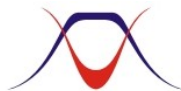


ATID CO., Ltd

# APPROVAL SHEET

Circularly Polarized Patch Antenna		
NO	MODEL	FREQUENCY
1	AEP50-915RHCP-UFL	902MHz ~ 928MHz

공 급 업 체			승 인 업 체		
작 성	검 토	승 인	작 성	검 토	승 인
					



**Antenna Engine**

4F 328-8 Young Hwa B/D, Sang-Dong,  
Wonmi-Gu, Bucheon-Si, Kyoung Gi-Do, KOREA  
TEL. : 070) 7740-7735  
FAX : 032) 652-7758



# (ANTENNA SPECIFICATION)

1. Model Name: AEP50-915RHCP-UFL

2. Antenna Type : Circularly Polarized Patch Antenna

### 3. FEATURES

- For UHF Band RFID Applications
- Excellent Axial Ration
- Wide Bandwidth
- Compact Size and Light Weight

### 4. ANTENNA 형상

첨부 도면과 같음.

### 5. Electrical Properties

No.	ELECTRICAL DATA	SPECIFICATIONS	REMARK
5. 1	FREQUENCY RANGE	902~928 MHz	
5. 2	IMPEDANCE	50 Ω	
5. 3	V. S. W. R	LESS THAN 1 : 2.0	NOMINAL
5. 4	GAIN(Linear, Each Polaization)	0 dBi (Max)	
5. 5	RADIATION PATTERN	Directional	
5. 6	POLARIZATION	RHCP	

### 6. Mechanical Properties

No.	MECHANICAL	SPECIFICATIONS	REMARK
6. 1	SIZE ( W * H * T)	49 * 49 * 8.6 (mm)	
6. 2	Cable	Coaxial Cable with UFL Connector	50mm

## 7. Environment Resistance Properties

### 7.1 Sinusoidal Vibration

#### 7.1.1 Vibration Frequencies

10-55-10Hz(1cycle)

#### 7.1.2 Sweep Rate

1 octave/min(logarithmic)

#### 7.1.3 Maximum Amplitude

$A = 1.52\text{mm}$

#### 7.1.4 Maxim Acceleration

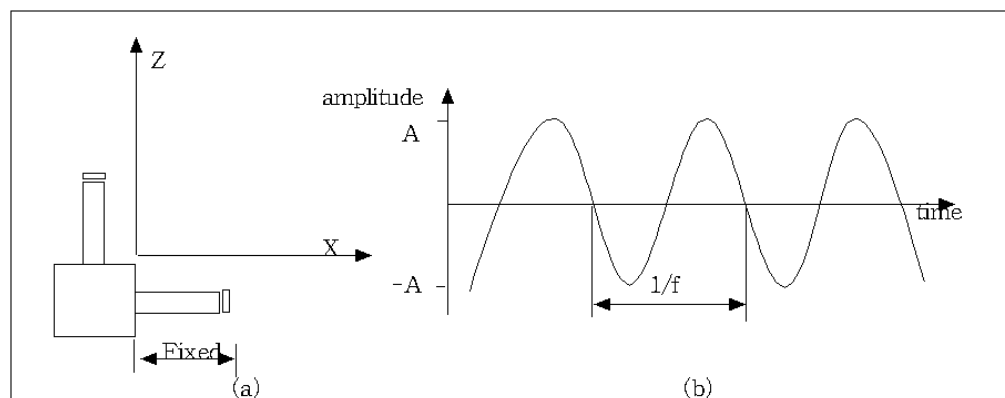
2g

#### 7.1.5 Crossover Frequency

18.2Hz

#### 7.1.6 Measuring Method

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



< Figure 1 >

### 7.2 Operational Temperature

#### 7.2.1. Low Operational Temperature

TLO =  $-30^{\circ}\text{C}$

#### 7.2.2 High Operational Temperature

THO =  $+70^{\circ}\text{C}$

#### 7.2.3 Demands

No visual deterioration shall occur, and the antenna shall satisfy the electrical demands, according to 5, during the test.

#### 7.2.4 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.

#### 7.2.5 Temperature Cycling

-Low Cycling Temperature

TLC =  $-40^{\circ}\text{C}$

- High Cycling Temperature

THC = +80°C

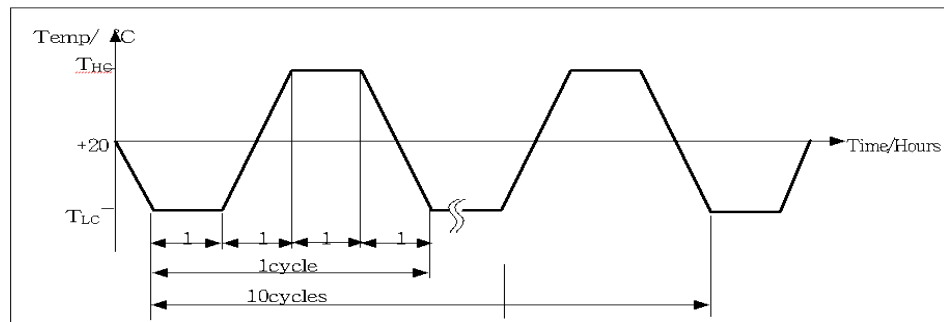
- Demands

No visual deterioration shall occur during the test. The antenna shall satisfy the electrical demands, according to 5.

-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 2 below.



