AnyDATA.NET Inc.

Model Name: EMIV-V2

Date: August 31, 2006

PRODUCT SPECIFICATION

Product : Magnet Whip Antenna

Part No. : MADS-1001

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

DS Technology CO., Ltd.

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Table of Contents

1. General

1.1 The Product

Model Name	
Antenna Type	Magnetic
Applications	CDMA 800MHz, 1900MHz

1.2 Electrical Properties

Frequency Range(Tx)	824~849 MHz, 1850~1910 MHz
Frequency Range(Rx)	869~894 MHz, 1930~1990 MHz
Impedance	30Ω ± 10Ω
VSWR	Less Than 3.0:1
Radiation Pattern	Omni-Directional
Polarization	Linear

1.3 Mechanical Properties

Dimension	20.0 mm(L) x 6.5 mm(W) x 6.5 mm(H)
Operational Temperature	-20°C ~ +70°C
Cable length	1m
Ground plate	120(mm) x 180(mm)

2. Electrical Properties

2.1 Frequency Band

Service / Band	CDMA800	CDMA1900
Tx(MHz)	824~849	1850~1910
Rx(MHz)	869~894	1930~1990

2.2 Impedance

2.2.1 Normal Value

30Ω ± 10Ω

2.2.1 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

The impedance matching should be optimized in the more critical talk position.

2.3.1 Maximum values in free space

SERVICE	CDMA 800 MHz		CDMA 1900 MHz	
	TX	RX	TX	RX
VSWR	3.0:1	2.5:1	3.0:1	2.5:1

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 production, 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.

2.4 Gain(dBi)

2.4.1 Measuring Method

The connection is done according to 2.3.2.
Radiation patterns are measured at 3 different Plane
The antenna measured according to the figure 1 below.

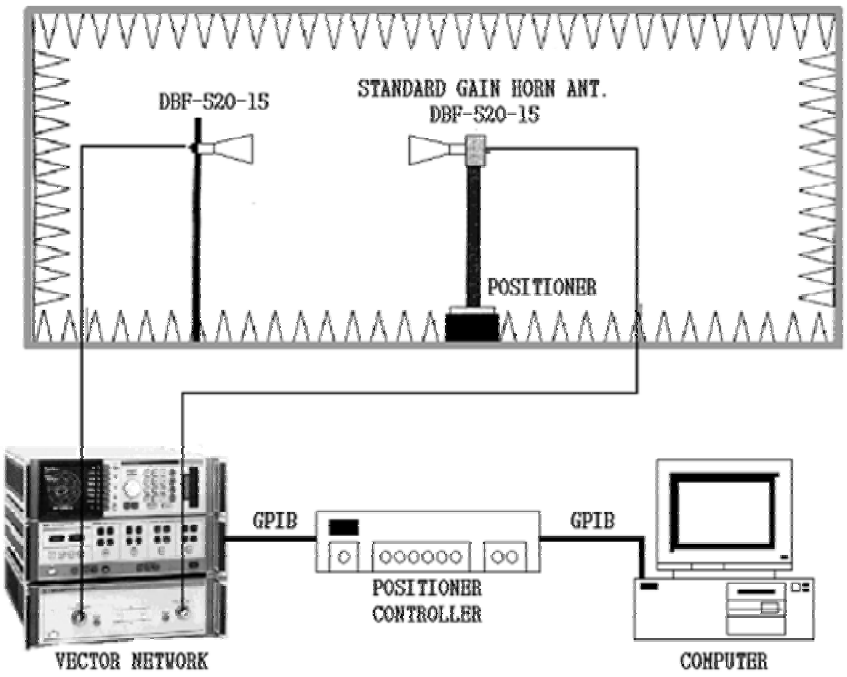


figure 1

2-4-2. Radiation Pattern Measure

Radiation Pattern Measure according to figure2(a), figure2(b), Scale and Range set up 5dB ,30dB(each).

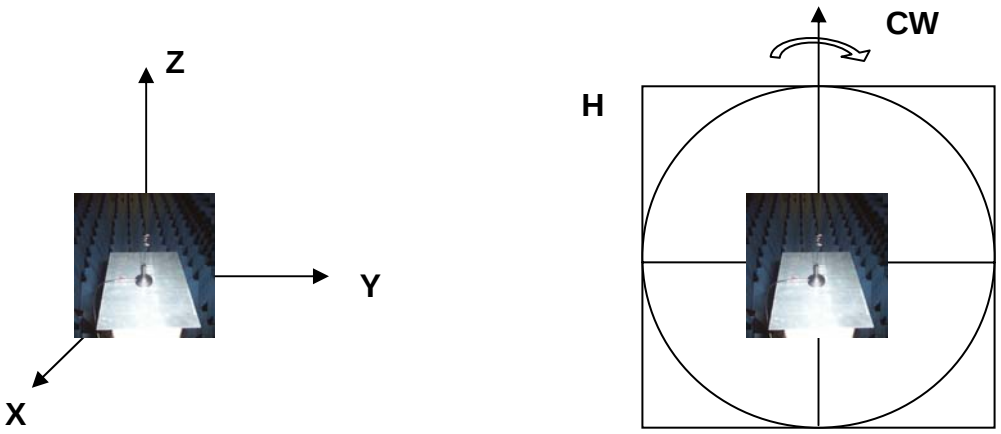


Figure 2 (a)

