up to +80℃ 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.

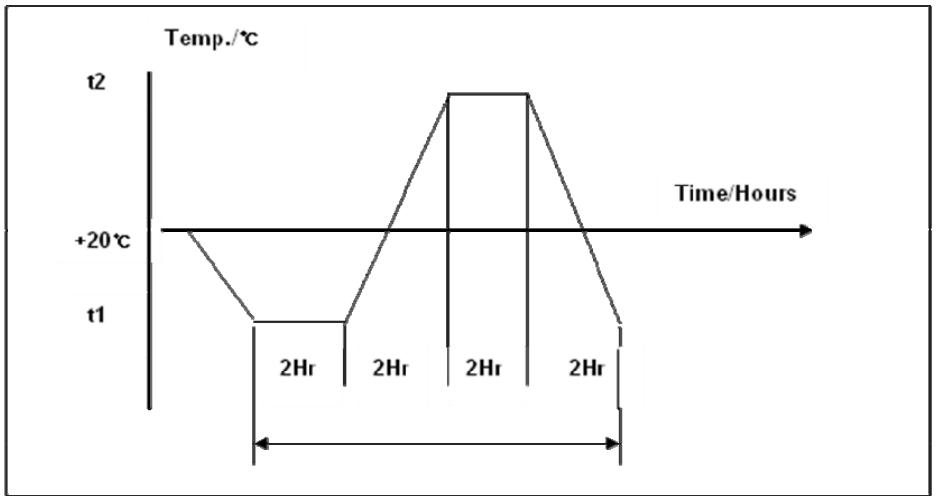


Figure 3.2.1 Temperature Cycling

3.3 Corrosion Resistance Test

3.3.1 Test Condition

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

3.3.2 Requirements

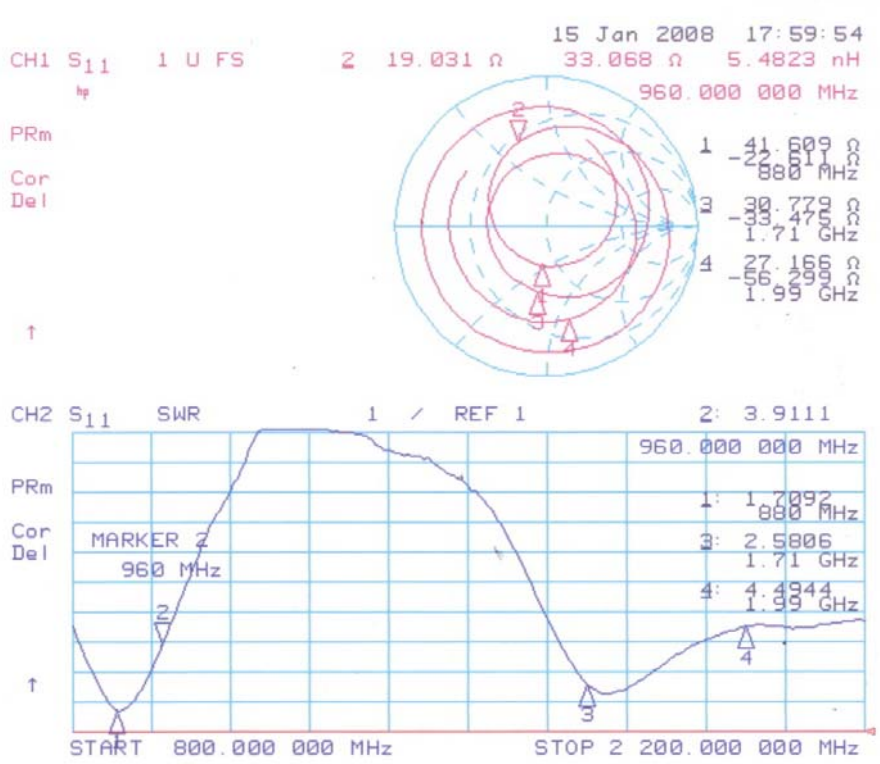
After the test, the antenna must not have an outer damage, and also it must pass requirement shown in 2.4.

