CDMA2000 1x
WIRELESS LOCAL LOOP
FIXED TELEPHONE
CWF-1x 1900/800
Product Specification

Contents

1. Scope

1.1 Purpose

The purpose of this document is to define the product specifications for the CDMA2000 1x Wireless Local Loop Fixed Telephone ("CWF").

1.2 General Descriptions

CDMA is a modulation and multiple access scheme based on the spread-spectrum communication technology. Individual terminals use spread-spectrum techniques and occupy the entire spectrum whenever they transmit. Users share time and frequency allocations, and are channelized by unique assigned codes. Signals of different users are separated at the receiver by using a correlator that captures signal energy only from the desired user or channel. Undesired signals contribute only to noise and interference.

CWF has the following main features:

- CDMA2000 1X
- 2Line, 1Icon LCD
- Packet Data Speed (Up to 153.6 Kbps)
- Circuit Data Speed (Up to 14.4 Kbps) *
- Generate Dial tone
- Caller ID*
- R-UIM (Non UIM for Software Option)
- Call Waiting*
- Call Forwarding*
- Three-way Calling*
- Signal Strength Indicator LED
- Power LED
- RS-232C and USB Data Port for Data Service (Cable dependent)
- Automatic Sending
- Vocoder: 13KQ-CELP, 8K EVRC

*: Network Dependent Features

2. Applicable Documents

The following standards constitute provision of CWF.

1.	3GPP2 C.S0001	Introduction to CDMA2000 standards for Spread Spectrum Systems
2.	3GPP2 C.S0002	Physical Layer Standard for CDMA2000 Spread Spectrum Systems
3.	3GPP2 C.S0003	Medium Access Control (MAC) Standard for CDMA2000 Spread Spectrum Systems
4.	3GPP2 C.S0004	Signaling Link Access Control (LAC) Standard for CDMA2000 Spread Spectrum Systems
5.	3GPP2 C.S0005	Upper Layer (Layer 3) Signaling Standard for CDMA2000 Spread Spectrum Systems
6.	3GPP2 C.S00011-B	Recommended Minimum Performance standards for CDMA2000 Spread Spectrum Mobile Stations
7.	3GPP2 C.S00015-A	Short Messages Services for Wideband Spread Spectrum Systems
8.	TIA/EIA/IS-707-A	Data Service Options for Wideband Spread Spectrum Systems

3. Specifications

3.1 General Specifications

Item			Specification
Frequency Range	CWF-1x 1900	Transmitter	1850 ~ 1910 MHz
		Receiver	1930 ~ 1990 MHz
	CWF-1x 800	Transmitter	824.64 ~ 848.37 MHz
		Receiver	869.64 ~ 893.37 MHz
Input / Output Impedance			50 ohm
Frequency Accuracy			CDMA 2000 1x Compliant
Operating Temperature			-10 ~ +50 (℃)
Storage Temperature (Battery exclude)			-25 ~ +75(℃)
Operation Humidity			5% ~ 90%
Battery Backup Time		Standby	72hr
		Talk	2hr
AC Adapter Input			AC 110~240 V, 50~60 Hz

3.1.1 Transmitter

Item	Specification	Remark
Waveform Quality Factor	0.944 or more	
Open loop Output Power Range	CDMA 2000 1x Compliant	
Closed Loop Power Control Range	UP: > +24 dBm DOWN: < -24 dBm	
Static Timing offset	±1 μs	
Amplitude Error (Percent)	0 ~ 100	
Phase Error (Degree)	0 ~ 90	
Maximum RF Output Power	630 mW (+28 dBm)	
Minimum Tx Power Control	-50 dBm below	
Occupied Bandwidth	1.32MHz	
Conducted Spurious Emissions	CDMA 2000 1x Compliant	

3.1.2 Receiver

Item	Specification	Remark
RX Sensitivity	CDMA 2000 1x Compliant	
Dynamic Range	-104 dBm ~ -25 dBm	
RX conducted spurious emission	CDMA 2000 1x Compliant	

3.1.3 LED

LED	Color	Condition	Meaning
POWER	-	OFF	Power off
	GREEN	ON	Power On and Rx Condition Very good status
	ORANGE		Power On and Rx Condition good status
	RED		Power On and Rx Condition poor status
	RED/GREEN/ORANGE	Blinking	Ring (Incoming Call)

3.1.4 ICON

ICON Shape	Meaning	Meaning
	Signal Strength	Indicate the strength of the current signal. The more bars, the stronger signal.
	Battery Status	Indicate the level of the battery power. The more bars the more power. When the battery low, the icon blinks and the alert tone sound.
	Menu Edit	Indicate that you are using the phone's menu.
	Alarm	Indicate that you are set the phone's alarm.
	Phonebook mode	Indicate that you are in the internal phone's phonebook book.
	Message	Flashes when you have a page, a text or a voice mail message.
	In Use	Indicate that a call in progress.

3.1.5 Sound Indications

Type	Condition	Meaning
Normal dial tone	Freq: 350 + 440 Hz Cadence: Continuous Duration: 30s ±2s	The CWF is in-service with adequate receive signal. ** Dial tone frequency is changeable.
No service tone	Frequency: 425Hz Cadence: 1.8s on / 0.8s off, 0.33s on / 0.8s off	CWF is not capable of making or receiving calls.
Outgoing call restriction tone	Frequency: 425Hz Cadence:0.8s on/0.2s off	CWF is not capable of making calls but is capable of receiving calls.
Howler tone	Frequency: 1400+2060/ 2450+2600Hz Cadence: 100ms on/ 100ms off	The handset is not properly laid down. Checking the handset.