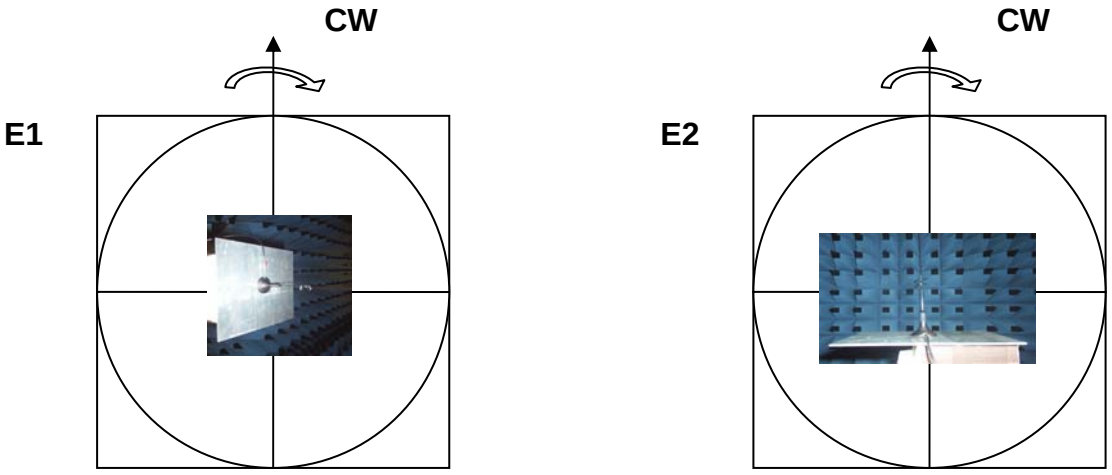
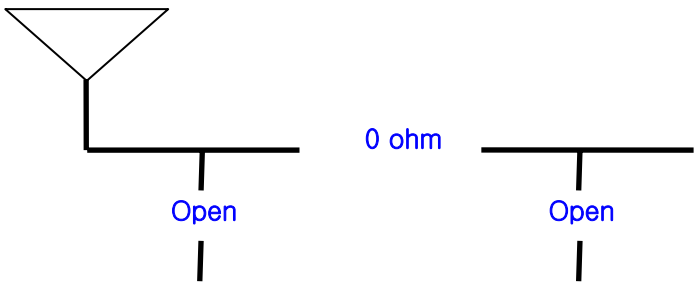


Figure 2 (b)

2-4-3 Typical values in maximum direction

Item		Data			
Frequency Range		824MHz ~ 894MHz		1850 ~ 1990MHz	
Frequency		824 MHz	894 MHz	1850 MHz	1990 MHz
Peak Gain	**H-plane**	-0.0 dBi	-0.1 dBi	0.3 dBi	0.72 dBi
	E1-plane	-0.3 dBi	-0.1 dBi	0.9 dBi	0.1 dBi
	E2-plane	-4.0 dBi	-5.2 dBi	-4.23 dBi	-2.7 dBi
Average Gain	**H-plane**	-5.79 dBi	-5.3 dBi	-4.79 dBi	-7.0 dBi
	E1-plane	-5.38 dBi	-5.33 dBi	-4.47 dBi	-6.1 dBi
	E2-plane	-6.83 dBi	-9.4 dBi	-7.97 dBi	--5.6 dBi

- **Antenna Matching Value**



3. Environment Resistance Properties

3.1 Operational Temperature

3.1.1. Low Operational Temperature

TLO = -20°C

3.1.2 High Operational Temperature

THO = +70°C

3.1.3 Demands

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

3.1.4 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.

3.2 Temperature Cycling

3.2.1 Low Cycling Temperature

TLC = -40°C

3.2.2 High Cycling Temperature

THC = +80°C

3.2.3 Demands

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

3.2.4 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.

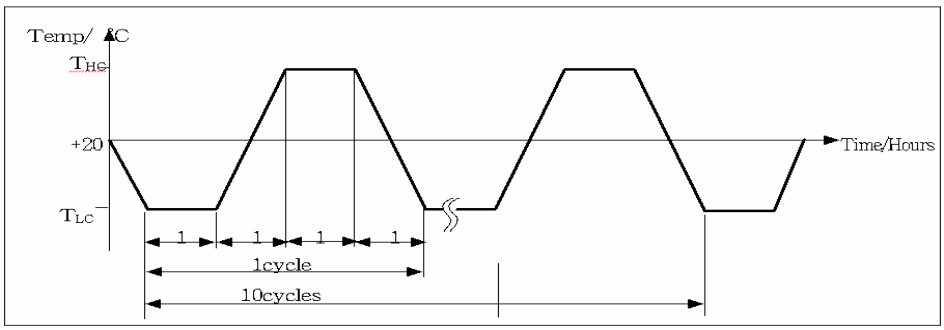


Figure 3. Temperature Cycling

3.3 Humidity

3.3.1 Relative Humidity

95%

3.3.2 Temperature

+55°C

3.3.3 Demands

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

3.3.4 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.