3.3.3 Measuring Method

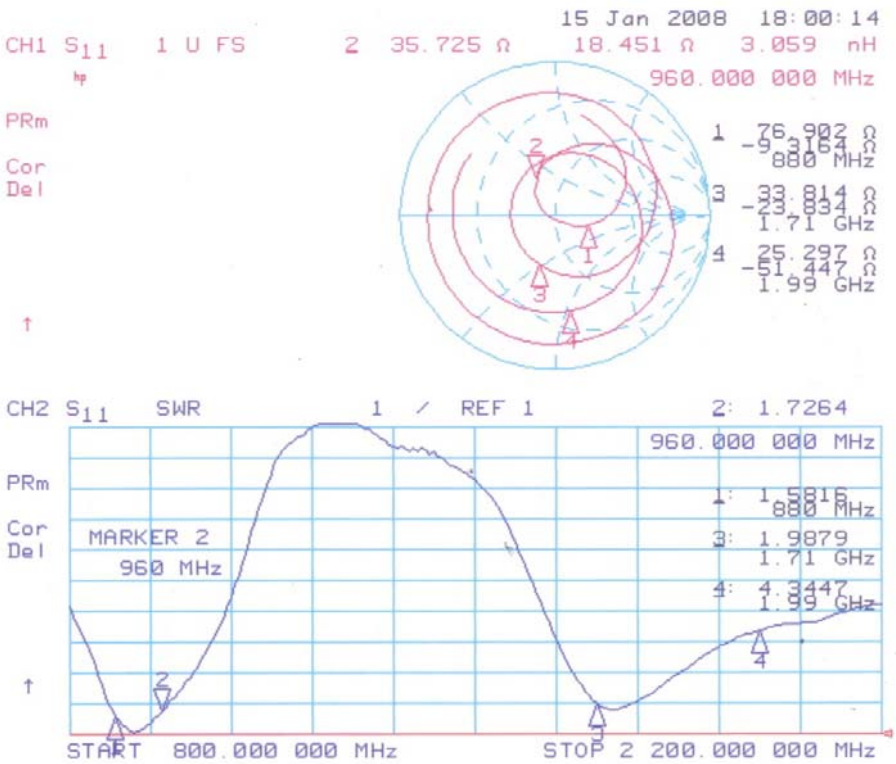
Antenna is soaked in sodium chloride solution at temperature +60℃ and 90%(NaCl) for 96 hours and dry out.

4. Electric Performance Data

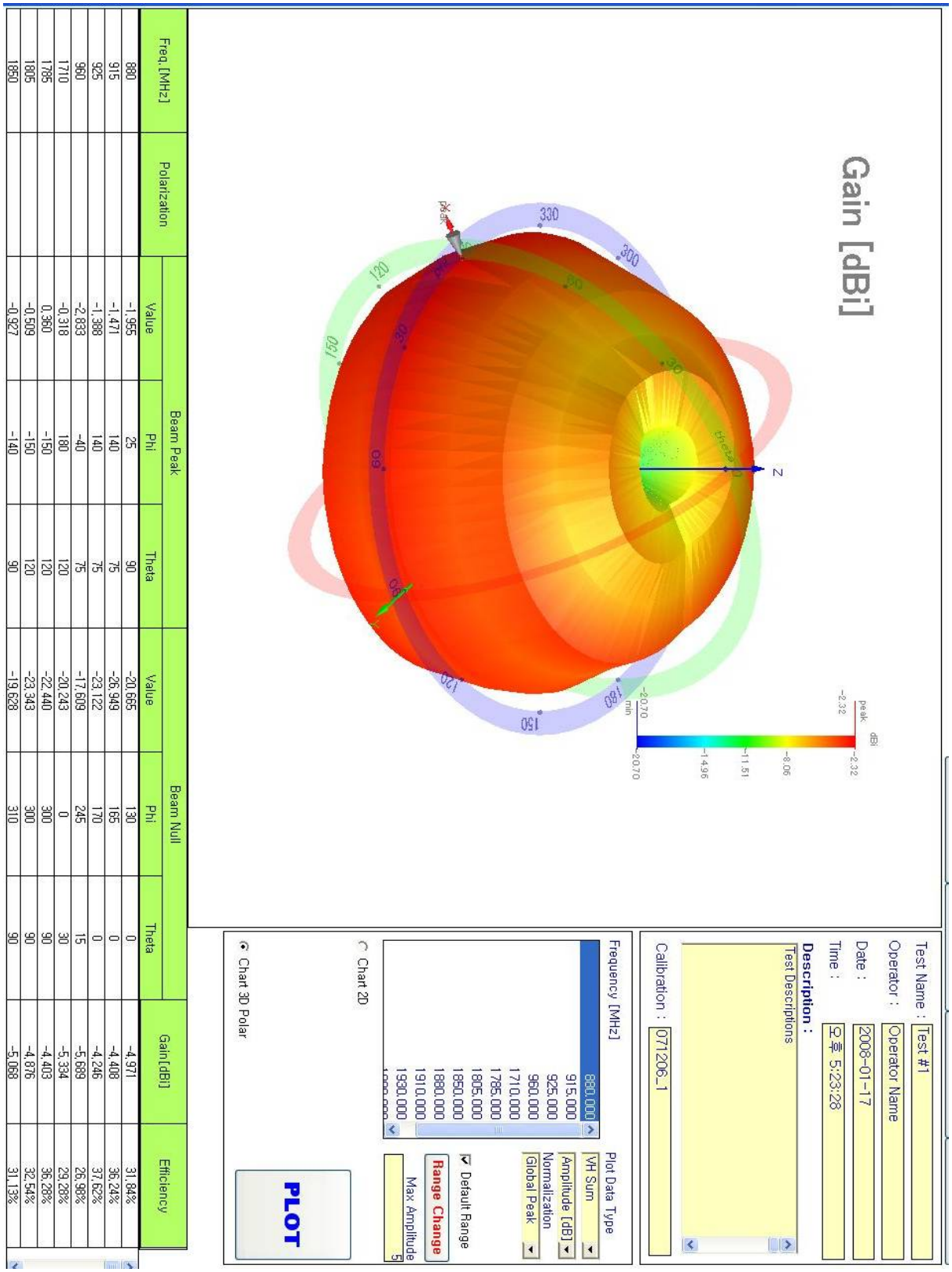
4.1.1. Smith Chart & VSWR (Slide Down)