< Figure 2 >

### 7.3 Humidity

7.3.1 Relative Humidity

95%

7.3.2 Temperature

+55°C

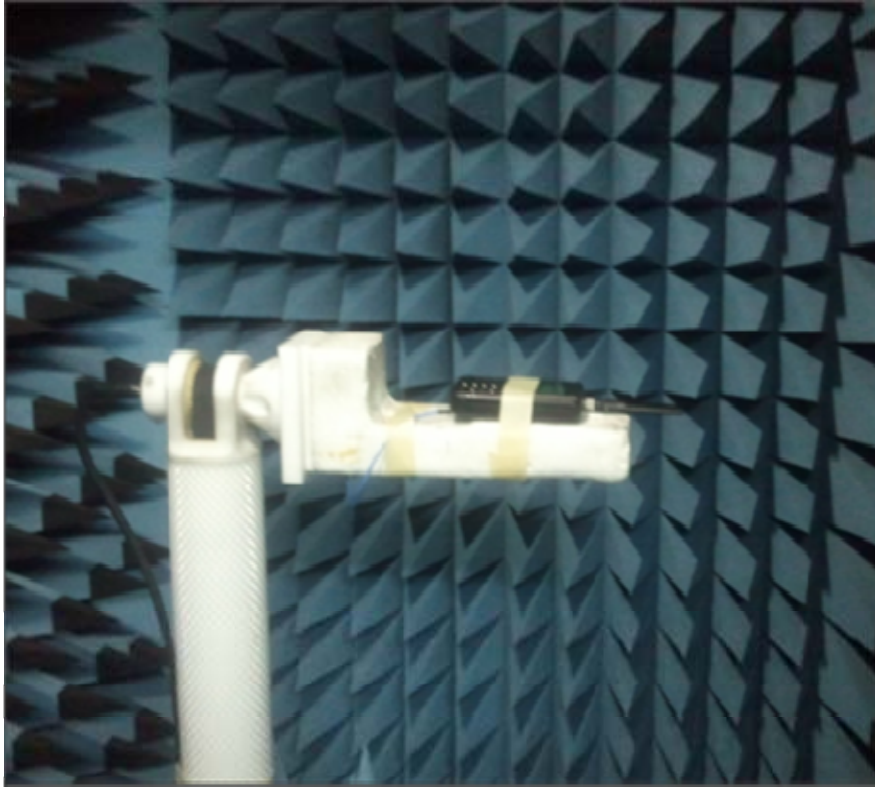
7.3.3 Demands

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

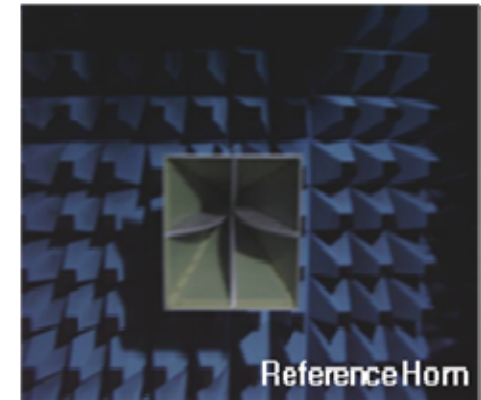
7.3.4 Measuring Method

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.

## ※ 3D-Measurement



Gain Horn



Reference Horn

- Calibration 주파수 대역 : 0.8 ~ 2.7[GHz]
  - 2D 복사패턴 Angle step : 05°
  - 3D 복사패턴 Angle step : 15°
- 안테나의 이득과 복사 패턴을 정확히 측정하기 위해 챔버내에 설치된 혼안테나를 Calibration 하는 장면.

# 8. Radiation Pattern[902~928 MHz]

2012-07-05 오전 11:16:08
KTM
Calibration
900\_RFID
Select Frequency
900Mhz\_RFID
Motor

2D Measurement
3D Measurement

Measurement Setup
Angle Step
15
Measurement Pol
H+V POL

START
STOP
EXIT

User Info  
Print

Data | HV Sum Line | H Line | V Line | Polar | Plan | Plan - Horizontal | Plan - Vertical

H plan

E1 plan

E2 plan

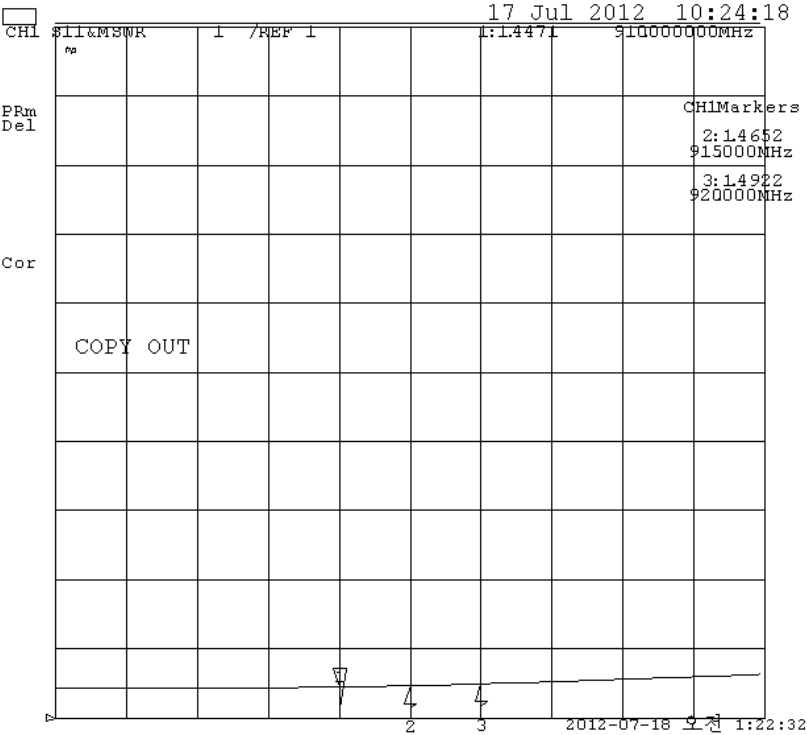
Hor+Ver | Horizontal | Vertical | H plan | E1 plan | E2 plan

	Frequency[MHz]	PeakValue	Theta[deg]	Phi[deg]	MinValue	Theta[deg]	Phi[deg]	3D Avg[dBi]	2D Avg[dBi]	Efficiency[%]
	900.000	-1.148	105	285	-22.434	120	60	-5.157	0	30.359%
	905.000	0.888	105	285	-18.161	105	60	-3.200	0	47.642%
	910.000	0.654	105	285	-19.003	105	75	-3.459	0	44.883%
	915.000	0.380	60	285	-20.928	105	75	-3.760	0	41.882%
	920.000	-1.297	60	285	-23.879	105	75	-5.476	0	28.213%
	925.000	-2.478	60	285	-26.021	105	75	-6.670	0	21.429%
	930.000	-3.718	60	285	-27.672	105	75	-7.968	0	15.894%