3.4 Sinusoidal Vibration

3.4.1 Vibration Frequencies

10-55-10Hz(1cycle)

3.4.2 Sweep Rate

1 octave/min(logarithmic)

3.4.3 Maximum Amplitude

A = 1.52mm

3.4.4 Maxim Acceleration

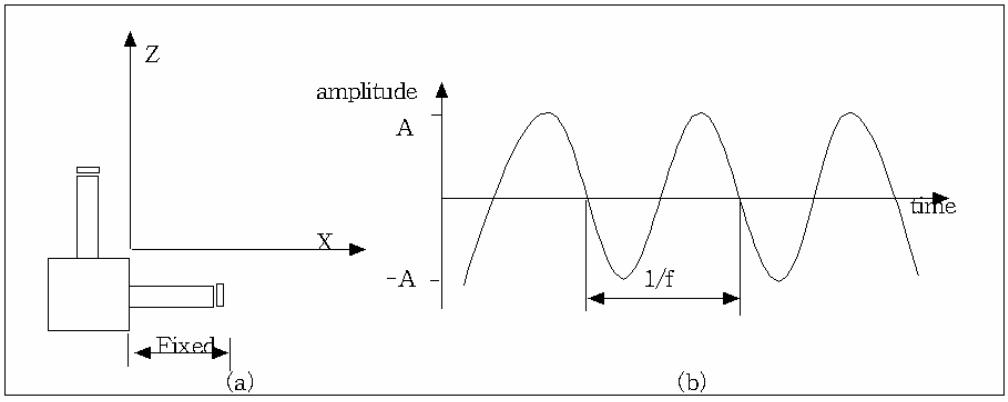
2g

3.4.5 Crossover Frequency

18.2Hz

3.4.7 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.



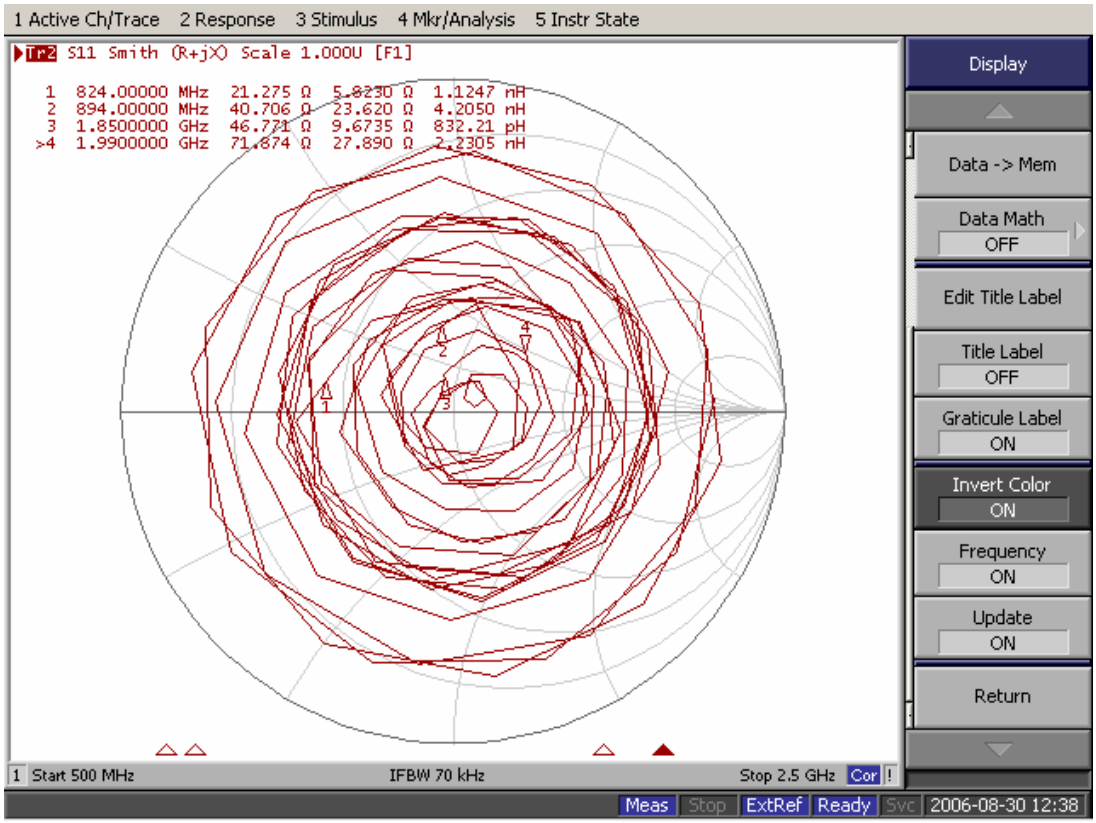
(a) Vibration directions (b) Vibration form