3.1.6 Adapter

Item		Specification	Remark
Input	Voltage	AC110V/220V (AC90 ~ AC265V)	
	Current	0.2A@ AC110V 0.15A@ AC220V	
	Frequency	50/60Hz (47~63Hz)	
Output	Voltage	5V DC Typical	
	Current	2A(MAX)	
	Ripple Noise	1%	
Operation Temperature		-10℃ ~ +50℃	
Humidity		30% ~ 85% RH	

3.1.7 Battery

Item	Specification	Remark
Cell Type	Rechargeable Lithium Ion Cylindrical Cell	
Nominal Voltage	3.7V	
Max. Charge Voltage	4.20 V	
Number of Cell	1	
Capacity	2000mAh (20℃)	Min: 1950mAh
Service Life	500 cycles	70% of initial capacity
Ambient Temperature Range	Charge : 0 to 45 ℃ Discharge : -30 to 60 ℃ Storage : -20 to 45 ℃	
Internal Resistance	110 mΩ (at 1000Hz)	

3.1.8 Frequency Bands

CWF 1x800 product shall support CDMA IS-2000, Band Class 0 (800MHz). CWF 1x1900 product shall support CDMA IS-2000, Band Class 1 (1.9GHz PCS bands).

3.1.9 Preferred Roaming List (PRL)

1. CWF shall enable or disable the PRL usage from engineering menu.

2. CWF shall be able to verify the PRL and software version while in idle or active (during a call) mode.

3.1.10 Vocoder

CWF shall be able to support:

1. 8K-EVRC vocoder as the initial pre-set option for voice.

2. 13K-Q-CELP depends on network option.

3.1.11 External Interfaces

Specifically CWF shall have external interfaces:

1. Power supply.

2. RF Port.

3. USB data port or RS-232 data port. (Cable dependent)

3.1.12 Keypad/Button/Switch

1. The keypad of CWF shall follow 12 key matrix (0 to 9, *, #) standard with alphanumeric indications for text input.

2. CWF shall have clear key to accommodate backspace.

3. CWF shall have Hook Switch button to accept a call, as call hold button (for three way calling and call waiting features), and as flash button.

4. CWF should have redial button to repeat the last dialed number.

5. CWF shall have speakerphone button and the speakerphone button can also be used to release call while speakerphone active.

6. CWF shall have volume ringer and voice control.

3.1.13 Display/LCD

1. CWF shall support numeric/alphabet display (LCD) with 2 lines (exclude header) and 16 characters per line.

2. CWF shall have LCD indicator that indicates for signal strength, incoming SMS, voice mail and battery.

3. CWF shall have LCD indicator that indicates hook (in use) status and power status.

4. CWF shall have signal strength indicator either LED or in display menu. The signal strength meters in display menu shall be at least four or more level.

5. CWF shall have battery indicator in display menu; the battery meters shall be at least three or more level.

6. CWF have indicator at the display menu to present whether fixed wireless terminal has service or not service.

7. CWF shall have capability to indicate VMS message arrival notification.

8. CWF shall have capability to indicate SMS message arrival notification.

3.2 Functional Specifications

3.2.1 General Functionalities

1. CWF shall have dial tone when the hook is off while in the idle state.

2. CWF shall be able to originate call to numbers with 3 or more digits and have capability to support up to 28-digit dialing.

3. CWF shall have phonebook memory minimum 99-phone entries and allow user to search and add entry in the phonebook.

4. CWF shall support auto-sending capability. The complete number must be sent maximum at 10 seconds from last digit dialed. User can accelerate the phone dialing by pressing the recall key after dialing the number.

5. CWF shall accept the incoming call by picking the hook up.

6. CWF shall release a call by hook on (put the hook back).

7. CWF shall not support vibration mode.

3.2.2 Battery Time

1. CWF shall have minimum 120 minutes talk time when QPCH is not turned on.

2. CWF shall have minimum 72 hours standby time when QPCH is not turned on.

3.2.3 Languages

CWF shall support English, Spanish, Indonesia language and 7-bit ASCII code. (Other language shall be defined.)

3.2.4 Features

3.2.4.1 Call Waiting & 3-way calling (Network dependent feature)

1. CWF shall support call-waiting feature.

2. While in a voice call, CWF shall be able to receive a call waiting notification, display the caller ID number supplied and to connect (answer) that call by pressing the hook. The caller ID (CLI) of the B-party must be displayed when in a call.

3. CWF shall support Call waiting CLI feature. CLI of B-party must be added to incoming call list if user answers the call. If user does not answer incoming B-party call, then CLI must be added to missed-call list.

4. CWF shall support DTMF during a call waiting. When engaged with B-party, any DTMF tones corresponding to key pressed shall be transmitted without delay.

5. CWF shall support call transition between calling parties by “Press hook”.

3.2.4.2 Call Forwarding (Network dependent feature)

CWF shall support Call Forwarding Unconditional、Call Forwarding on Busy、Call Forwarding No Answer and Call Forwarding not reachable feature.

3.2.4.3 Caller ID

CWF shall display:

1. The Calling Party Number value in either numeric or alpha numeric.

2. The name in the phonebook, corresponding to the calling number.

3.2.4.4 Voice Mail System (VMS)

CWF shall support to retrieve VMS.

3.2.4.5 Indicators

CWF shall have capability:

1. To indicate the service warning dropped call (audible and visual) and reminder of unread SMS (visual).

2. To display： call timer in hours, minutes and seconds of time in call (visual)、a user programmable power up message such as banner (visual)、 an incoming call alert (audible and visual)、dialed digits (visual)、the date & time (visual)、PPP link is active (visual)、when data bearer in use (Tx/Rx indicator).