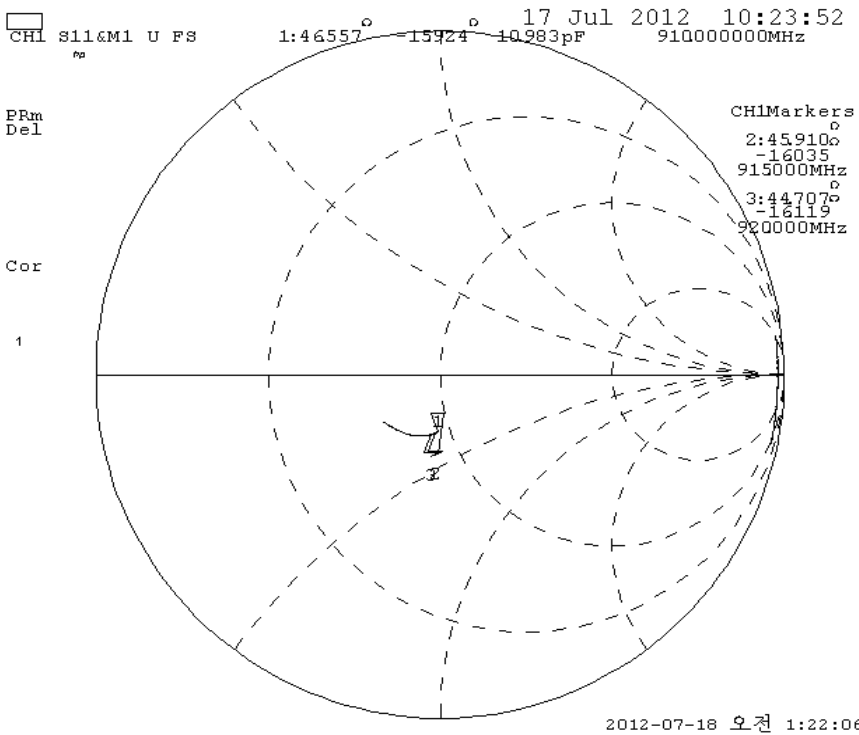
Frequency  
Add Delete  
Sort Save

File  
Save as Open  
Delete Screen capture

# 9. Input Impedance



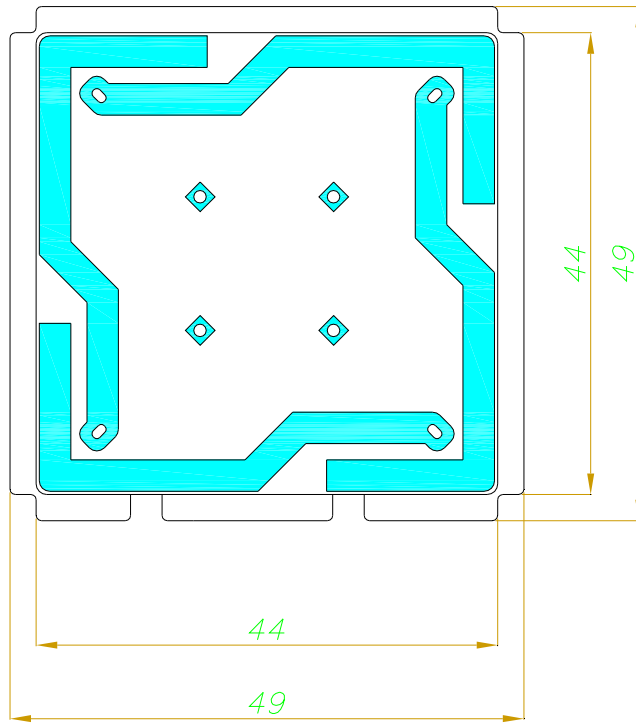
VSWR



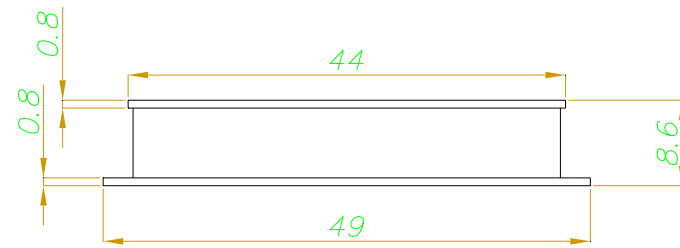
Smith Chart



✳ Mechanical Dimension



< FRONT VIEW >



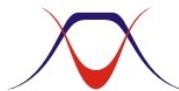
< SIDE VIEW >

ATID CO., Ltd

# APPROVAL SHEET

Circularly Polarized Patch Antenna		
NO	MODEL	FREQUENCY
1	AEP55-915RHCP-UFL	902MHz ~ 928MHz

공 급 업 체			승 인 업 체		
작 성	검 토	승 인	작 성	검 토	승 인
이재현					



**Antenna Engine**

4F 328-8 Young Hwa B/D, Sang-Dong,  
Wonmi-Gu, Bucheon-Si, Kyoung Gi-Do, KOREA  
TEL. : 070) 7740-7735  
FAX : 032) 652-7758



# (ANTENNA SPECIFICATION)

1. Model Name: AEP55-915RHCP-UFL

2. Antenna Type : Circularly Polarized Patch Antenna

### 3. FEATURES

- For UHF Band RFID Applications
- Excellent Axial Ration
- Wide Bandwidth
- Compact Size and Light Weight

### 4. ANTENNA 형상

첨부 도면과 같음.

### 5. Electrical Properties

No.	ELECTRICAL DATA	SPECIFICATIONS	REMARK
5. 1	FREQUENCY RANGE	902~928 MHz	
5. 2	IMPEDANCE	50 Ω	
5. 3	V. S. W. R	LESS THAN 1 : 2.0	NOMINAL
5. 4	GAIN(Linear, Each Polaization)	0 dBi (Max)	
5. 5	RADIATION PATTERN	Directional	
5. 6	POLARIZATION	RHCP	

### 6. Mechanical Properties

No.	MECHANICAL	SPECIFICATIONS	REMARK
6. 1	SIZE ( W * H * T)	54 * 54 * 8.6 (mm)	
6. 2	Cable	Coaxial Cable with UFL Connector	50mm

## 7. Environment Resistance Properties

### 7.1 Sinusoidal Vibration

#### 7.1.1 Vibration Frequencies

10-55-10Hz(1cycle)

#### 7.1.2 Sweep Rate

1 octave/min(logarithmic)