Figure 4. Sinusoidal Vibrator

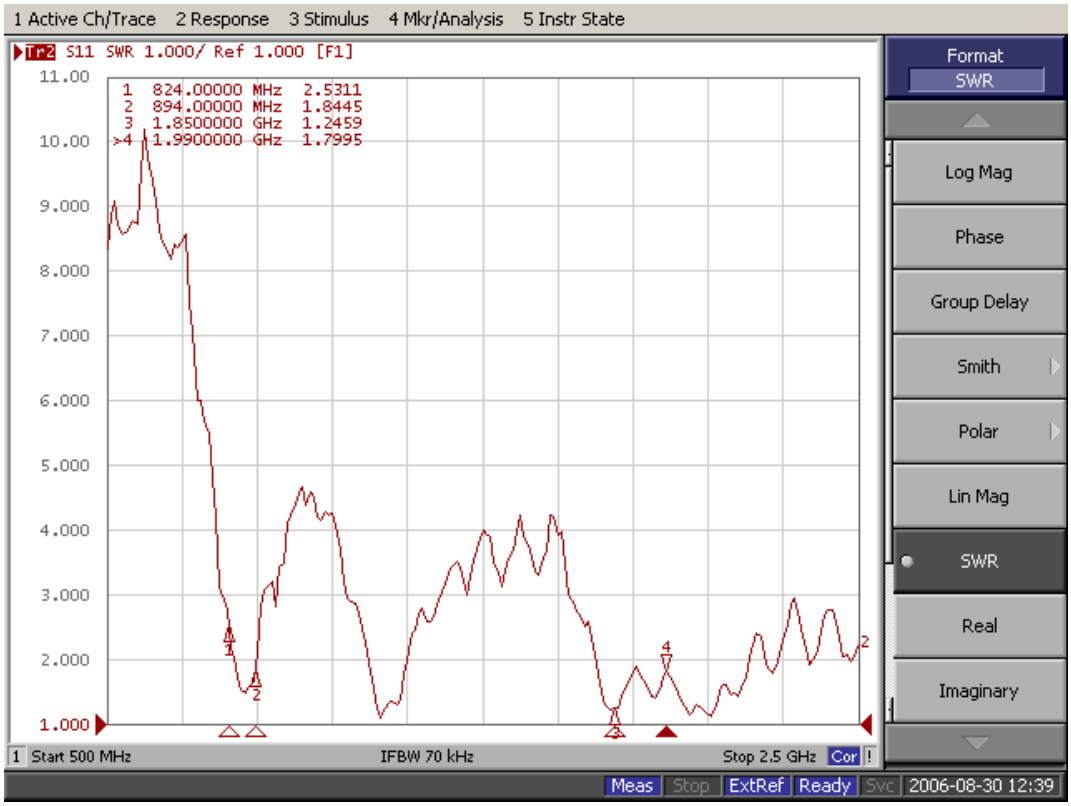
4. Test Data

4.1 Network Data

4.1.1 Smith Chart

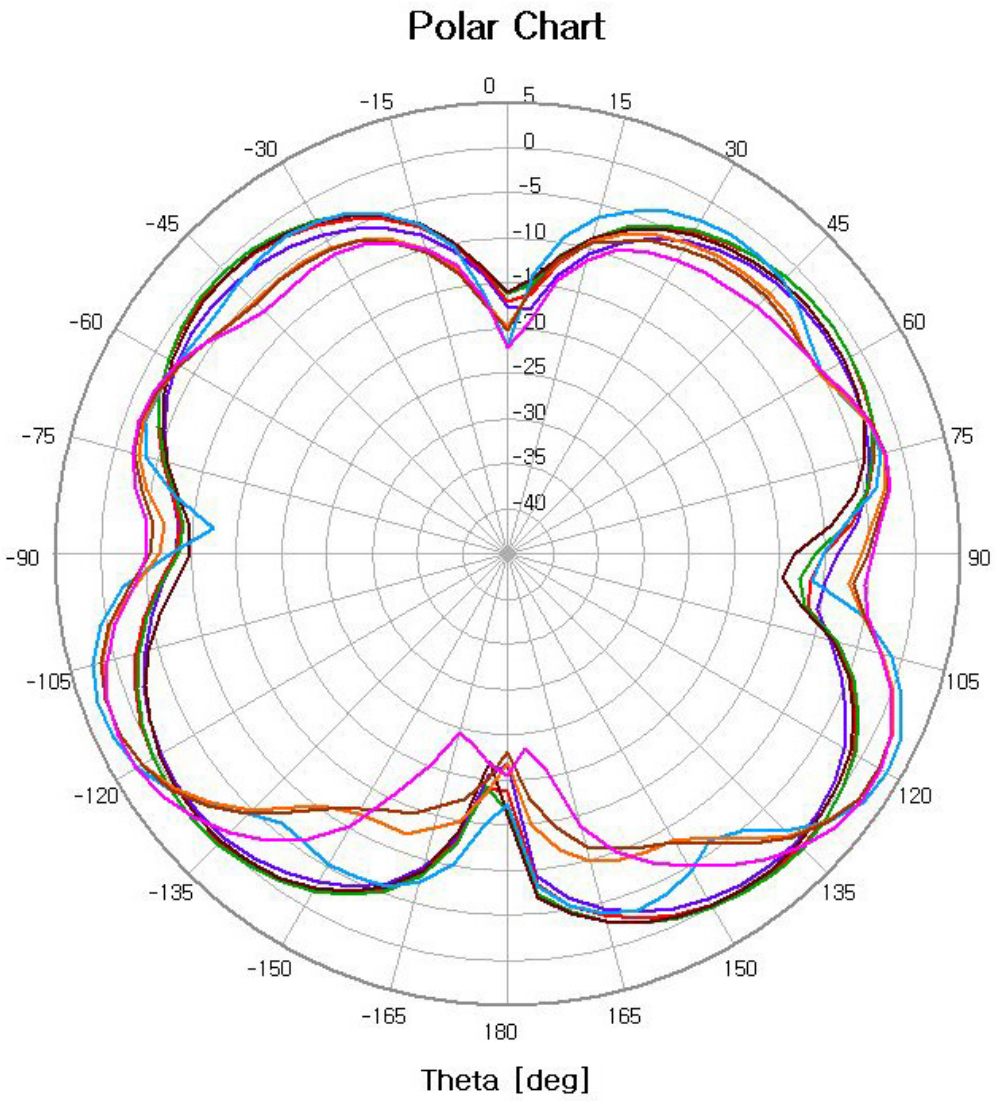


4.1.2 VSWR



