G-PLUS

Model Name: DB-830

Date: March 2, 2007

PRODUCT SPECIFICATION

Product : Antenna

Part No. : KH-GMDI-GP002

Mechanic Eng'r	RF Eng'r	Mfg. Eng'r	Approved By

KWANG HYUN AIRTECH

Address : Rm 414, Woolim Lions Valley II, 680 Gasan-Dong,
Geumcheon-Gu, Seoul 153-787 Korea
Tel: 82-2-2027-2615, Fax: 82-2-2027-2614

Table of Contents

1. General

1.1 The Product

Model Name	KH-GMDI-GP002
Antenna Type	MONOPOLE
Applications	GSM850/PCS

1.2 Electrical Properties

Frequency Range(Tx)	GSM850	824~849 MHz
	PCS	1850~1910 MHz
Frequency Range(Rx)	GSM850	869~894 MHz
	PCS	1930~1990 MHz
Impedance	50Ω ± 10Ω	
VSWR	GSM850	Less Than 3.7:1
	PCS	Less Than 4.7:1
Radiation Pattern	Omni-Directional	
Polarization	Vertical	

1.3 Mechanical Properties

Dimension	27mm(L) x 18.5mm(W) x 5.4mm(H)
Operational Temperature	-30°C ~ +70°C
Connector Type	Snap in Type

2. Electrical Properties

2.1 Frequency Band

Service / Band	GSM850	PCS
Tx(MHz)	824 ~ 849MHz	1850 ~ 1910MHz
Rx(MHz)	869 ~ 894MHz	1930 ~ 1990MHz

2.2 Impedance

2.2.1 Normal Value

50Ω ± 10Ω

2.2.2 Measuring Method

The impedance over the frequency bands shall be as close as possible to 50Ω after matching. Both free space and talk position are considered.

2.3 VSWR

2.3.1 Maximum values in free space

Service	GSM850		PCS	
	Tx	Rx	Tx	Rx
VSWR	1.42 : 1	3.74 : 1	4.74 : 1	3.39 : 1

2.3.2 Measuring Method

A 50Ω coaxial cable is connected(soldered) to the 50Ω point, at the duplex-filter on the main PCB. The connection of the coaxial cable shall be done to introduce a minimum of mismatch. As much as possible the coaxial cable arrangement shall prevent influences from induced currents on the cable. In the other end, the coaxial cable is connected to a network analyzer. The measurement is performed at room temperature. The handset, including the PCB, must not in any significant way differ from the mass produced handset, i.e. the antenna feeding network has to be equivalent to the feeding network in mass production. The specification shall be met in the entire frequency band. The free space means that the handset is placed on a non-conductive surface of cellular plastic.

2.4 Gain(dBi)

2.4.1 Typical minimum values in maximum direction

Service	GSM850		PCS	
	Tx	Rx	Tx	Rx
Gain	-3.06: 1	-6.41: 1	-10.08 : 1	-5.61 : 1

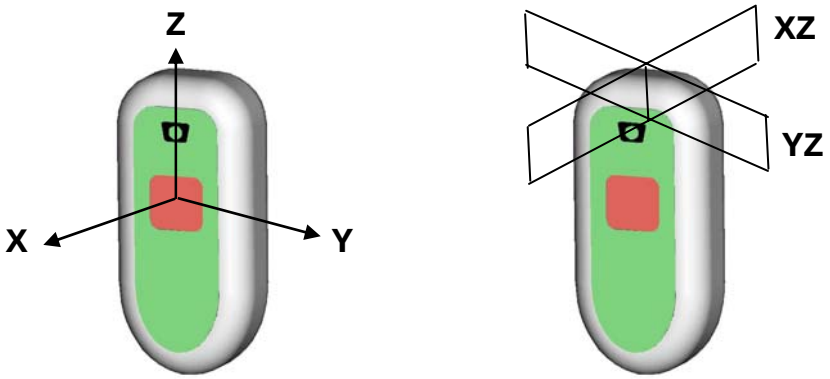
2.4.2 Measuring Method

The connection is done according to 2.3.2.