#### 7.1.3 Maximum Amplitude

$A = 1.52\text{mm}$

#### 7.1.4 Maxim Acceleration

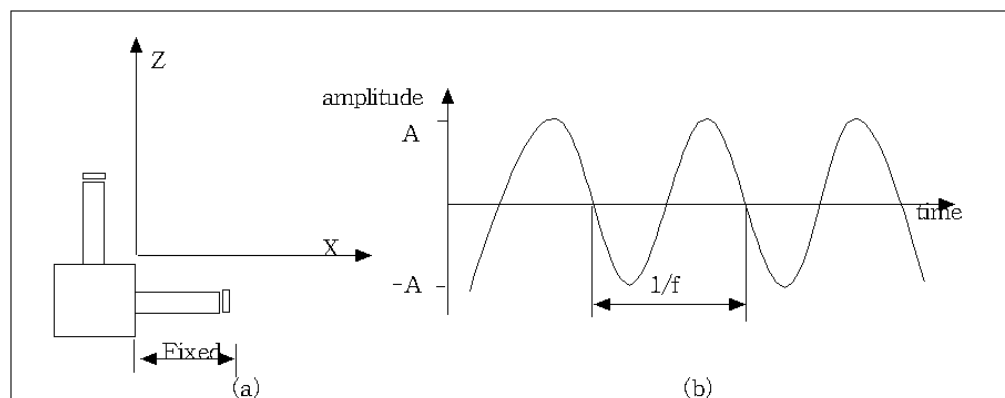
2g

#### 7.1.5 Crossover Frequency

18.2Hz

#### 7.1.6 Measuring Method

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



< Figure 1 >

### 7.2 Operational Temperature

#### 7.2.1. Low Operational Temperature

TLO =  $-30^{\circ}\text{C}$

#### 7.2.2 High Operational Temperature

THO =  $+70^{\circ}\text{C}$

#### 7.2.3 Demands

No visual deterioration shall occur, and the antenna shall satisfy the electrical demands, according to 5, during the test.

#### 7.2.4 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.

#### 7.2.5 Temperature Cycling

-Low Cycling Temperature

TLC =  $-40^{\circ}\text{C}$

- High Cycling Temperature

THC = +80°C

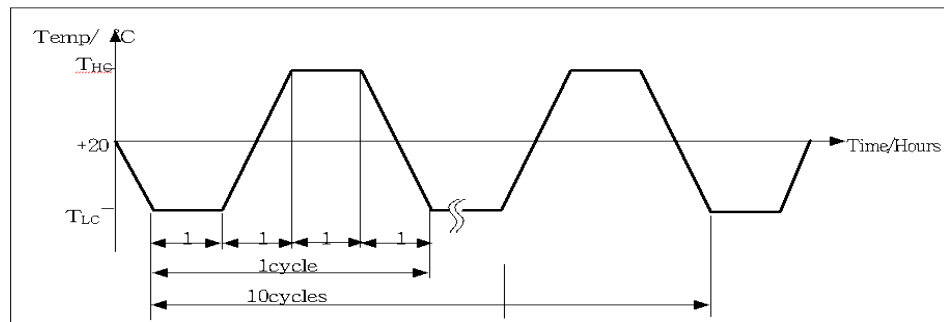
- Demands

No visual deterioration shall occur during the test. The antenna shall satisfy the electrical demands, according to 5.

-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 2 below.



< Figure 2 >

### 7.3 Humidity

7.3.1 Relative Humidity

95%

7.3.2 Temperature

+55°C

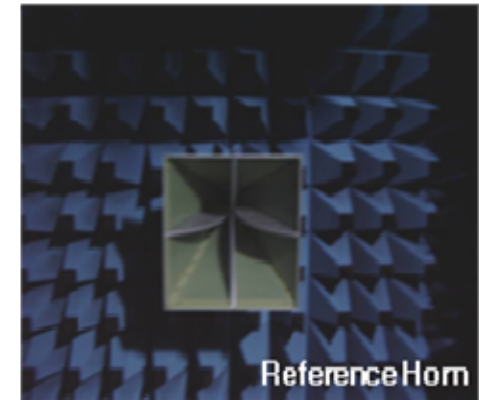
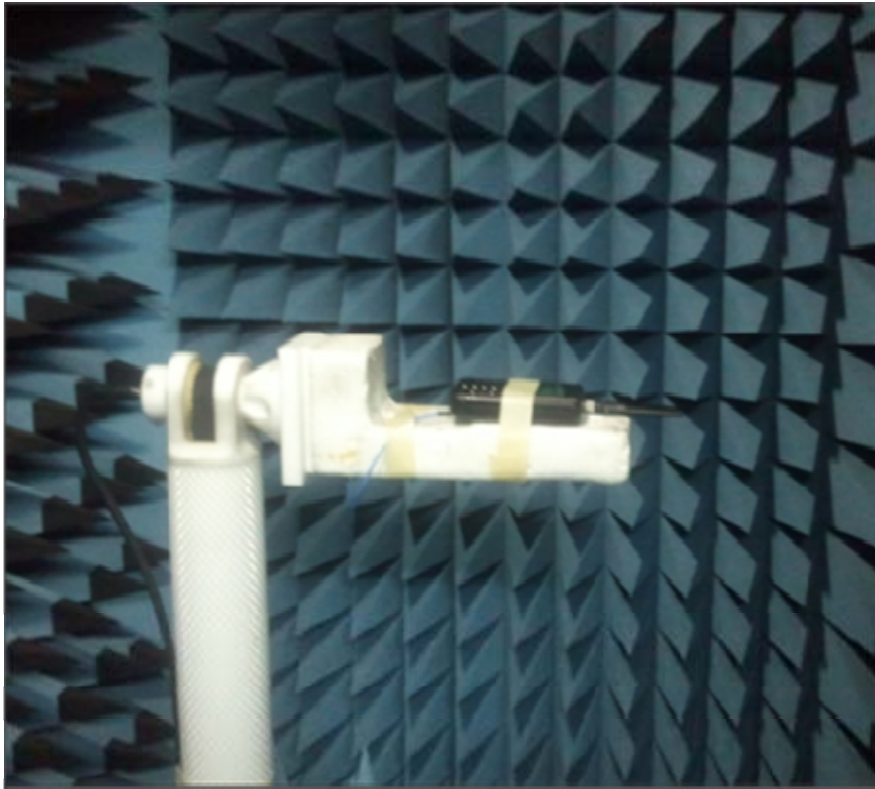
7.3.3 Demands

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

7.3.4 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.

## ※ 3D-Measurement



- Calibration 주파수 대역 : 0.8 ~ 2.7[GHz]
- 2D 복사패턴 Angle step : 05°
- 3D 복사패턴 Angle step : 15°

- 안테나의 이득과 복사 패턴을 정확히 측정하기 위해 챔버내에 설치된 혼안테나를 Calibration 하는 장면.