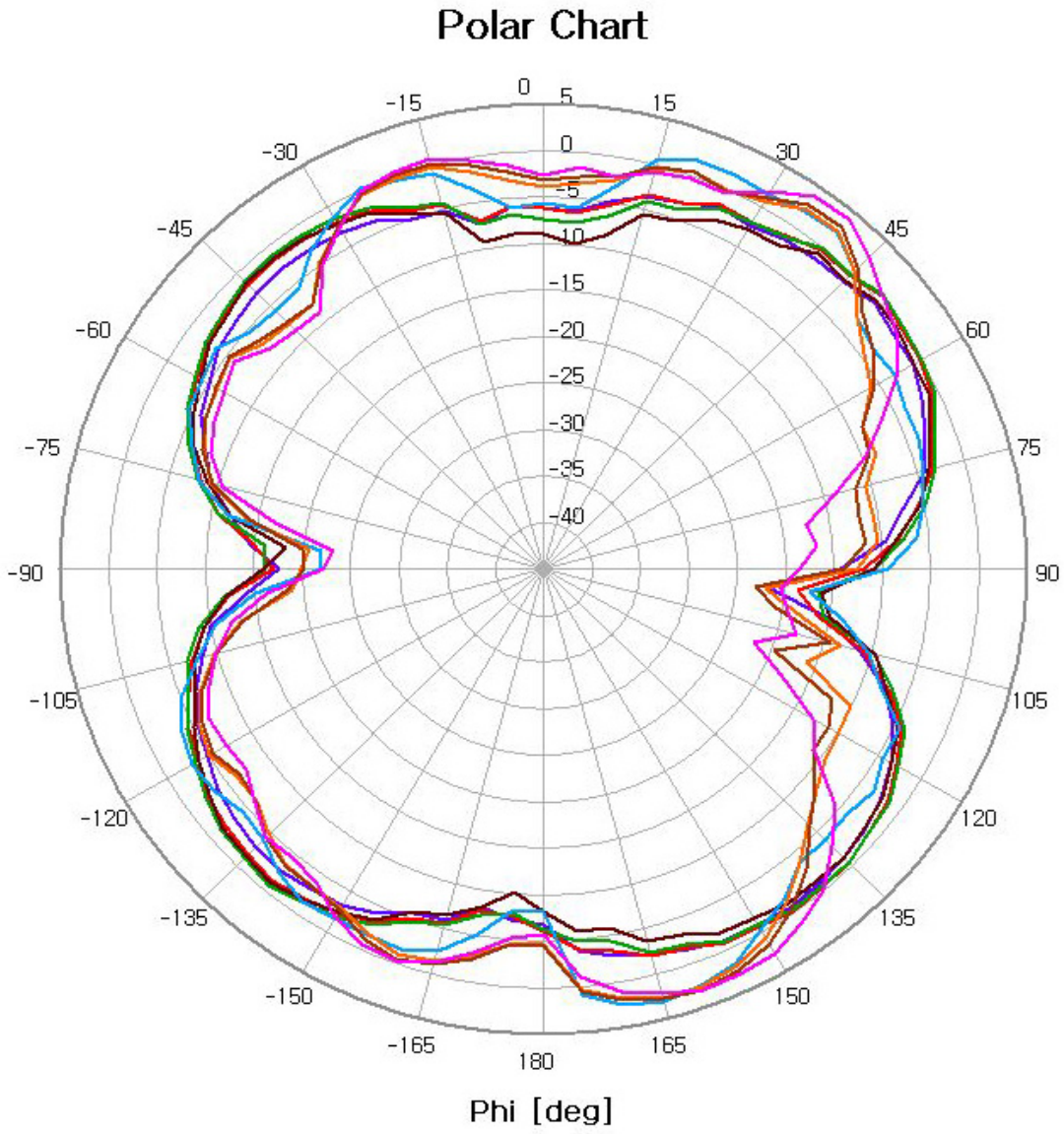
4 .2 Radiation Pattern

4.2.1 H – Plane



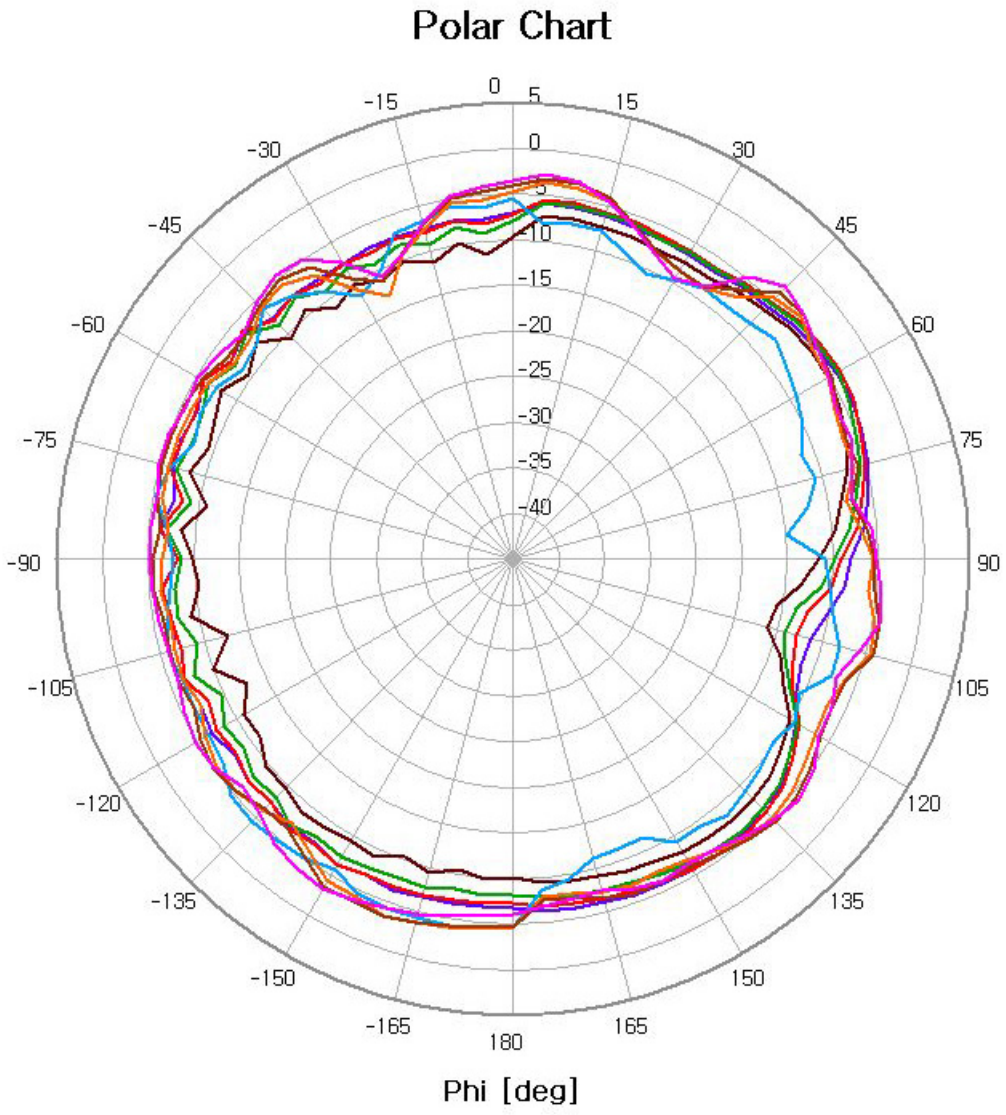
Frequency	Max.	Min.	Avg.
824Mhz	-0.0	-21.7	-5.79
849Mhz	0.84	-19.0	-4.92
869Mhz	0.93	-19.1	-4.75
894Mhz	0.38	-22.1	-5.3
1850Mhz	0.3	-22.1	-4.79
1910Mhz	0.4	-21.91	-6.46
1930MHz	0.3	-23.08	-6.7
1990MHz	0.7	-24.49	-7.0