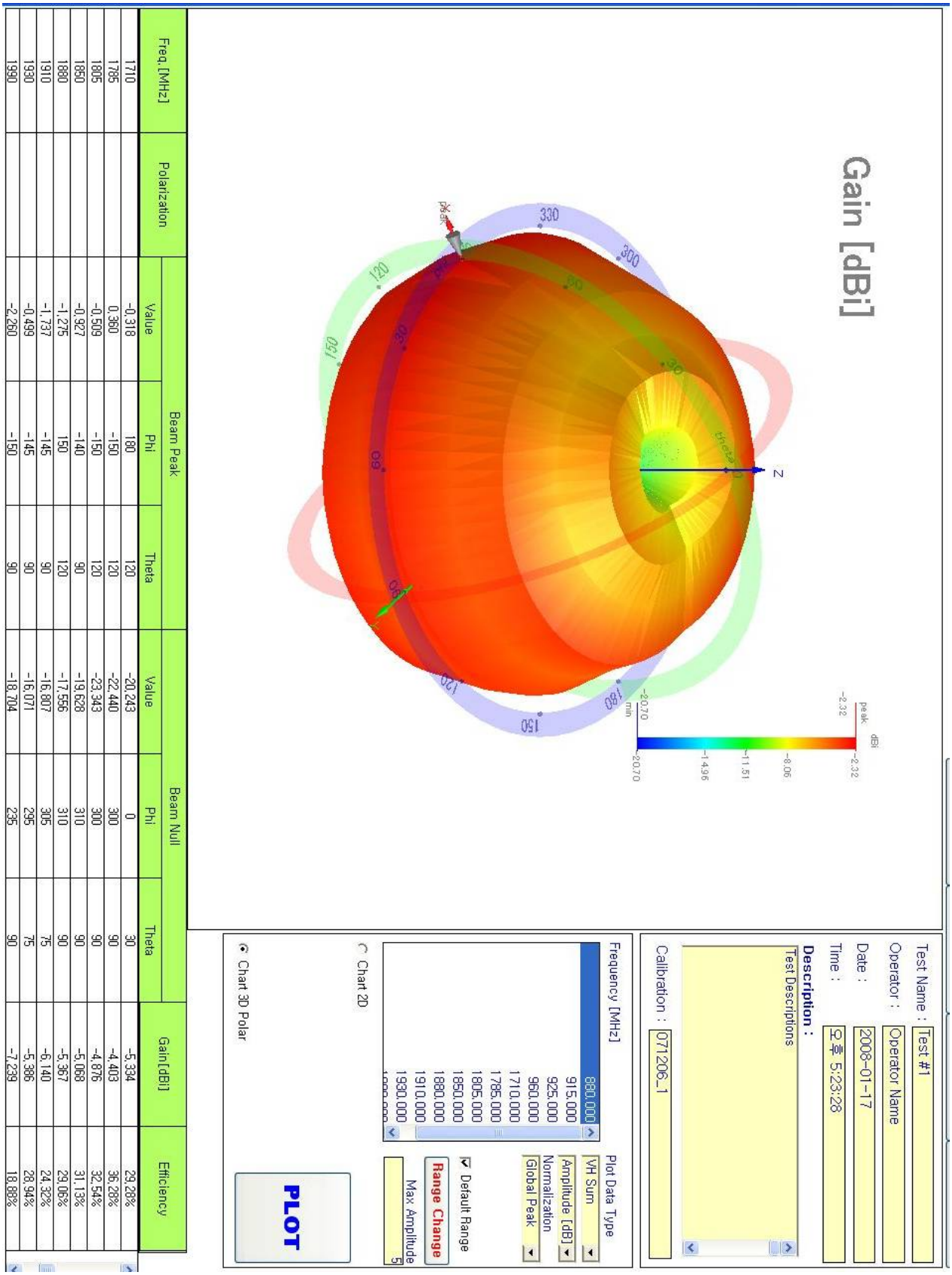
4.1.2. Smith Chart & VSWR (Slide Up)