# 8. Radiation Pattern[902~928 MHz]

2012-07-05 오전 10:16:40
KTM
Calibration 900\_RFID
Select Frequency 900Mhz\_RFID
Motor

2D Measurement
3D Measurement

Measurement Setup
Angle Step 15
Measurement Pol H+V POL

START
STOP
EXIT

User Info
Print

Data | HV Sum Line | H Line | V Line | Polar | Plan | Plan - Horizontal | Plan - Vertical

H plan

E1 plan

E2 plan

Hor+Ver | Horizontal | Vertical | H plan | E1 plan | E2 plan

	Frequency[MHz]	Peak Value	Theta[deg]	Phi[deg]	Min Value	Theta[deg]	Phi[deg]	3D Avg[dBi]	2D Avg[dBi]	Efficiency[%]
	900.000	-0.154	105	285	-17.500	135	60	-4.658	0	34.060%
	905.000	-0.194	105	285	-18.620	135	60	-4.784	0	33.086%
	910.000	-1.090	105	285	-20.035	135	60	-5.746	0	26.512%
	915.000	-0.755	105	270	-19.578	90	60	-5.493	0	28.101%
	920.000	-1.489	105	270	-22.840	90	45	-6.343	0	23.104%
	925.000	-1.744	105	270	-25.998	90	45	-6.671	0	21.422%
	930.000	-2.244	105	270	-27.154	90	45	-7.273	0	18.652%

Frequency

Add
Delete

Sort
Save

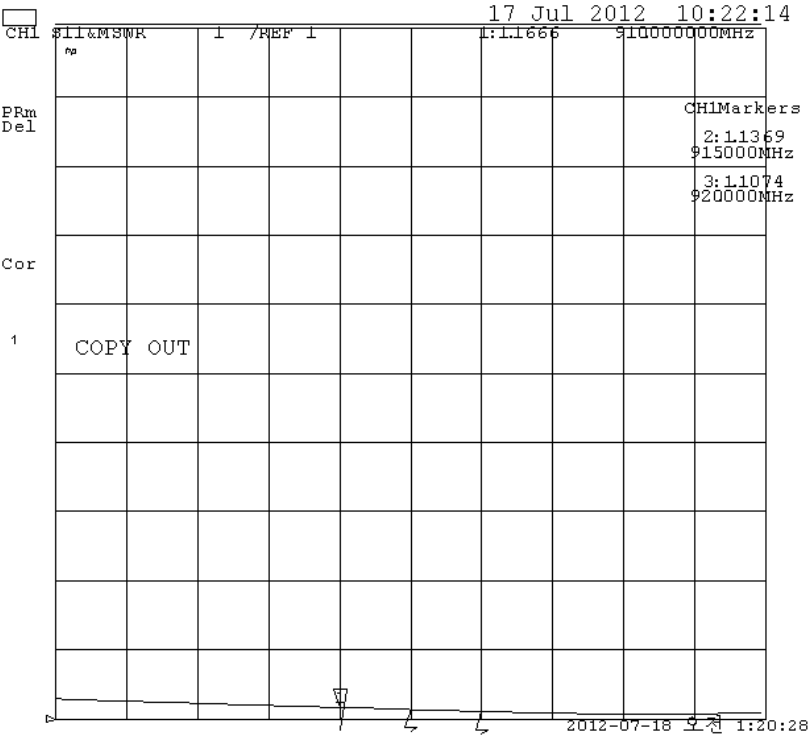
File

Save as
Open

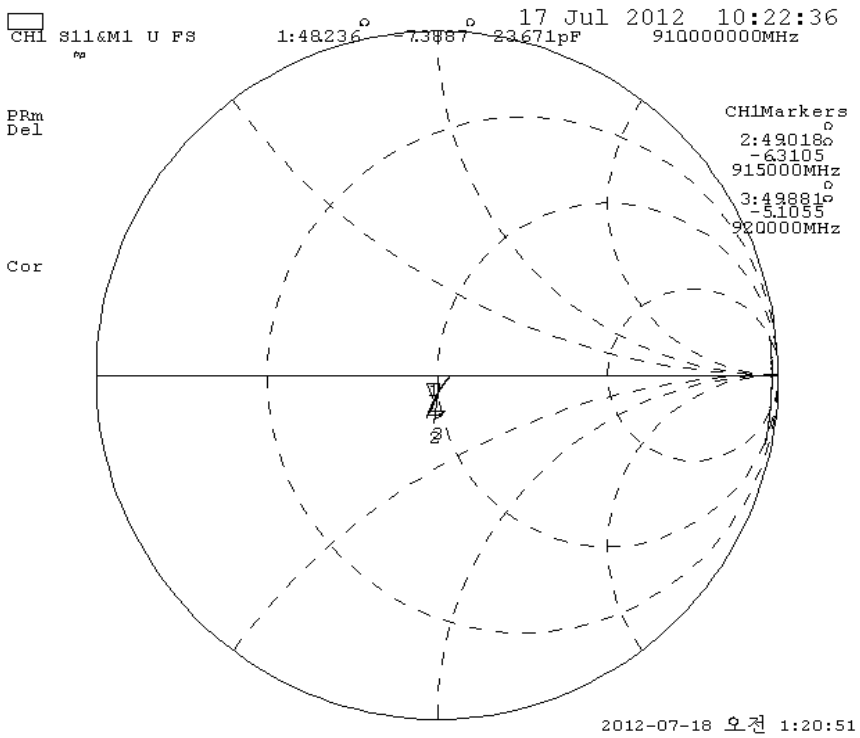
Delete
Screen capture



# 9. Input Impedance



VSWR



Smith Chart

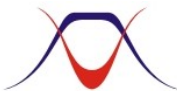


ATID CO., Ltd

# APPROVAL SHEET

Circularly Polarized Patch Antenna		
NO	MODEL	FREQUENCY
1	AEP60-915RHCP-UFL	902MHz ~ 928MHz

공 급 업 체			승 인 업 체		
작 성	검 토	승 인	작 성	검 토	승 인
					



**Antenna Engine**

4F 328-8 Young Hwa B/D, Sang-Dong,  
Wonmi-Gu, Bucheon-Si, Kyoung Gi-Do, KOREA  
TEL. : 070) 7740-7735  
FAX : 032) 652-7758



# (ANTENNA SPECIFICATION)

1. Model Name: AEP60-915RHCP-UFL

2. Antenna Type : Circularly Polarized Patch Antenna

### 3. FEATURES

- For UHF Band RFID Applications
- Excellent Axial Ration
- Wide Bandwidth
- Compact Size and Light Weight

### 4. ANTENNA 형상

첨부 도면과 같음.