4.2.2 E1 - Plane



Frequency	Max.	Min.	Avg.
824Mhz	-0.3	-21.71	-5.38
849Mhz	0.6	-18.7	-4.62
869Mhz	0.8	-16.53	-4.49
894Mhz	-0.1	-18.18	-5.33
1850Mhz	0.9	-22.0	-4.47
1910Mhz	0.6	-21.91	-5.78
1930MHz	0.0	-23.07	-5.81
1990MHz	0.12	-23.12	-6.1

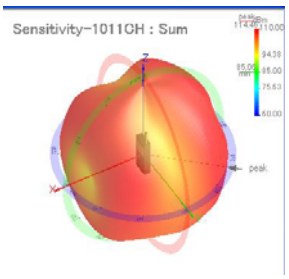
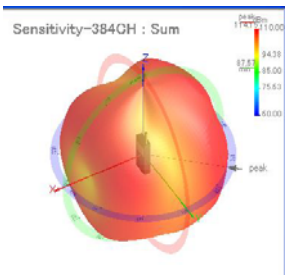
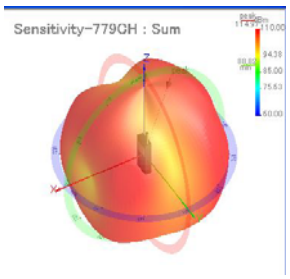
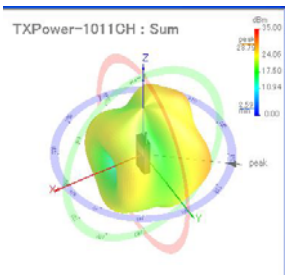
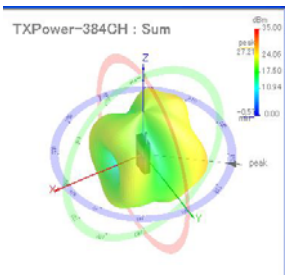
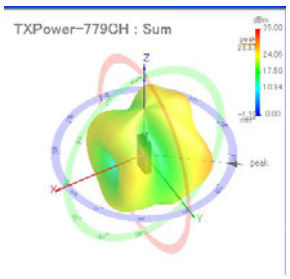
4.2.3 E2 – Plane



Frequency	Max.	Min.	Avg.
824Mhz	-4.09	-11.4	-6.84
849Mhz	-3.68	-12.85	-7.01
869Mhz	-4.04	-14.18	-7.75
894Mhz	-5.26	-16.1	-9.41
1850Mhz	-4.23	-14.94	-7.98
1910Mhz	-3.53	-13.14	-6.24
1930MHz	-3.24	-11.41	-5.69
1990MHz	-2.7	-10.88	-5.6

4.3 Active test

4.3.1 TRP & TIS(USC)

	1011	384	779
TIS-Sum			
	1011	**384**	**779**
TRP-Sum			

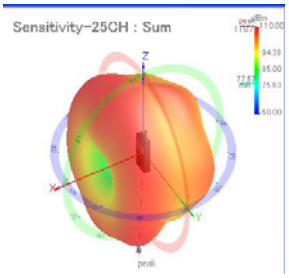
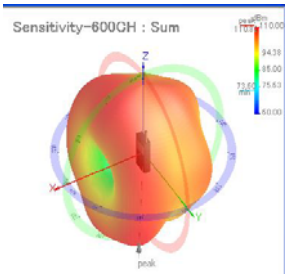
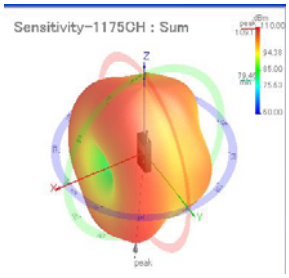
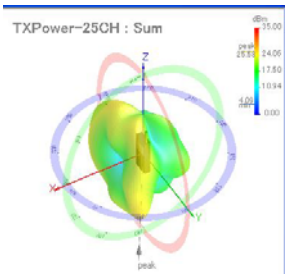
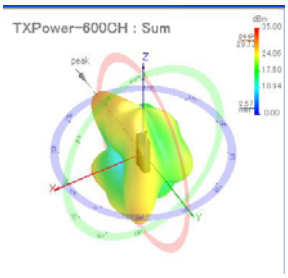
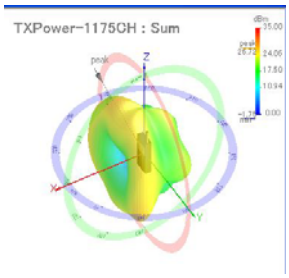
Total Isotropic Sensitivity [dBm]

Channel	1011	384	779	
RX Frequecny [MHz]	869.64	881.52	893.37	
TIS [dBm]	107.4	107.3	107.5	
Pass / Fail				
Total TIS [dBm]	107.4			

Total Radiated Power [dBm]