4.2.1. GAIN DATA (Slide Down)

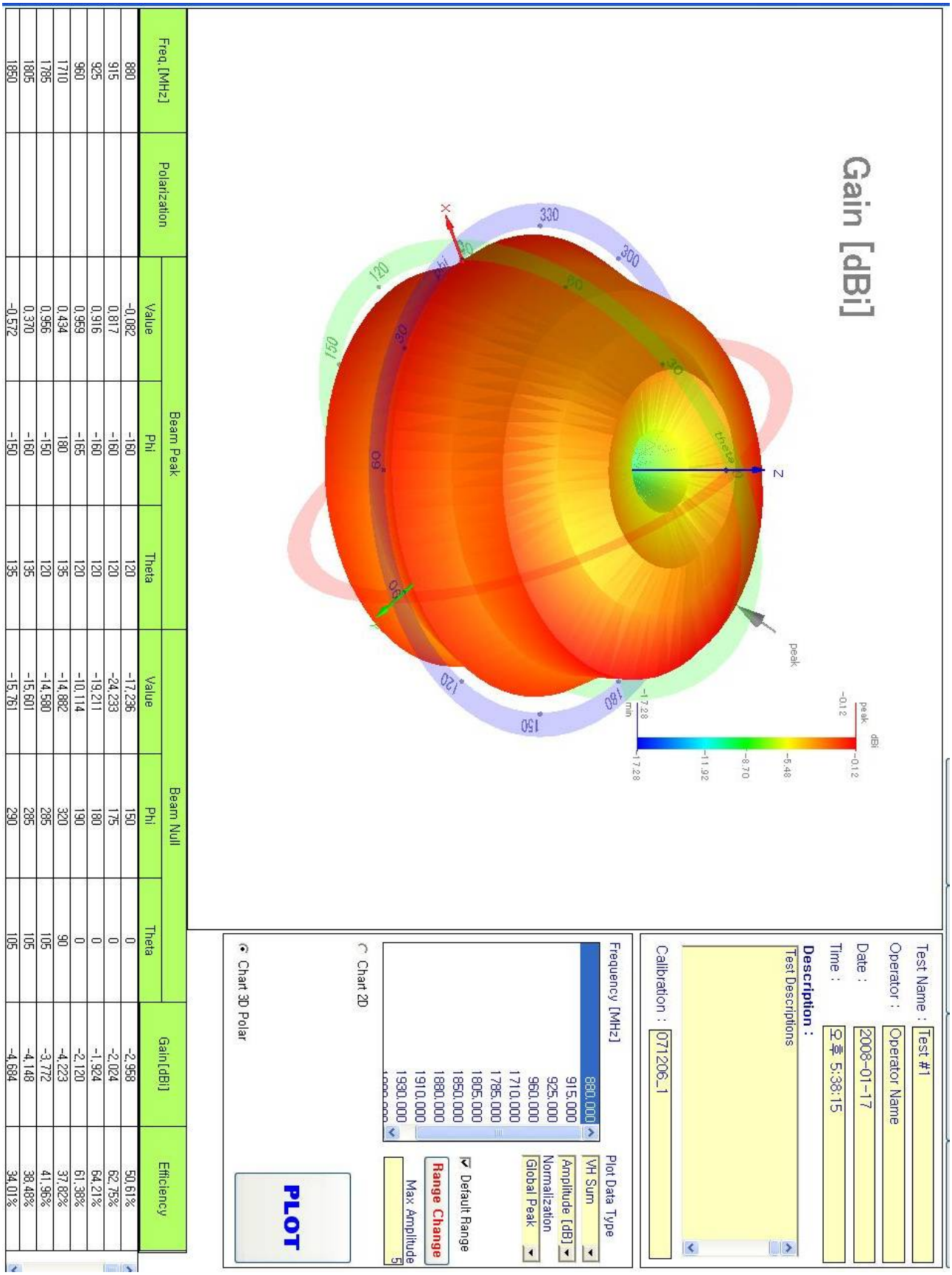


Freq.[MHz]	Polarization	Beam Peak			Beam Null			Gain[dBi]	Efficiency
		Value	Phi	Theta	Value	Phi	Theta		
880		-1.955	25	90	-20.665	130	0	-4.971	31.84%
915		-1.471	140	75	-26.949	165	0	-4.408	36.24%
925		-1.388	140	75	-23.122	170	0	-4.246	37.62%
960		-2.833	-40	75	-17.609	245	15	-5.689	26.98%
1710		-0.318	180	120	-20.243	0	30	-5.334	29.28%
1785		0.360	-150	120	-22.440	300	90	-4.403	36.28%
1805		-0.509	-150	120	-23.343	300	90	-4.876	32.54%
1850		-0.927	-140	90	-19.628	310	90	-5.068	31.13%