3. To support keypad feedback tones (audible).

4. To show if it's sending or receiving data packets.

3.2.5 Number Assignment Module

1. When using the UIM card, some parameters of the NAM shall be changed with the service programming code (SPC) through keypad, such as SCI, SO, Home SID/NID, and Directory Number.

2. The software upgrade should be done through the data cable (RS-232C only).

3. CWF has one NAM.

4. The software version can be verified through the user menu.

3.2.6 Short Message Service

3.2.6.1 Basic Capabilities

1. CWF shall send and receive SMS.

2. CWF shall support alphanumeric addressing in mobile terminated SMS.

3. CWF shall be able to save and delete message, except to save the draft message.

4. The message inbox of CWF shall support maximum 28 messages. (23 messages in UIM Card, 5 messages in NV)

5. The messages outbox of CWF shall support up to 3 messages.

3.2.6.2 Mobile Terminated SMS

1. CWF shall support audible alert for received message and visual alert on the LCD display panel.

2. CWF shall display the sender phone number, and check if it is stored in the terminal phonebook, the name also could be displayed.

3. CWF shall display the message timestamp.

4. CWF shall erase latest received message automatically, when SMS memory is full.

5. CWF shall support the reception of message size (for 7-bit ASCII) up to 160 characters.

6. CWF shall receive message with zero or blank character.

7. CWF shall display callback number.

8. CWF shall support alphanumeric addressing in SMS (name alias) if the number exists in the phonebook.

9. CWF shall receive SMS during a call.

3.2.6.3 Mobile Originated SMS

1. CWF shall send short numbers with at least 3 digits.

2. CWF shall send message to numbers containing with special characters (i.e. *, #, %, ”, :, +, <, >, =, -, ., &, ’, (,), _, !, ?).

3. CWF shall reply the message to original address of received message.

4. CWF shall send message with at most 160 characters (ASCII character) and the message with zero character (blank character).

5. CWF shall use the 7-bit ASCII code to send message.

6. CWF shall allow the user to select the priority level of the message.

7. CWF shall support message ID such as normal, urgent and emergence.

8. CWF shall allow the user to compose and send SMS during the call.

9. CWF shall include originating address of SMS.

3.2.7 Data Service

1. CWF shall provide the data rate up to 115kbps, when connected to PC via RS-232C serial port.

2. CWF shall support IS-2000 packet switched data.

3. CWF shall support F-SCH up to 153.6kbps.

4. CWF shall support R-SCH up to 153.6kbps.

4. Abbreviations

3GPP2	**T**hird **G**eneration **P**artnership **P**roject **2**
ASCII	**A**merican **S**tandard **C**ode for **I**nformation **I**nterchange
CDMA	**C**ode **D**ivision **M**ultiple **A**ccess
CLI	**C**a**l**ler **I**D
CWF	**C**DMA2000 1x **W**ireless local loop **F**ixed telephone
DTMF	**D**ual **T**one **M**ultiple **F**requency
EVRC	**E**nhanced **V**ariable **R**ate **C**ODEC
F-SCH	**F**orward **S**upplemental **Ch**annel
ID	**Id**entifier
LCD	**L**iquid **C**rystal **D**isplay
LED	**L**ight **E**mitting **D**iode
NAM	**N**umber **A**ssignment **M**odule
NID	**N**etwork **Id**entification
PPP	**P**oint-to-Point **P**rotocol
PCS	**P**ersonal **C**ommunication **S**ystem
PRL	**P**referred **R**oaming **L**ist
Q-CELP	**Q**ualcomm **C**odebook **E**xcited **L**inear **P**rediction
QPCH	**Q**uick **P**aging **Ch**annel
R-UIM	**R**emovable **U**ser **I**dentity **M**odule
R-SCH	**R**everse **S**upplemental **Ch**annel
SCI	**S**ynchronized **C**apsule **I**ndicator
SO	**S**ervice **O**ption
SID	**S**ystem **Id**entification Number
SMS	**S**hort **M**essage **S**ervice
SPC	**S**ervice **P**rogramming **C**ode
VMS	**V**oice **M**ail **S**ystem
WLL	**W**ireless **L**ocal **L**oop

승인번호		승인원ISSUE	1.0	제품 ISSUE	1.0

사양 승인원 (Approval Sheet)

프로젝트 명(PROJECT NAME)	Antenna
도 번(MODEL No.)	DSW-1900
품목번호(ITEM No.)	

		담 당	검 토	승 인
	기구 (MECHANIC)			
		담 당	검 토	승 인
	전자 (ELECTRONIC)			

		담 당	검 토	승 인
에이슨	기구 (MECHANIC)			
		담 당	검 토	승 인
	전자 (ELECTRONIC)			

다음과 같이 DSW-1900의 사양 승인원을 제출하오니 검토 후 승인하여 주시기 바랍니다.

2004년 07월 08일

경기도 시흥시 대야동 303-6번지 ‡ 429- 807

에 이 슨 대표 김 종 훈 (인)

목 차 (Table of Contents)

1. 승인원 이력 LIST(Approval Sheet Check List)

이 력 변 경		날 짜	항 목 / 내 용	근 거
승인원 issue	제품 issue			
Ver 1.0	Ver 1.0	2004.07.08	초도발행	

2. 개 요(APPLICATION)

2.1. 개요

본 규격서는 DSW-1900의 사양에 대해 기술하였다.