### 5. Electrical Properties

No.	ELECTRICAL DATA	SPECIFICATIONS	REMARK
5. 1	FREQUENCY RANGE	902~928 MHz	
5. 2	IMPEDANCE	50 Ω	
5. 3	V. S. W. R	LESS THAN 1 : 2.0	NOMINAL
5. 4	GAIN(Linear, Each Polaization)	1 dBi (Max)	
5. 5	RADIATION PATTERN	Directional	
5. 6	POLARIZATION	RHCP	

### 6. Mechanical Properties

No.	MECHANICAL	SPECIFICATIONS	REMARK
6. 1	SIZE ( W * H * T)	60 * 60 * 16.6 (mm)	
6. 2	Cable	Coaxial Cable with UFL Connector	50mm

## 7. Environment Resistance Properties

### 7.1 Sinusoidal Vibration

#### 7.1.1 Vibration Frequencies

10-55-10Hz(1cycle)

#### 7.1.2 Sweep Rate

1 octave/min(logarithmic)

#### 7.1.3 Maximum Amplitude

$A = 1.52\text{mm}$

#### 7.1.4 Maxim Acceleration

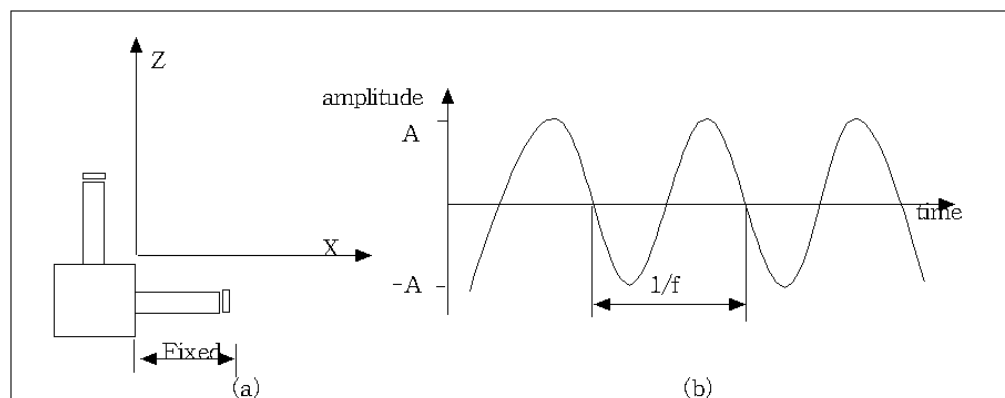
2g

#### 7.1.5 Crossover Frequency

18.2Hz

#### 7.1.6 Measuring Method

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



< Figure 1 >

### 7.2 Operational Temperature

#### 7.2.1. Low Operational Temperature

TLO =  $-30^{\circ}\text{C}$

#### 7.2.2 High Operational Temperature

THO =  $+70^{\circ}\text{C}$

#### 7.2.3 Demands

No visual deterioration shall occur, and the antenna shall satisfy the electrical demands, according to 5, during the test.

#### 7.2.4 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.

#### 7.2.5 Temperature Cycling

-Low Cycling Temperature

TLC =  $-40^{\circ}\text{C}$

- High Cycling Temperature

THC = +80°C

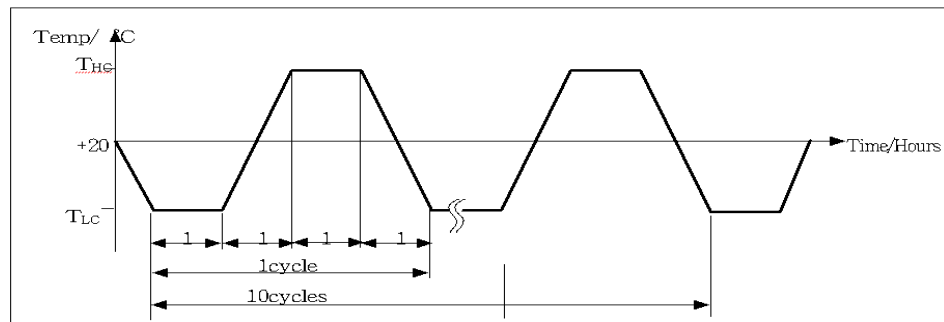
- Demands

No visual deterioration shall occur during the test. The antenna shall satisfy the electrical demands, according to 5.

-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 2 below.



< Figure 2 >

### 7.3 Humidity

7.3.1 Relative Humidity

95%

7.3.2 Temperature

+55°C

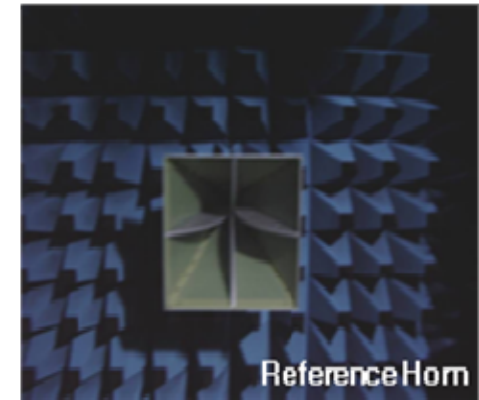
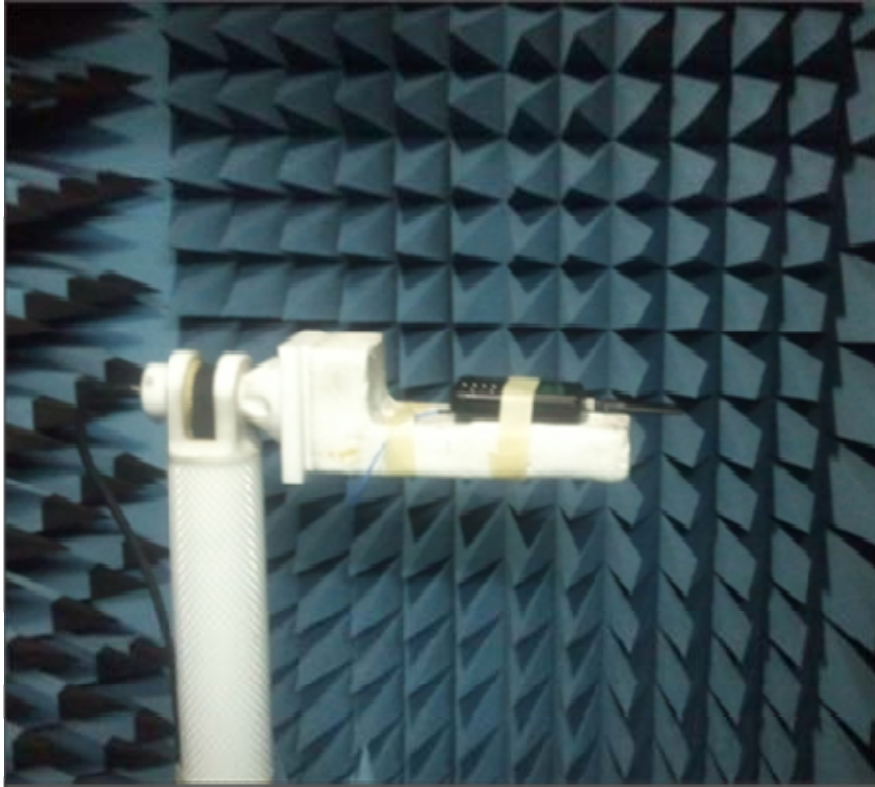
7.3.3 Demands