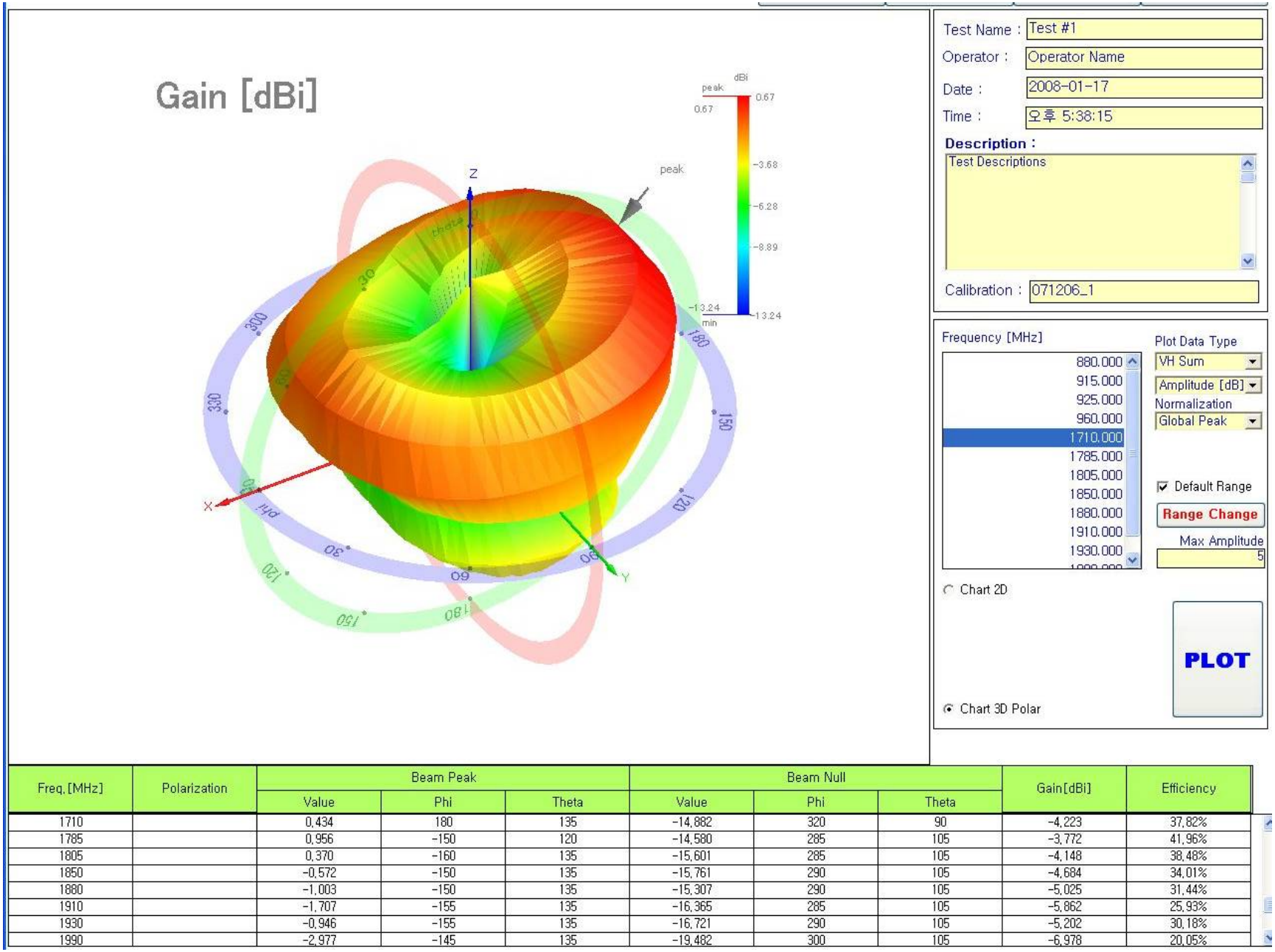


Freq.[MHz]	Polarization	Beam Peak			Beam Null			Gain[dBi]	Efficiency
		Value	Phi	Theta	Value	Phi	Theta		
1710		-0.318	180	120	-20.243	0	30	-5.334	29.28%
1785		0.360	-150	120	-22.440	300	90	-4.403	36.28%
1805		-0.509	-150	120	-23.343	300	90	-4.876	32.54%
1850		-0.927	-140	90	-19.628	310	90	-5.068	31.13%
1880		-1.275	150	120	-17.556	310	90	-5.367	29.06%
1910		-1.737	-145	90	-16.807	305	75	-6.140	24.32%
1930		-0.499	-145	90	-16.071	295	75	-5.386	28.94%
1990		-2.260	-150	90	-18.704	235	90	-7.239	18.88%

4.2.1. GAIN DATA (Slide Up)



Freq.[MHz]	Polarization	Beam Peak				Beam Null				Gain[dBi]	Efficiency
		Value	Phi	Theta		Value	Phi	Theta			