3. 규 격(Specification)

3.1. 일반 규격

General specification	
Model name	**DSW-1900**
Antenna type	**Half Wavelength Antenna**

3.2. 전기적 규격

Electrical specification	
Frequency range	**1850 ~ 1990㎒**
V.S.W.R	**1.7 : 1 Max.**
Gain(dBi)	**2±0.5**
Radiation pattern	**Omni-directional**
Polarization	**Vertical**
Max Power(W)	**5W Max.**
Impedance	**50Ω Normalizer**

3.3. 기계적 규격

Mechanical specification	
Connector type	**TNC Male**
Cover material	**Urethane**
Color	**Ivory**
Temperature range	**-30℃ ~ 70℃**
Weight	**30 ± 2g**
Dimension	**TBD**

4. 시험방법 및 절차서(Test Procedure & Measurement)

4.1. 외관검사

Antenna의 외관 및 치수, **Connector**등이 첨부된 " 6 " 번 항의 외관과 일치 하는지를 확인한다.

4.2. 전기적 특성검사

4.2.1. 준비물

장 비 명	Model	수량	규 격
Network Analyzer	**HP8752C** **(또는 동등 이상의 장비)**	**1대**	**· Freq. Range : 300KHz ~ 3GHz** **· Accuracy : <5ppm** **· Dynamic Range : 105dB** **· Trace at ±200dB** **· Resolution : 1Hz** **· Impedance : 50Ω**
Adaptor		**1EA**	**· N(M)-TNC(F)**
Calibration Kit	**HP85032B**	**1Set**	**· DC ~ 6GHz (N-Type)**

4.2.2. 검사

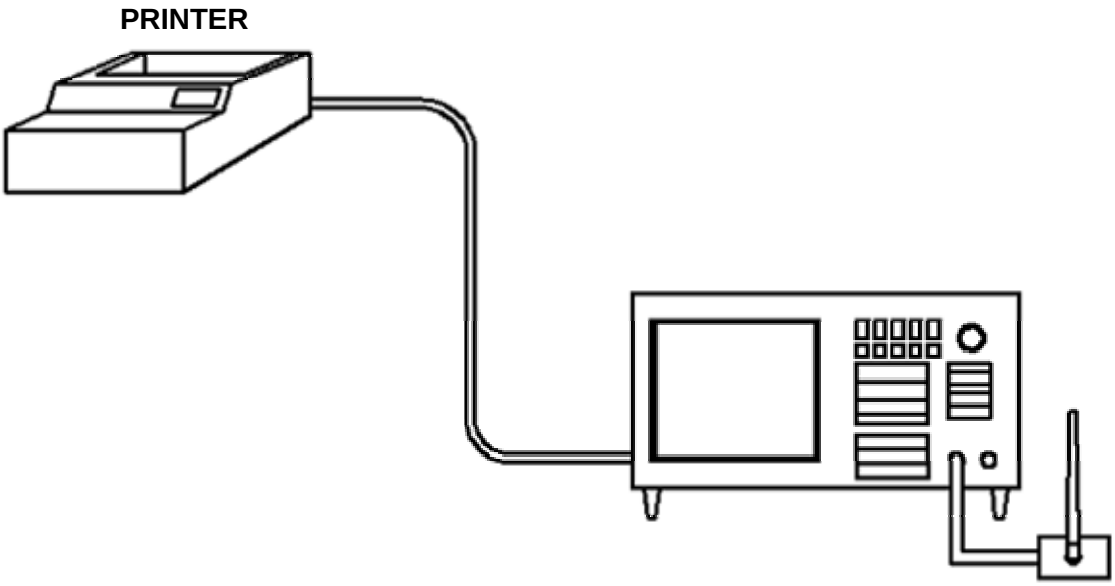


그림 1. Network Analyzer 검사 시 계측기 연결도

4.2.2.1. 검사

가. 장비 Setting 및 Calibration

㉠ 장비 Setting

ⓐ 주파수대역 : Center Frequency: 1920.0MHz, Span :300.0MHz
ⓑ Source Power : 10dBm,
ⓒ IF Bandwidth : 1000Hz
ⓓ Number of Point : 401

㉡ Calibration

N-Type Cal. Kit 을 사용하여 O.S.L 방법으로 1 Port Calibration 한다.

ⓐ S_{11} Calibration : Port 1 에 Open, Short, Load 를 각각 연결하여 Calibration 한다.

㉢ Calibration 확인

ⓐ Port1 에 Load 를 연결하여 S_{11} 의 V.S.W.R 이 1.02 : 1 이하 인지를 확인한다.
ⓑ Port1 에 Load 를 연결하여 S_{21} 값이 - 80.0dB 이하인지를 확인한다.

확인 결과 위의 기준을 만족하지 못할 경우 ㉡항의 Calibration 항을 반복 수행한다.

나. 검사방법 및 내용

항 목	검 사 방 법	기 준
VSWR	위 그림 1과 같이, ANT에 Network Analyzer의 Port 1을 연결한 다음 Operating Band 내에서의 S_{11}값을 측정한다.	1.9:1 Max.
Impedance	위 그림 1과 같이, ANT에 Network Analyzer의 Port 1을 연결한 다음 Operating Band 내에서의 Smith Chart 상의 S_{11}값을 측정한다.	50 ± 20Ω

4.3. Beam Pattern

4.3.1. 준비물

장 비 명	모 델	수량	규 격
Near Field Chamber	32 gate satimo	1대	· Freq. Range:800MHz~6GHz · Measurement Speed : Radiation Pattern Cuts: Real Time Full sphere far-field : < 20 secs · Measurement Accuracy : Dynamic Range: 70 dB Cross-polar isolation < -45 dB · Gain Accuracy : 1 - 6GHz < ±0.75dB 0.8 - 1 GHz < ±1 dB · Pattern Accuracy : < ± 2 dB @-20dB
Adaptor		1EA	· N(M)-TNC(F)
Computer		1대	· 측정 데이터용