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

7.3.4 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.

## ※ 3D-Measurement

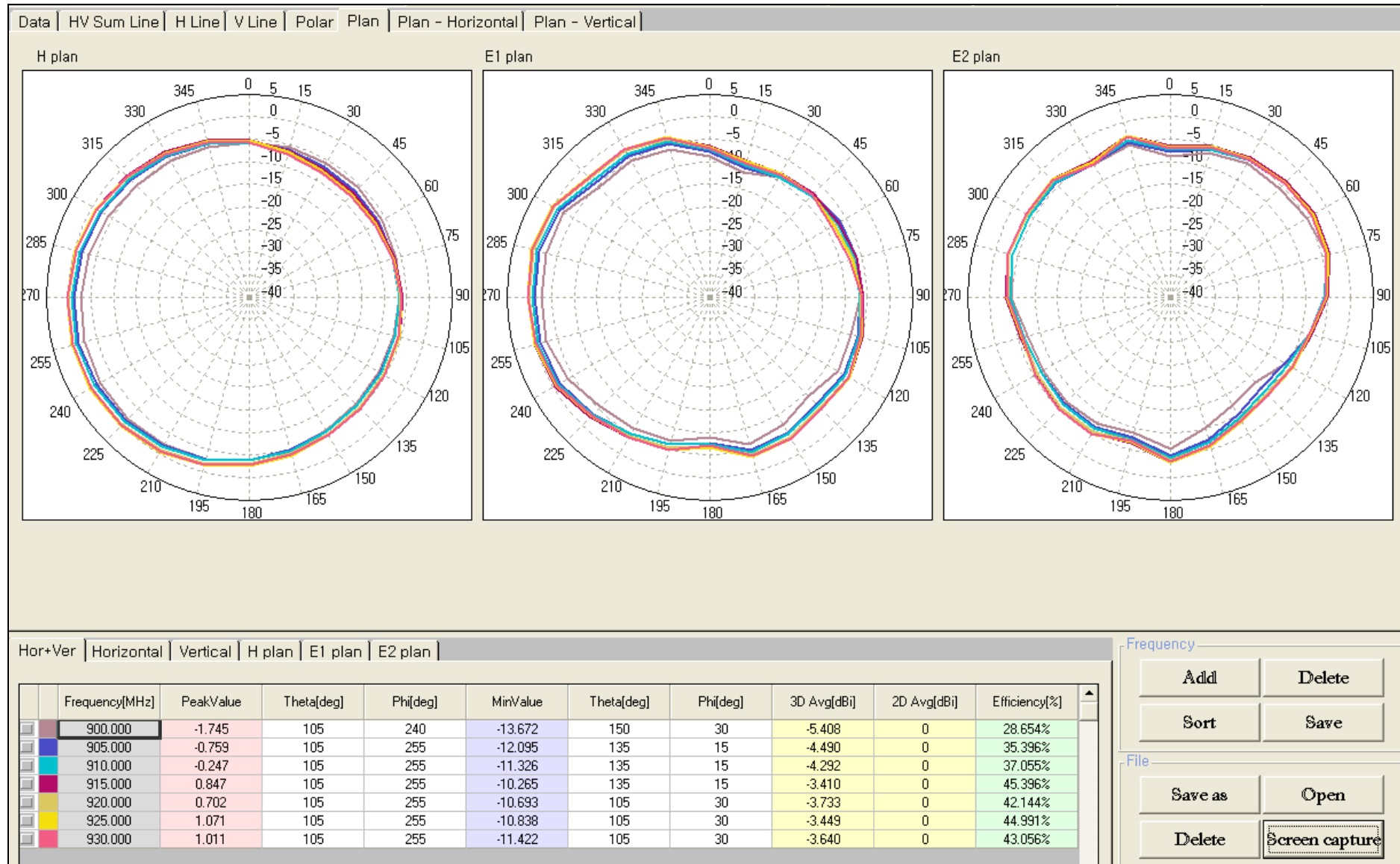


- Calibration 주파수 대역 : 0.8 ~ 2.7[GHz]
- 2D 복사패턴 Angle step : 05°
- 3D 복사패턴 Angle step : 15°

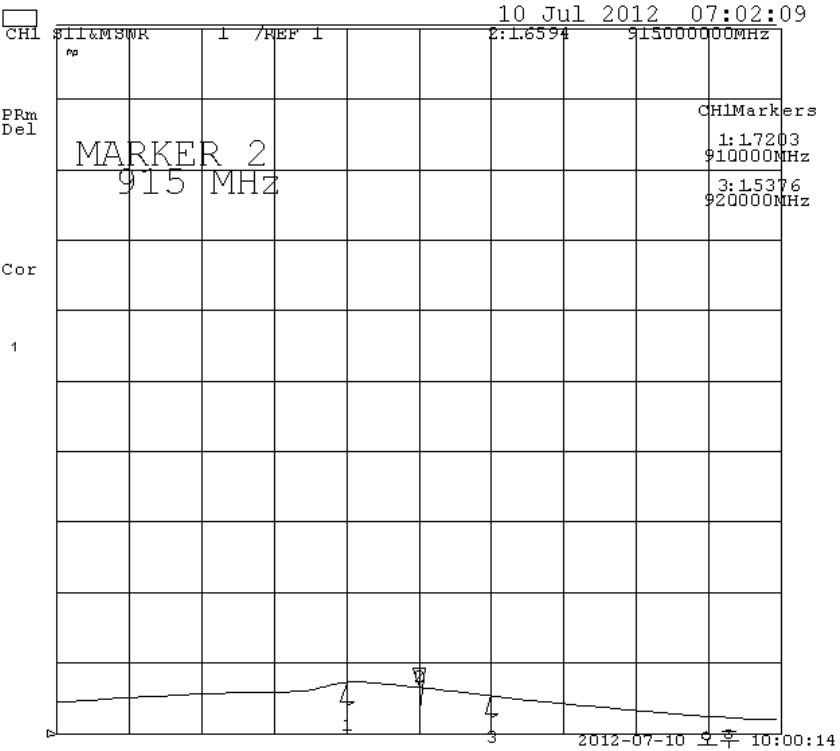
- 안테나의 이득과 복사 패턴을 정확히 측정하기 위해 챔버내에 설치된 혼안테나를 Calibration 하는 장면.