TX Frequency [MHz]	824.64	836.52	848.37	
TRP [dBm]	22.94	21.08	22.34	
Pass / Fail				
Total TRP [dBm]	22.18			

4.3.3 TRP&TIS(USPCS)

	25	600	1175
TIS-Sum			
TRP-Sum			

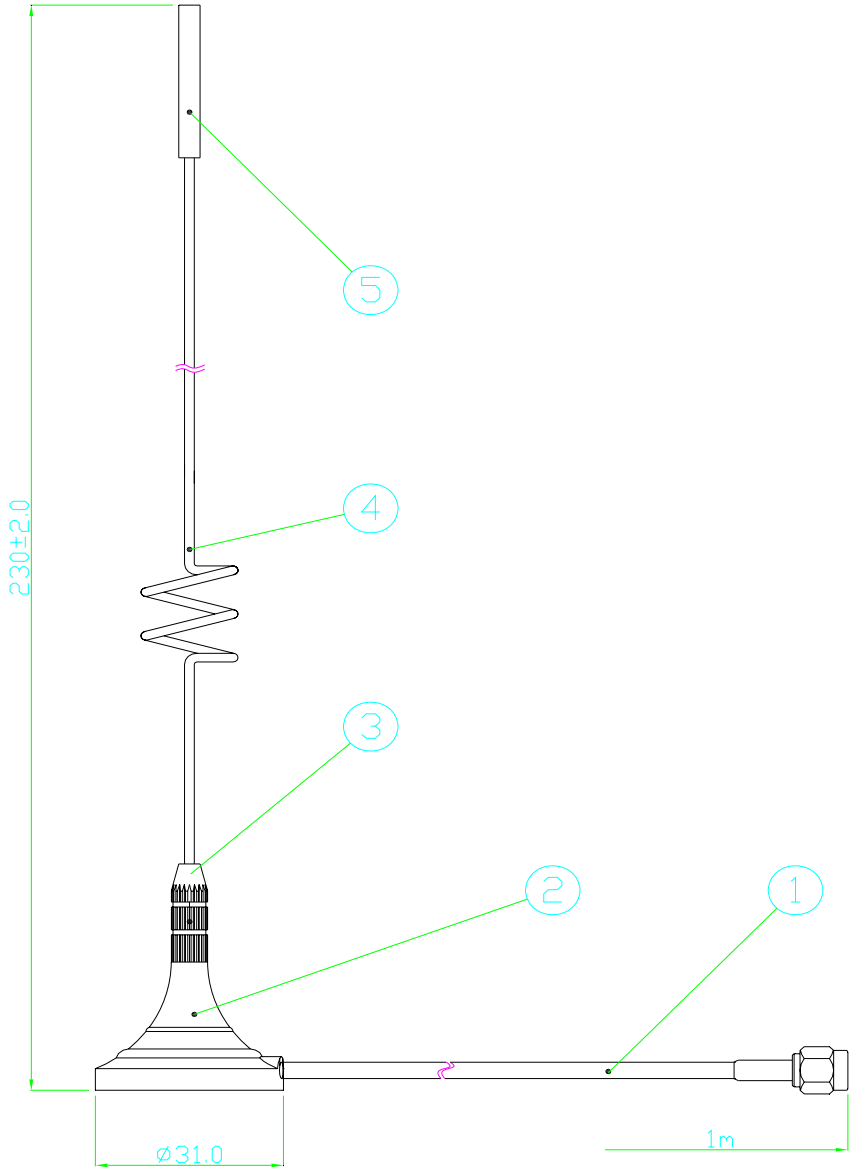
Total Isotropic Sensitivity [dBm]

Channel	25	600	1175	
RX Frequecny [MHz]	1931.25	1960	1988.75	
TIS [dBm]	104.4	104.1	102.8	
Pass / Fail				
Total TIS [dBm]	103.8			

Total Radiated Power [dBm]

TX Frequency [MHz]	1851.25	1880.00	1908.75	
TRP [dBm]	19.22	20.87	20.42	
Pass / Fail				
Total TRP [dBm]	20.23			

5. Mechanical Drawing



NO.	Part No.	Description	Q'TY	Meterial	Remark
5	MTDS-1004	TOP-METAL	1	MBsBD	BLACK Cr Plated
4	SPDS-1001	WHIP SPRING	1	SUS 304	BLACK Cr Plated
3	MTDS-1003	ROD METAL	1	MBsBD	BLACK Cr Plated
2	CODS-1001	BASE ASSY	1	-	-
1	CADS-1001	CABLE ASS'Y	1	-	SMA-M-RG174

Tolerlances — Decimals .* ±0.1 .* * ±0.05 — Angles ±1° — 1.6a

Designed By.	Checked By.	Approved By.	Model No.	Magnet Antenna
s.w. Park	-	b.h. Cho	Part No.	MADS-1001
			Part Name	CDMA-USPCS
	Scale: 1/1	Unit: mm	DS Technology	Rev. 0