4.3.2. 검사

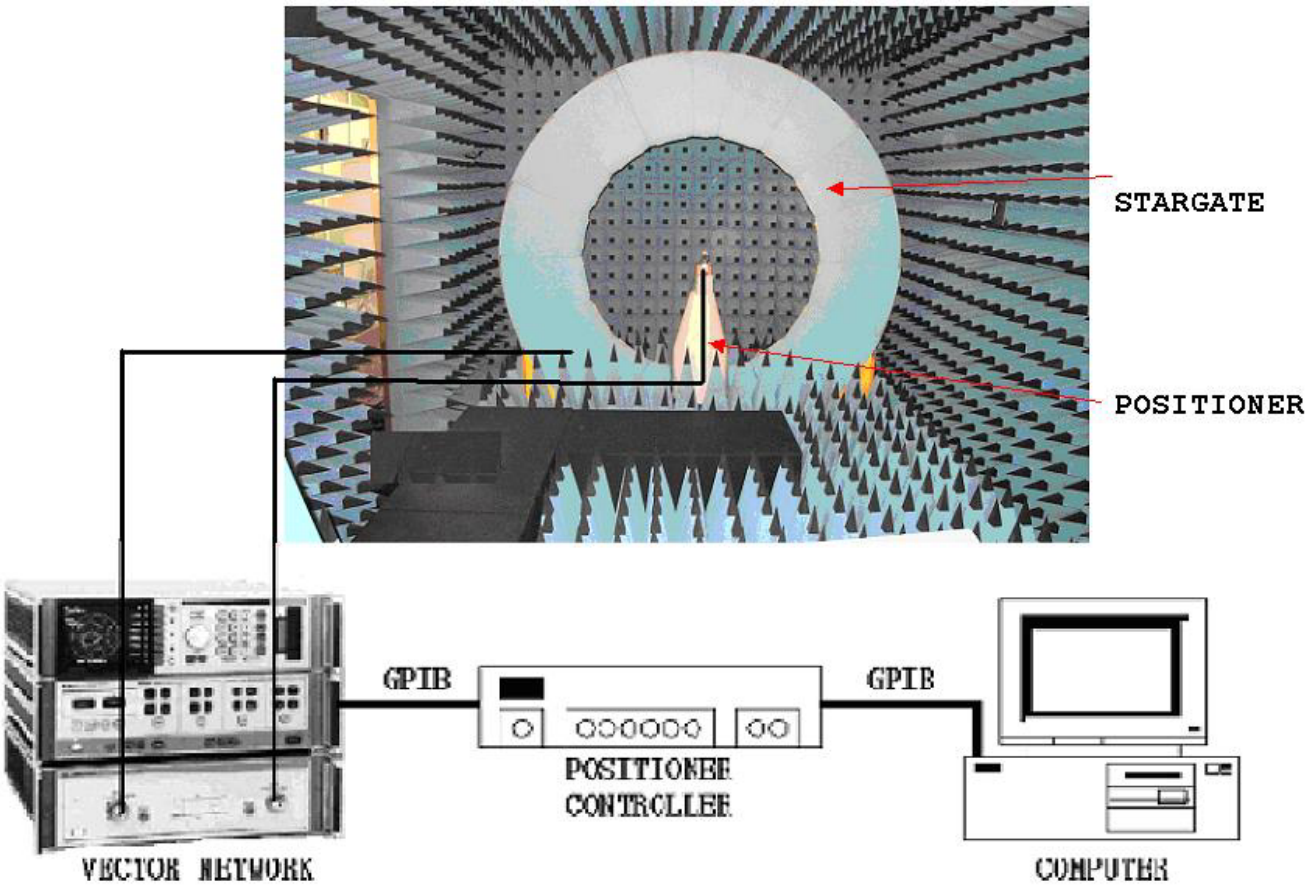


그림 2. Beam Patten 검사 시 계측기 연결도

4.3.2.1. 검사

가. 장비 Setting 및 측정

㉠ 장비 Setting

ⓐ 안테나를 Positioner 결합한 후 Star gate 32 Sensor 중앙에 위치하도록 만든다.

ⓑ Chamber System 조절을 위한 소프트웨어 시스템을 Setting 을 한다.

– Frequency Setting : 1850MHz, 1920MHz, 1990MHz

ⓒ Star gate 32 Sensor 중앙에 위치한 측정용 ANT 를 360° 회전시킨다.

ⓓ Computer 로 Chamber System 를 조절하며 측정을 위한 소프트웨어 시스템을 시작한다.

ⓔ Computer 에서 측정한 Data 를 출력한다.

나. 검사방법 및 내용

항 목	검 사 방 법	기 준
Beam Patterm	위 그림 2와 같이, ANT를 Positioner에 연결한 다음 **Near Field Chamber** 내에서의 S_{11}값을 측정한다.	2.0±0.5dBi

5. 포장 및 운반(Packing, Shipping, Handling)

5.1. 외관사양

가. 주문자의 상호와 생산자의 상호가 명기되어야 한다.

나. Model 명, Serial NO. 및 수량이 명기되어야 한다.