880		-0.082	-160	120		-17.236	150	0		-2.958	50.61%
915		0.817	-160	120		-24.233	175	0		-2.024	62.75%
925		0.916	-160	120		-19.211	180	0		-1.924	64.21%
960		0.959	-165	120		-10.114	190	0		-2.120	61.38%
1710		0.434	180	135		-14.882	320	90		-4.223	37.82%
1785		0.956	-150	120		-14.580	285	105		-3.772	41.96%
1805		0.370	-160	135		-15.601	285	105		-4.148	38.48%
1850		-0.572	-150	135		-15.761	290	105		-4.684	34.01%



Test Name : Test #1
Operator : Operator Name
Date : 2008-01-17
Time : 오후 5:38:15
Description :
Test Descriptions
Calibration : 071206_1

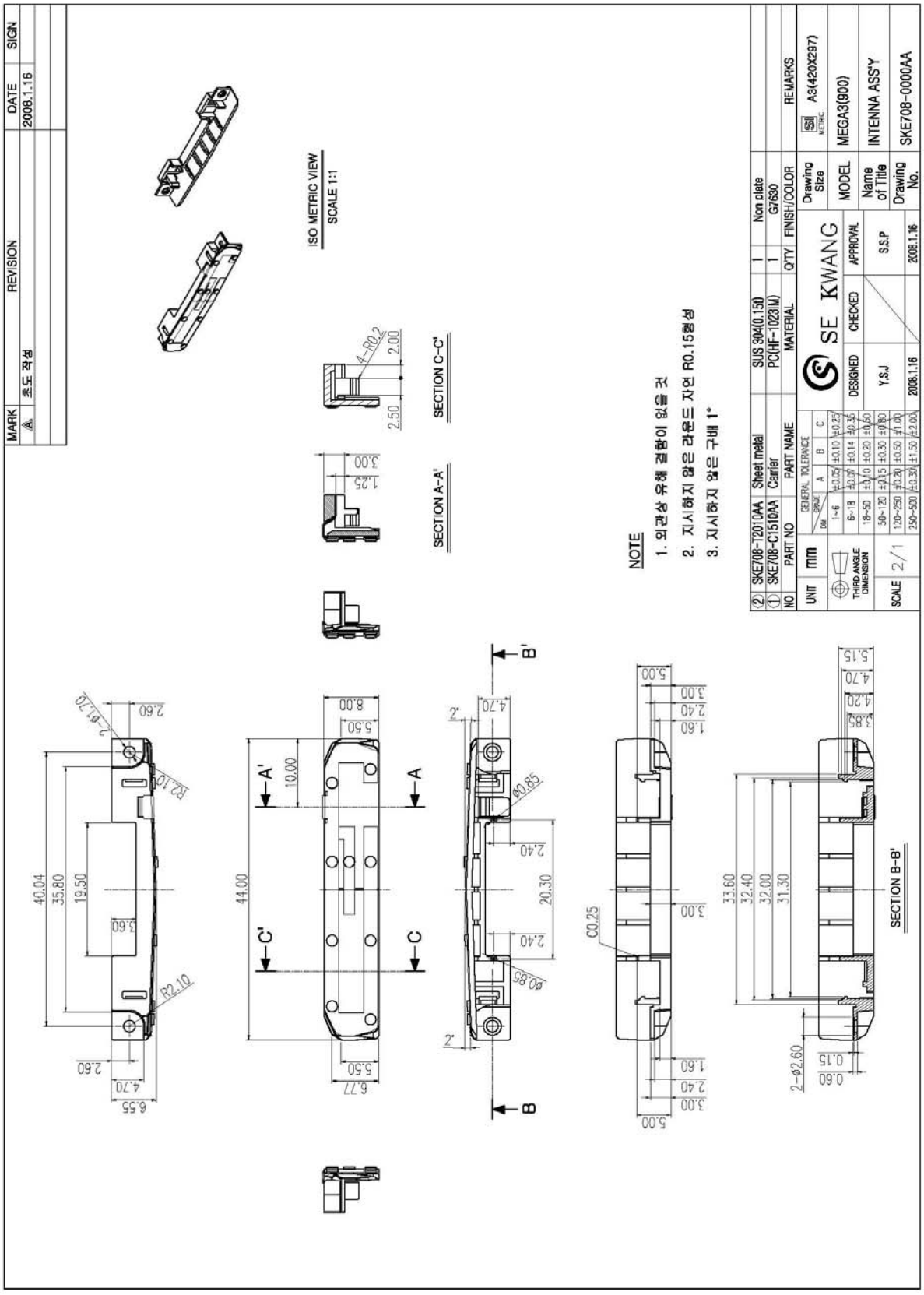
Frequency [MHz]
880.000
915.000
925.000
960.000
1710.000
1785.000
1805.000
1850.000
1880.000
1910.000
1930.000