Radiation patterns are measured at 6 different frequencies : Txmin, Txmid, Txmax, Rxmin, Rxmid and Rxmax.

The antenna is measured in 2 orthogonal E-planes(XZ Plane(E1), YZ Plane(E2)) in free space, according to the figure 1 below.

The antenna is also measured in the H-plane as well as in talk position.



(a) Coordinate system for the cellular phone (b) E-Plane

Figure 1. Gain Test

3. Mechanical Properties

3.1 Appearance

The appearance shall be according to the mechanical drawing on page 12.
The antenna shall have no cuts, abrasion or other mechanical damages.

3.2 Drop

3.2.1 Drops

1 drop in retracted mode(3cycles)

3.2.2 Drop Height

1.5m

3.2.3 Drop Angle

180°

3.2.4 Actual handset applied

3.2.5 Demands

The original shape shall be possible to restore. The antenna shall satisfy the electrical demands, according to 2.4.1, after the test.

3.2.6 Measuring Method

The antenna is placed in the handset or an equivalent test fixture.
The handset is dropped with the antenna downwards onto a metal plate.

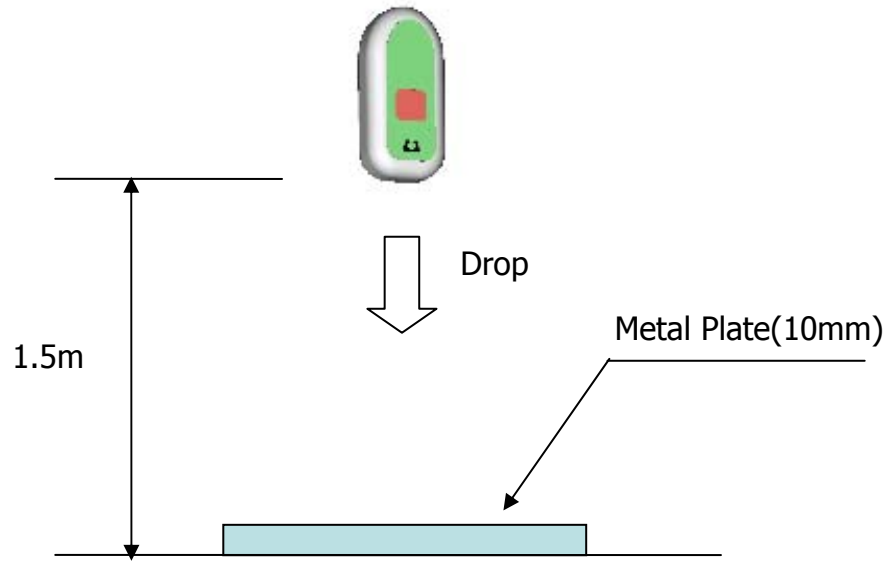


Figure 2. Drop Test

4. Environment Resistance Properties

4.1 Operational Temperature

4.1.1. Low Operational Temperature

TLO = -30°C

4.1.2 High Operational Temperature

THO = +70°C

4.1.3 Demands

No visual deterioration shall occur, and the antenna shall satisfy the electrical demands, according to 2.4.1, during the test.

4.1.4 Measuring Method

The antenna is placed in a climatic chamber at temperature TLO.
The antenna is taken out after 1 hour, and VSWR is immediately measured.
The antenna is placed in a climatic chamber at temperature THO.
The antenna is taken out after 1 hour, and VSWR is immediately measured.

4.2 Temperature Cycling

4.2.1 Low Cycling Temperature

TLC = -40°C

4.2.2 High Cycling Temperature

THC = +80°C

4.2.3 Demands

No visual deterioration shall occur during the test. The antenna shall satisfy the electrical demands, according to 2.4.1.

4.2.4 Measuring Method

The antenna is placed in a climatic chamber. The temperature is cycled as follows : The temperature is kept constantly at TLC for 1 hour, increased to THC during 1 hour, kept constantly at THC for 1 hour, and then decreased to TLC during 1 hour.
This procedure is repeated 10 times, ending at room temperature according to figure 3 below.