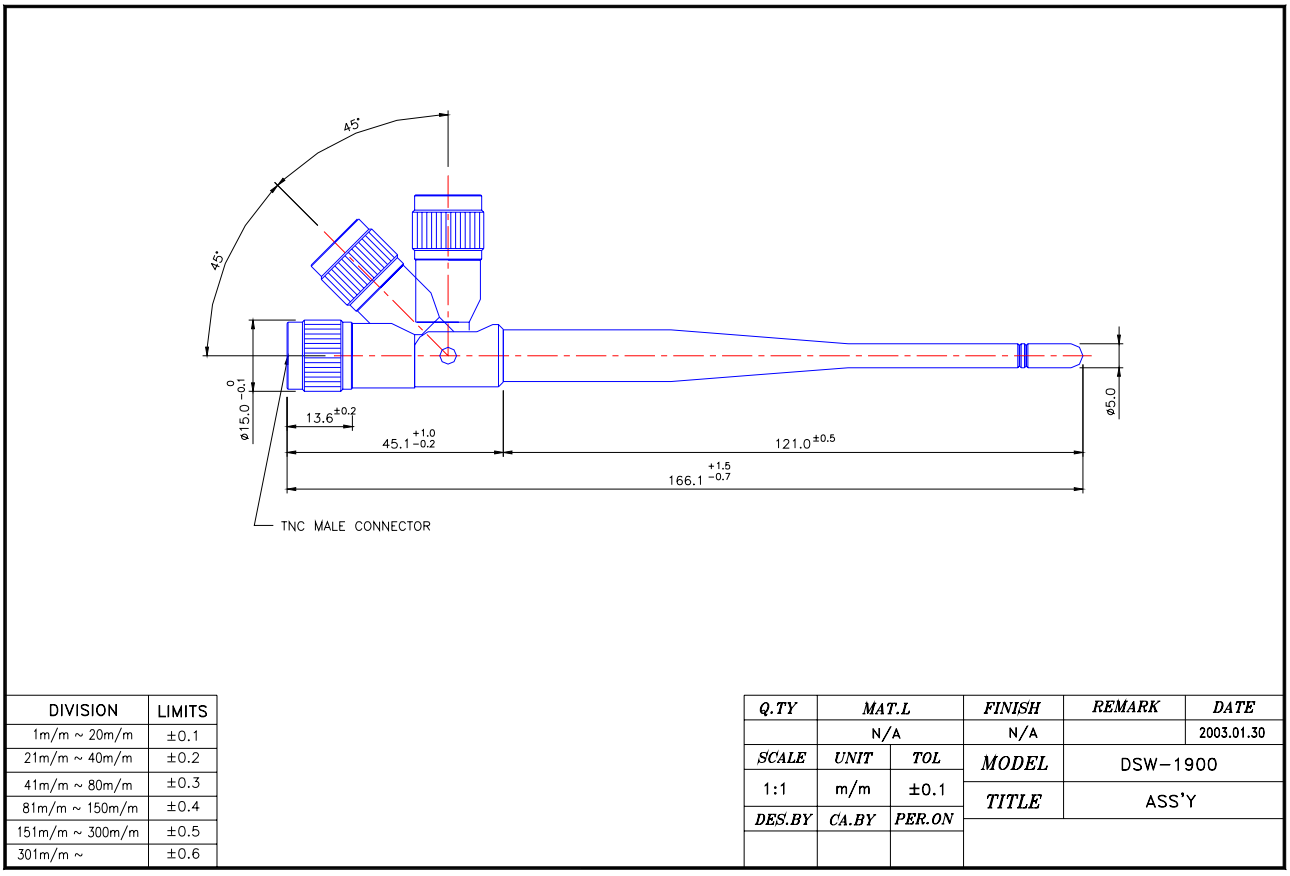
5.2. 포 장

가. 본 제품의 보관 및 수송에 따른 진동, 충격으로부터 보호 될 수 있도록 안전하게 포장한다.

나. 포장재료는 종이박스(DW2 종)로 하되, 장비에 손상이 가지 않는 재질을 이용한다.

6. 외 관(Appearance)

No.	도 번 [DWG No.]	품 명 [TITLE]	REV.	Page	비 고
1	DK040708002	ASS'Y	1.0	1/1	



DIVISION	LIMITS
1m/m ~ 20m/m	±0.1
21m/m ~ 40m/m	±0.2
41m/m ~ 80m/m	±0.3
81m/m ~ 150m/m	±0.4
151m/m ~ 300m/m	±0.5
301m/m ~	±0.6