Plot Data Type
VH Sum
Amplitude [dB]
Normalization
Global Peak
Default Range
Range Change
Max Amplitude
5

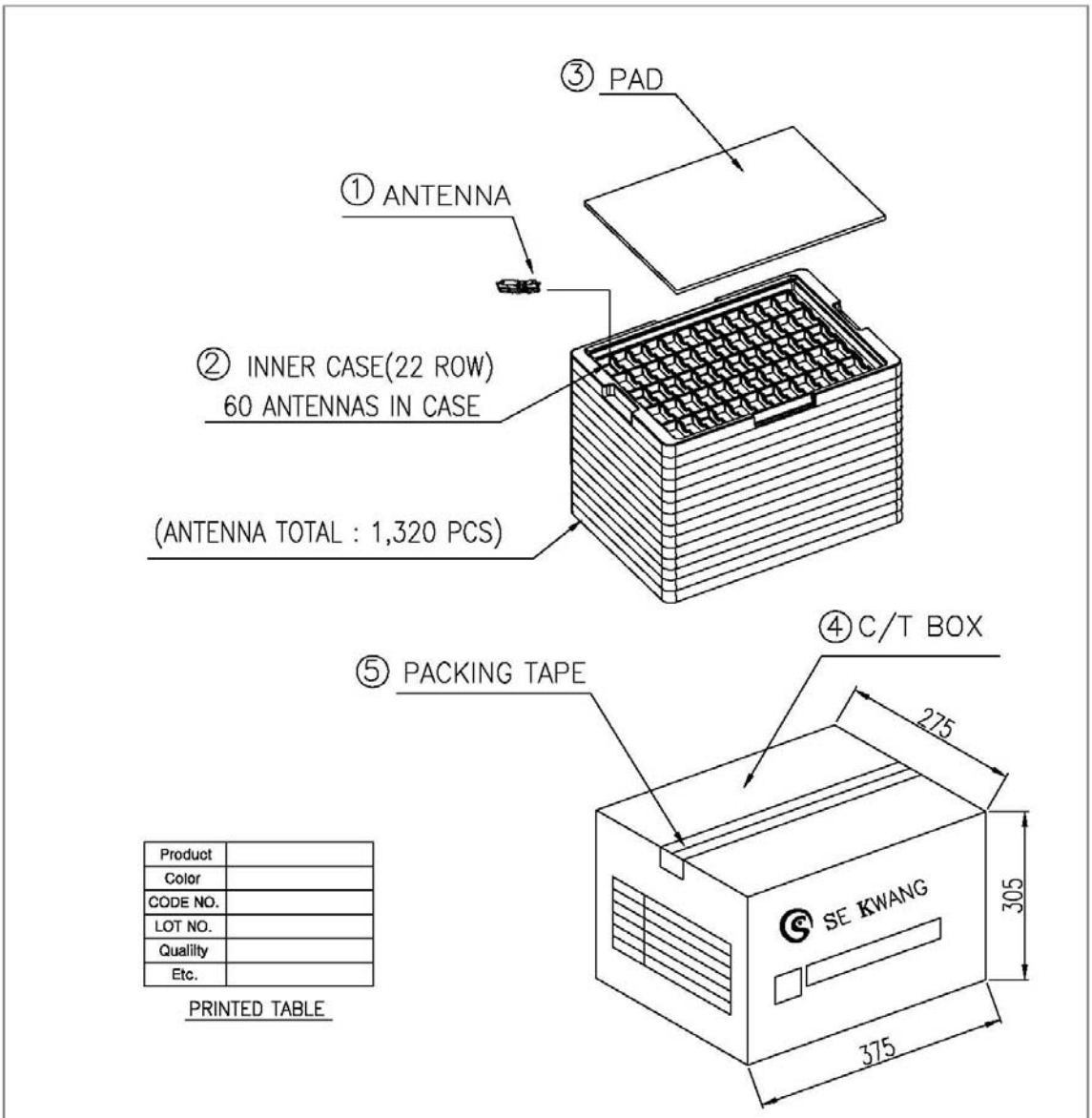
Chart 2D
Chart 3D Polar
PLOT

Freq. [MHz]	Polarization	Beam Peak			Beam Null			Gain[dBi]	Efficiency
		Value	Phi	Theta	Value	Phi	Theta		
1710		0.434	180	135	-14.882	320	90	-4.223	37.82%
1785		0.956	-150	120	-14.580	285	105	-3.772	41.96%
1805		0.370	-160	135	-15.601	285	105	-4.148	38.48%
1850		-0.572	-150	135	-15.761	290	105	-4.684	34.01%
1880		-1.003	-150	135	-15.307	290	105	-5.025	31.44%
1910		-1.707	-155	135	-16.365	285	105	-5.862	25.93%
1930		-0.946	-155	135	-16.721	290	105	-5.202	30.18%
1990		-2.977	-145	135	-19.482	300	105	-6.978	20.05%

5. Drawing


ISO METRIC VIEW
SCALE 1:1
SECTION A-A'
SECTION C-C'
SECTION B-B'
NOTE
1. 외관상 유해 결함이 없을 것
2. 지시하지 않은 라운드 자연 R0.15형성
3. 지시하지 않은 구배 1°
SE KWANG
SKE708-0000AA
INTENNA ASS'Y
MEGA3(900)
A3(420X297)
2008.1.16
Y.S.J
S.S.P

6. Packing



Product	
Color	
CODE NO.	
LOT NO.	
Quality	
Etc.	

PRINTED TABLE

NO	PART NAME	MATERIAL	Q'TY	FINISH//COLOR	REMARKS
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			
		DIM \ GRADE	A	B	C