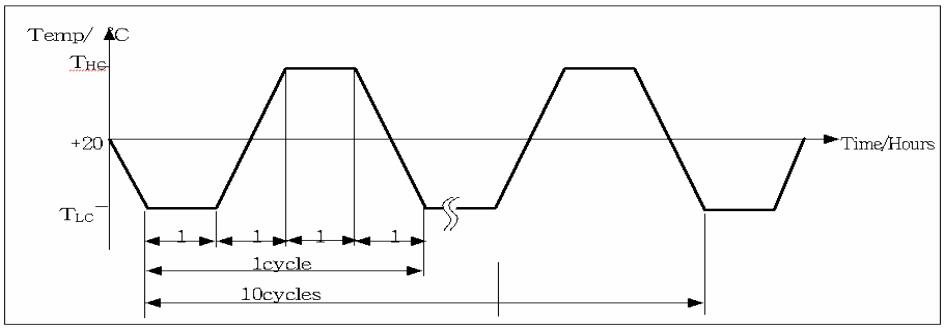


Figure 3. Temperature Cycling

4.3 Humidity

4.3.1 Relative Humidity

95%

4.3.2 Temperature

+55°C

4.3.3 Demands

No visual deterioration shall occur during the test. The antenna shall satisfy the electrical demands, according to 2.4.1, after the test.

4.3.4 Measuring Method

The antenna is placed in a climatic chamber for 24 hours. The antenna is taken out from the chamber and measured after another 24 hours in room temperature.

4.4 Sinusoidal Vibration

4.4.1 Vibration Frequencies

10-55-10Hz(1cycle)

4.4.2 Sweep Rate

1 octave/min(logarithmic)

4.4.3 Maximum Amplitude

A = 1.52mm

4.4.4 Maxim Acceleration

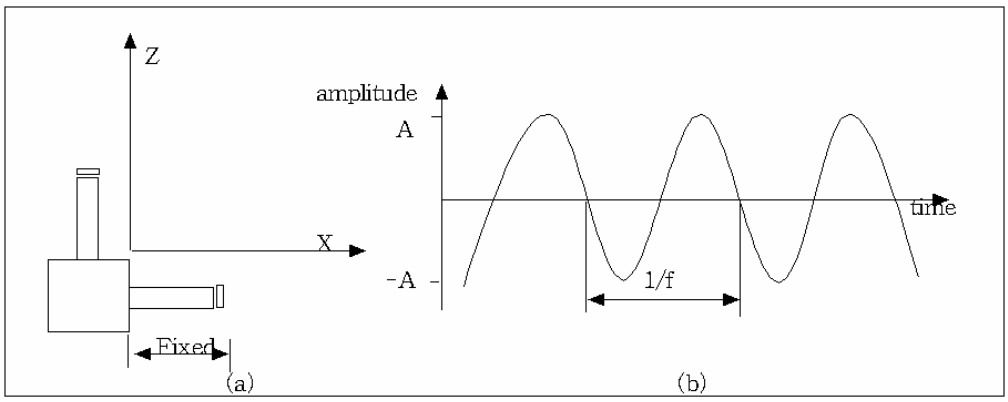
2g

4.4.5 Crossover Frequency

18.2Hz

4.4.6 Measuring Method

The fixed antenna is assembled in the test equipment. The vibration is done both in x-and z-directions, according to figure 4(a), with a duration of 1 hour in each direction.