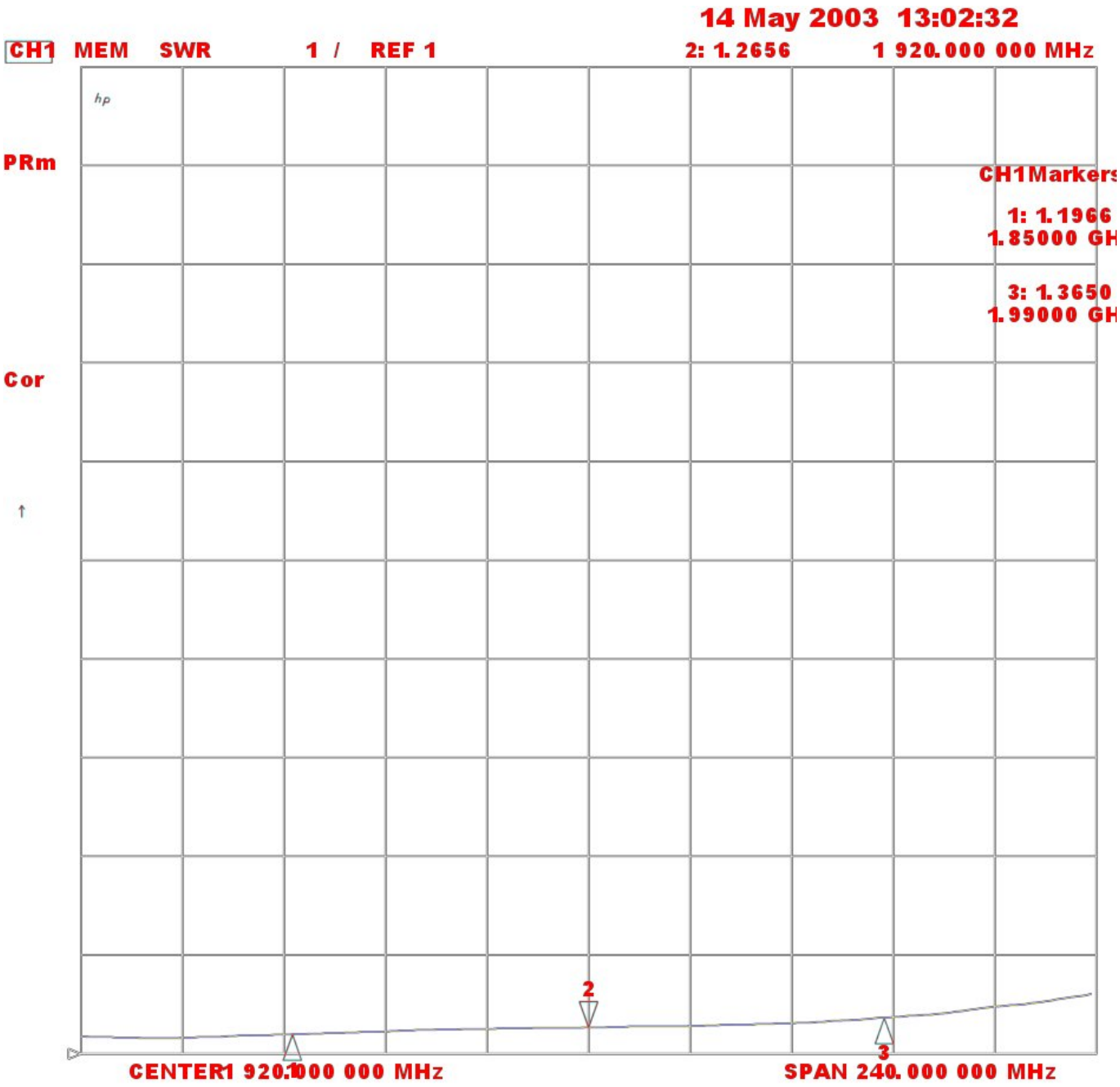
Q.TY	MAT.L		FINISH	REMARK	DATE
	N/A		N/A		2003.01.30
SCALE	UNIT	TOL	MODEL	DSW-1900	
1:1	m/m	±0.1	TITLE	ASS'Y	
DES.BY	CA.BY	PER.ON			

7. 시험성적서(Test Data Sheet)

Parameter	Specification	Data
		25℃
V.S.W.R	1.9 : 1 Max.	1.36 : 1
Beam Pattern	2.0 ± 0.5dBi	1.93dBi
Impedance	50 ± 20Ω	51