THIRD ANGLE DIMENSION		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

SE KWANG

DESIGNED	CHECKED	APPROVAL
		PARK.S.S

Drawing Size	METRIC A4(210X297)
MODEL	PACKING
Name of Title	
Drawing No.	–

7.Certification of RoHS

7.1. CARRIER(PC HF-1023IM)

ECO-013162

SAMSUNG CHEIL INDUSTRIES starex

Result of RoHS

Company	DAE SANG PRECISIDN
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

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
	Cr^{6+}	USEPA 3060A	UV/VIS	mg/kg	1	N.D
Flame Retardants	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 Approver :Han,Yeonjong

Published Date : January 02. 2008

Approved Date : January 01. 2008

Quality Management Team

7-2. SHEET METAL(STS 304)

SGS

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

Jeff Jang / Chemical Lab Mgr

F052 Version2

SGS

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

F052 Version2

SGS

Test Report No. F690501/LF-CTSAYA07-25042 Issued Date: November 14, 2007 Page 3 of 4

Picture of Sample as Received:

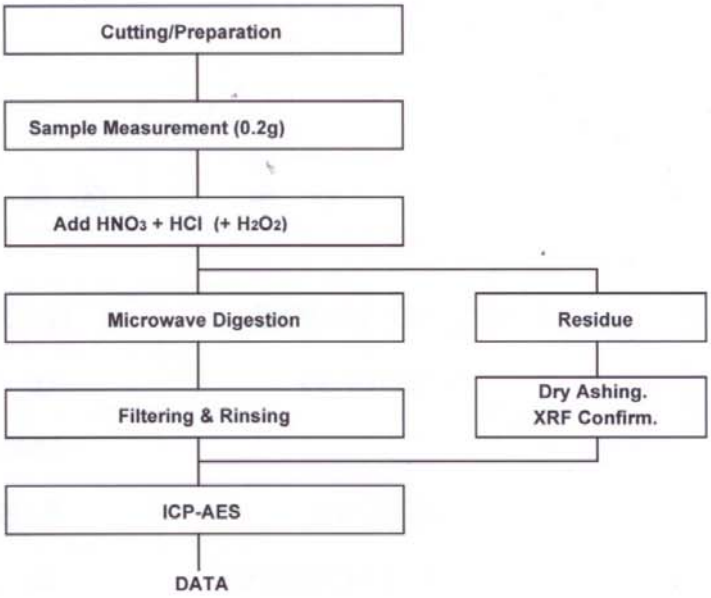
Sample Color : Silver

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

F052 Version2

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