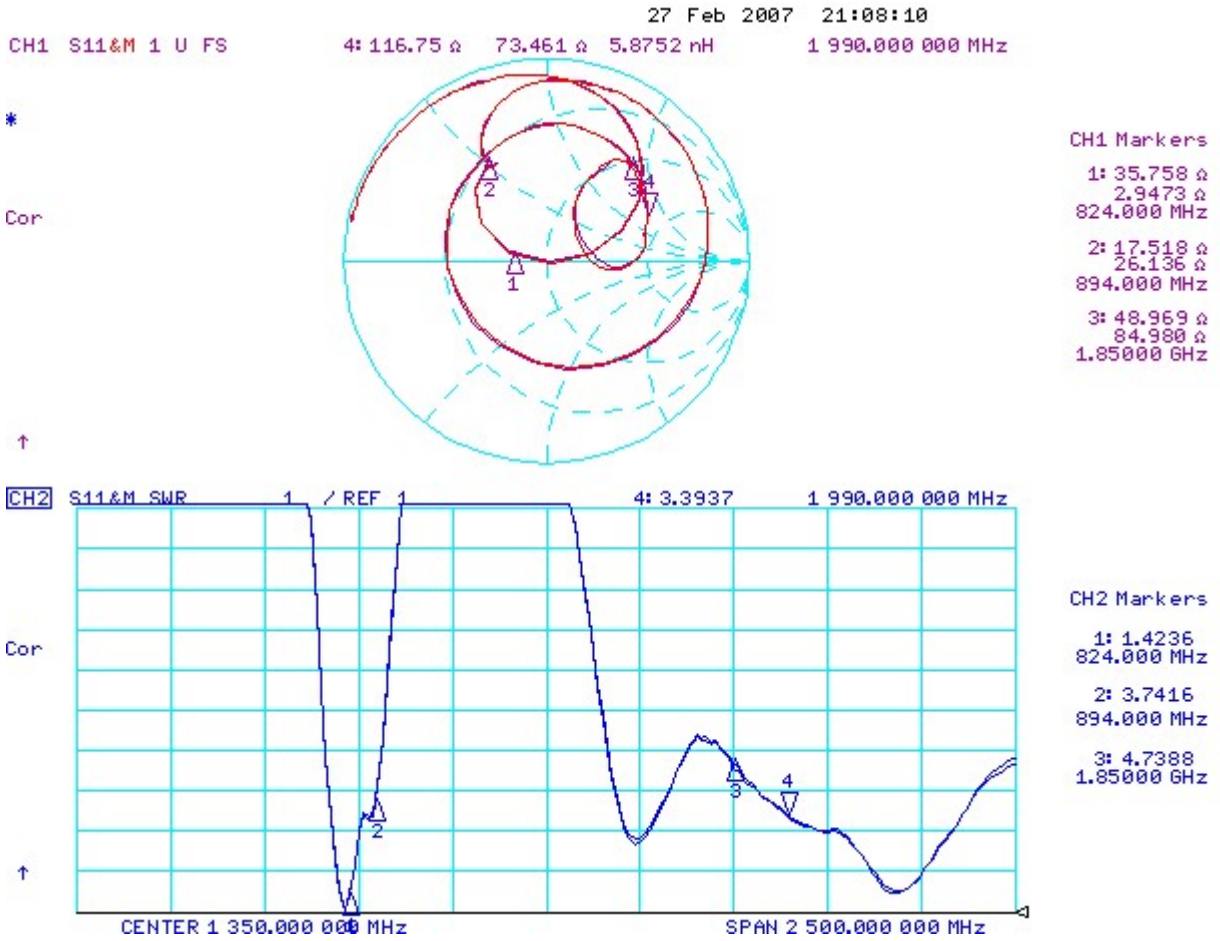


(a) Vibration directions (b) Vibration form

Figure 4. Sinusoidal Vibrator

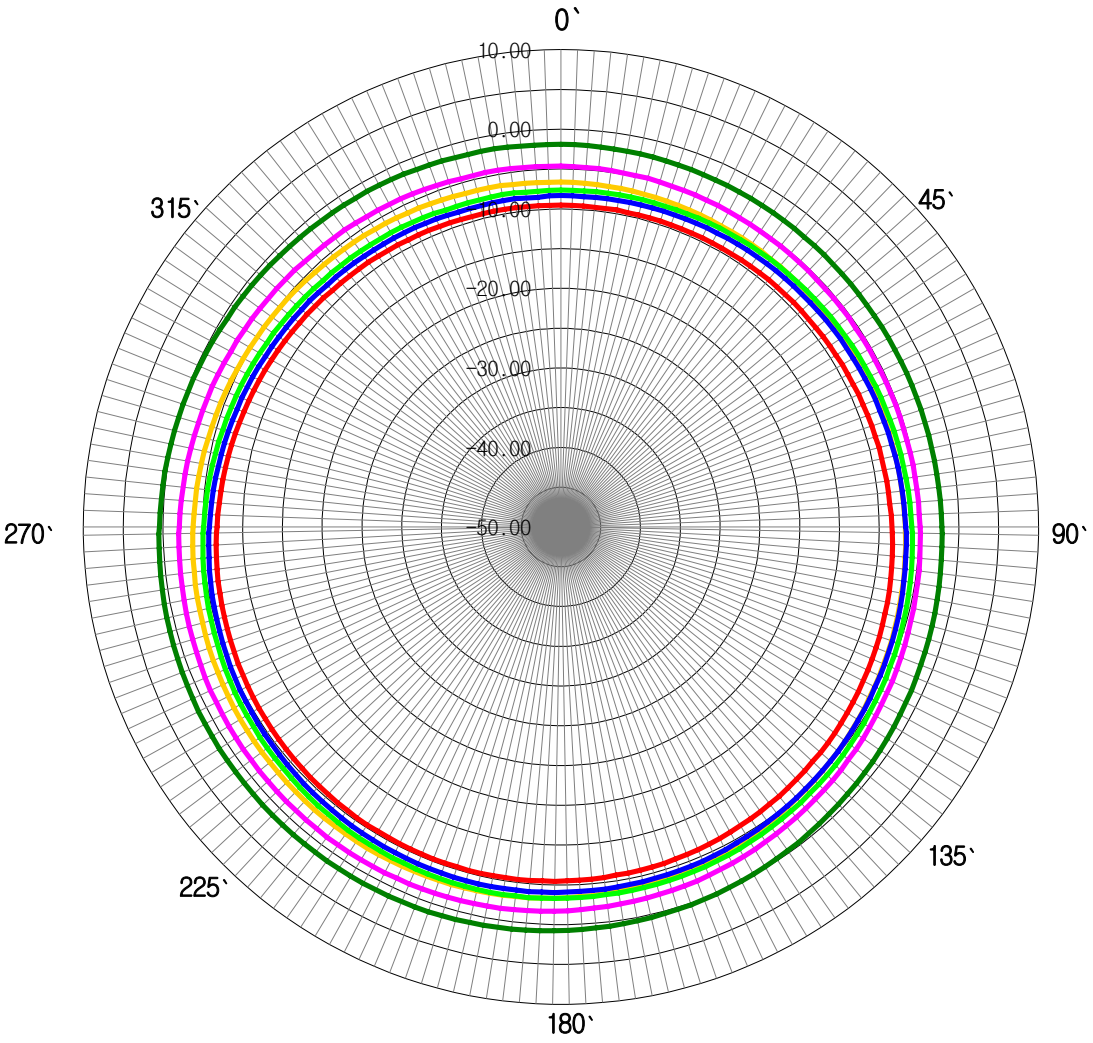
5. Test Data

5.1 Network Data



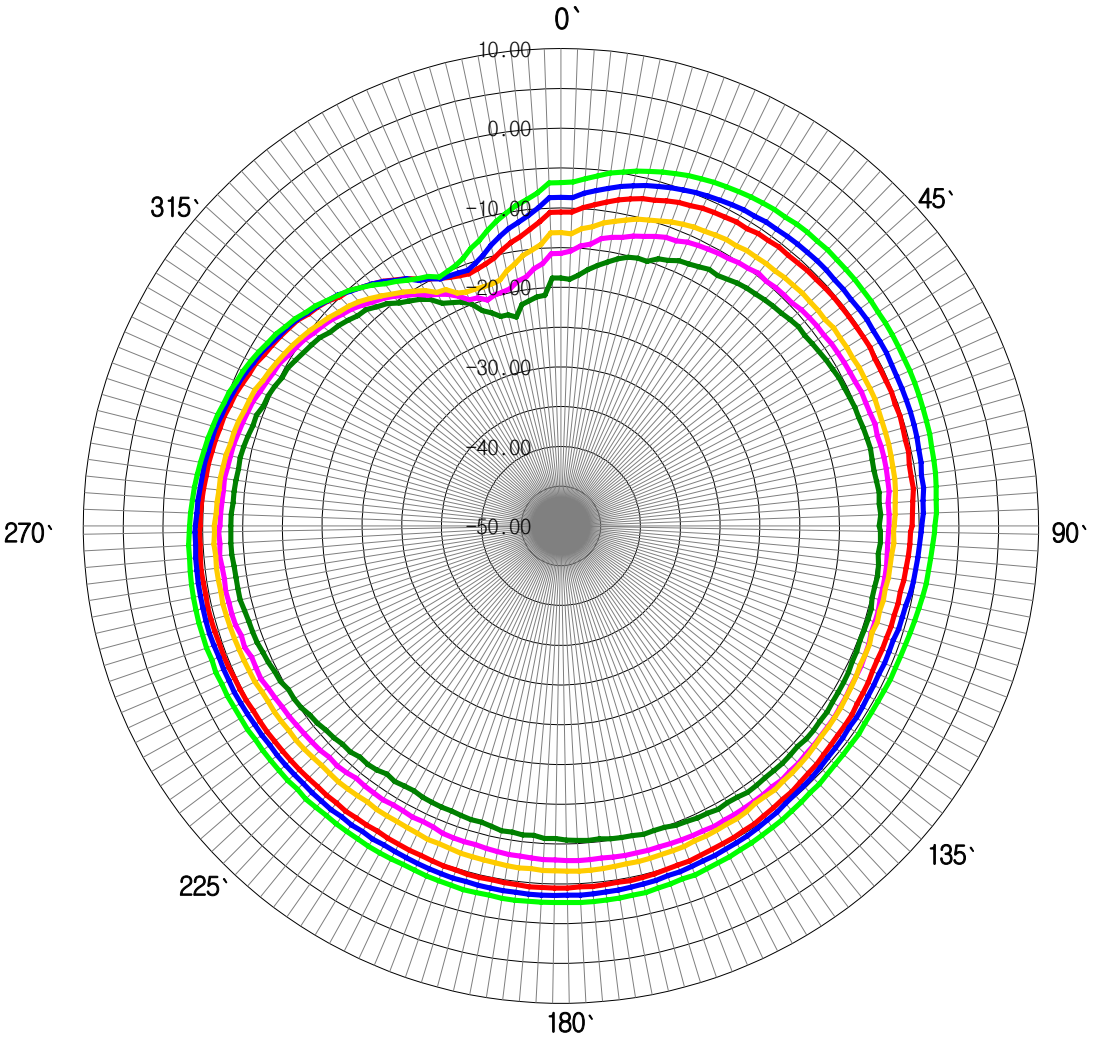
5.2 Radiation Pattern Data

5.2.1 GSM850



Frequency	Max.	Min.	Avg.
880Mhz	1.26	-2.50	-0.71
898Mhz	-1.19	-5.31	-3.33
915Mhz	-2.86	-7.29	-5.14
925Mhz	-5.28	-9.60	-7.54
943Mhz	-3.96	-8.44	-6.22
960Mhz	-3.23	-7.70	-5.48

5.2.2 PCS



Frequency	Max.	Min.	Avg.
880Mhz	-8.49	-23.14	-11.66
898Mhz	-6.97	-20.18	-9.81
915Mhz	-6.37	-18.41	-8.78
925Mhz	-4.47	-16.26	-6.65
943Mhz	-3.50	-15.82	-5.68
960Mhz	-1.80	-15.16	-4.50

6. Mechanical Drawing