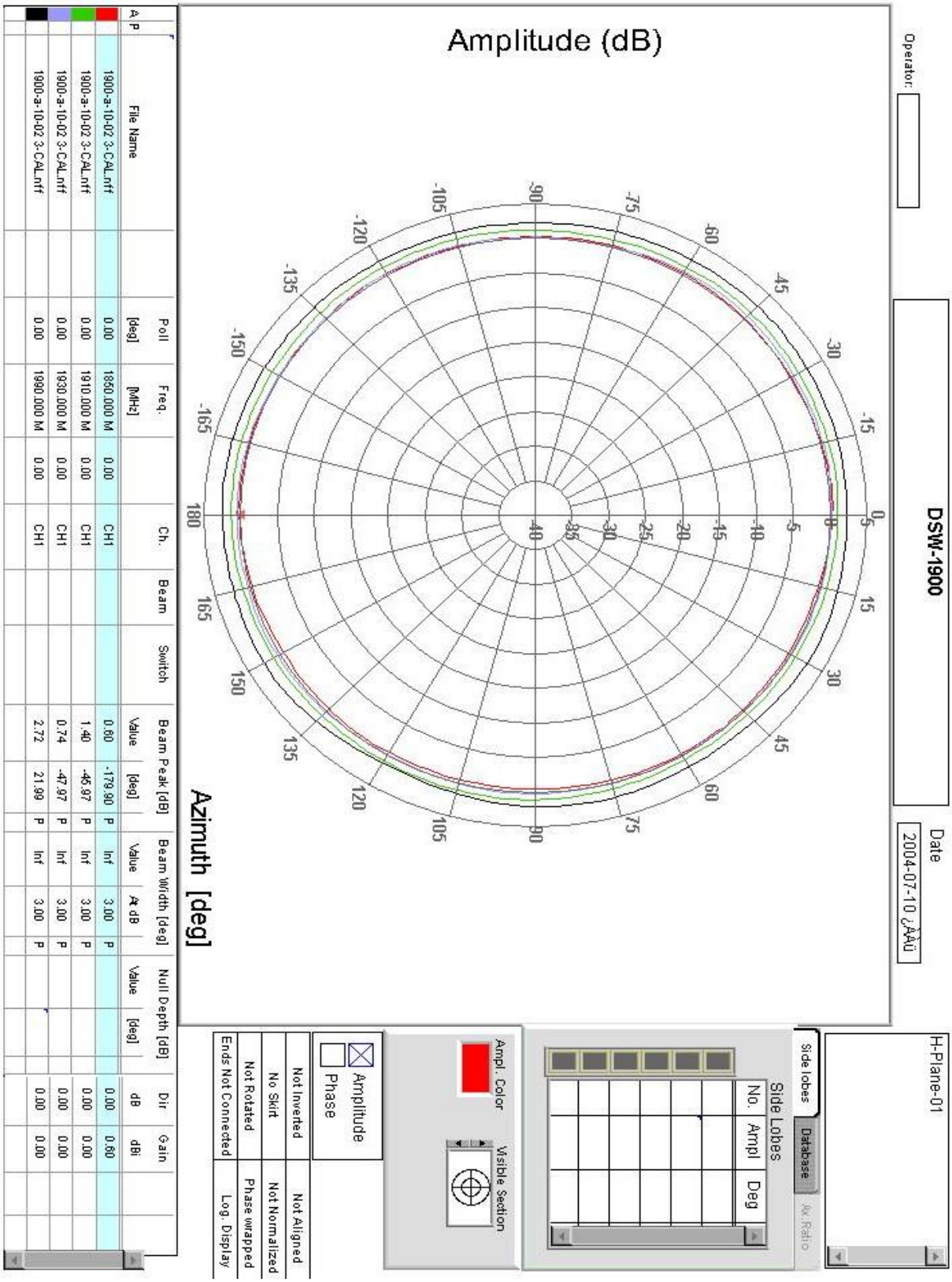
8. Data Sheet

8.1. V.S.W.R

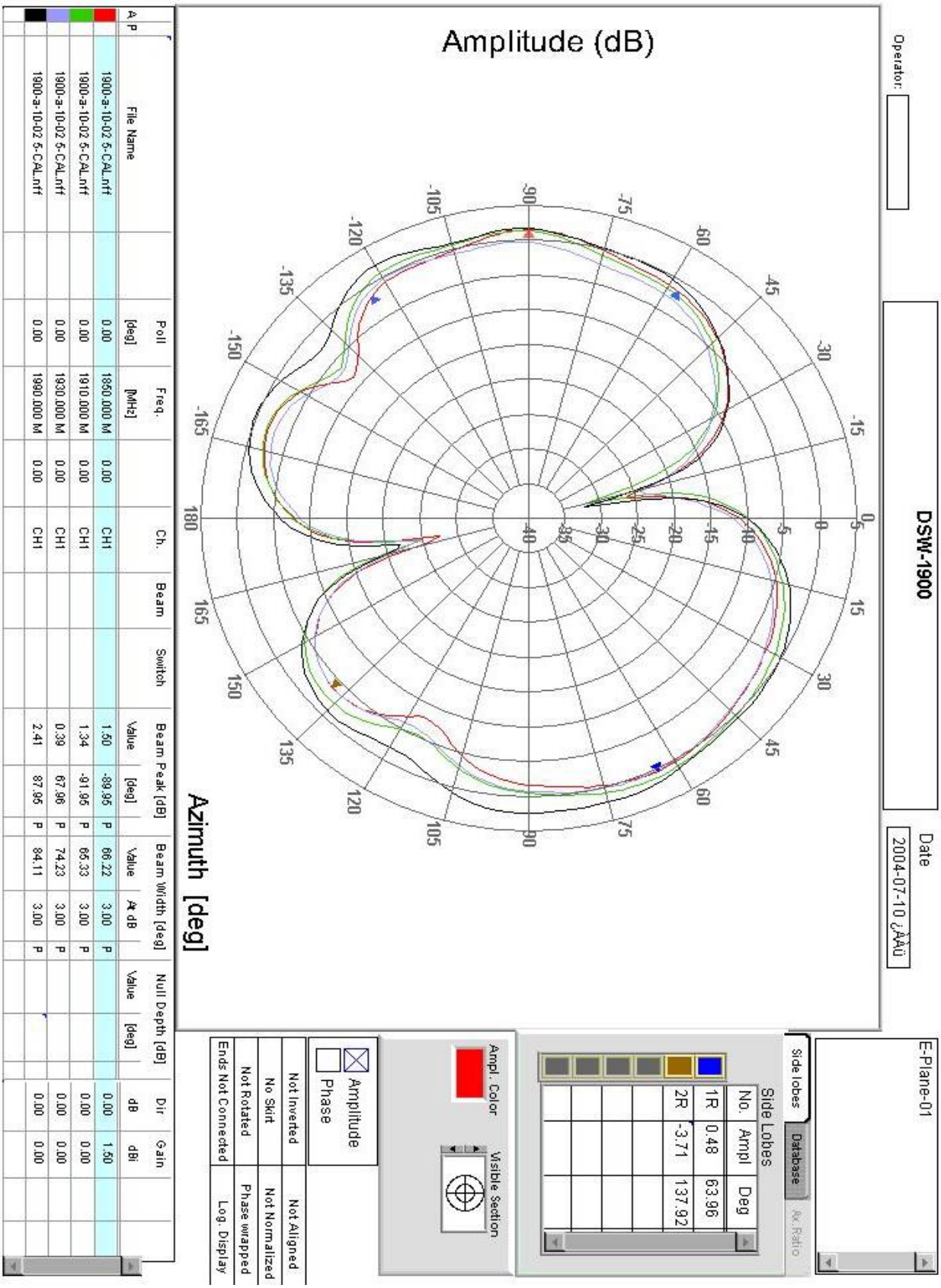


8.2. Beam pattern

8.2.1. Azimuth



8.2.2. Elevation



8.3. Impedance