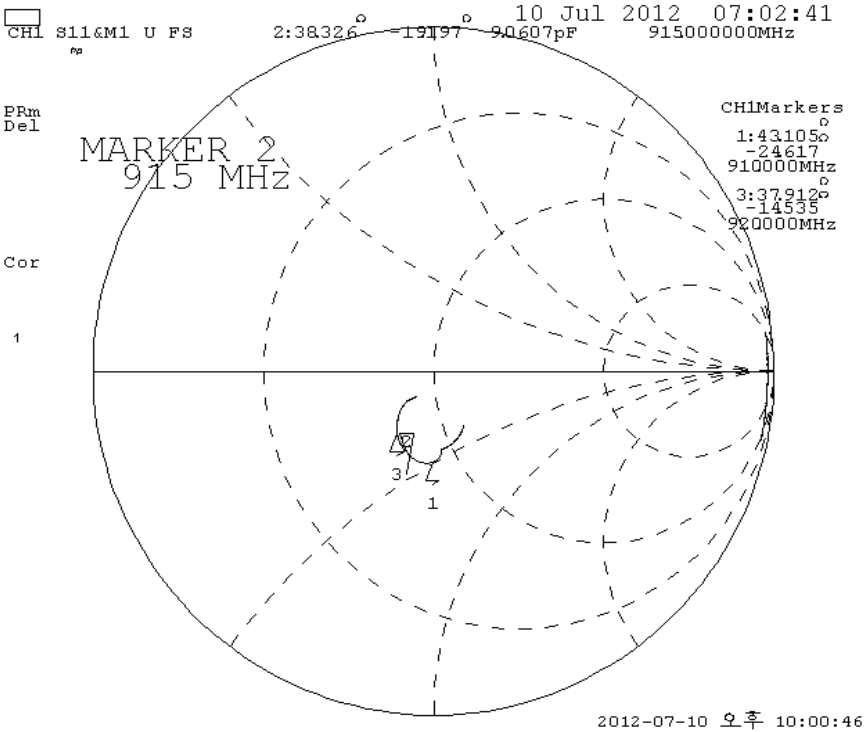
# 8. Radiation Pattern[902~928 MHz]



# 9. Input Impedance

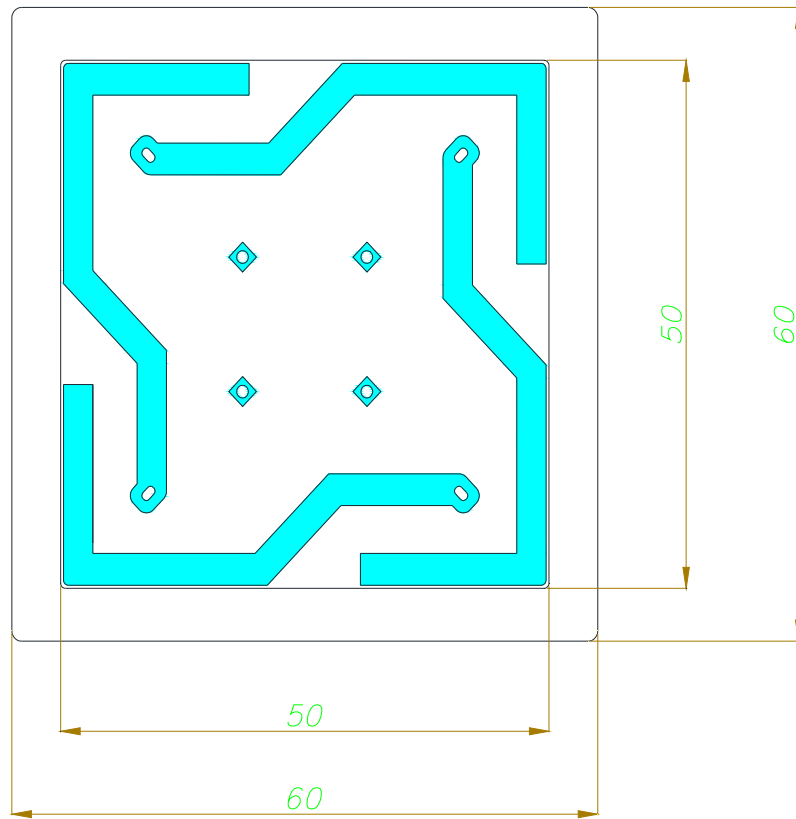


VSWR

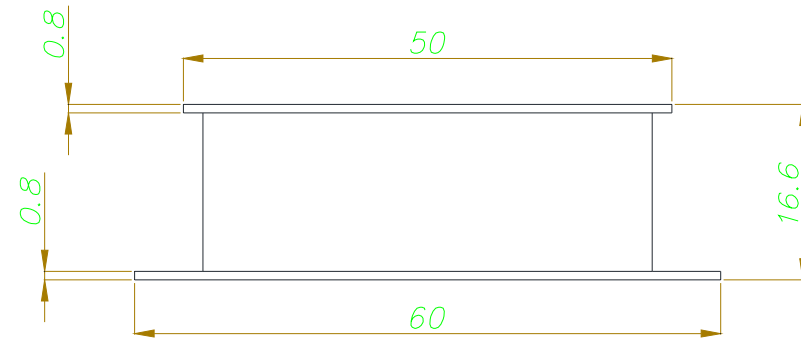


Smith Chart

✳ Mechanical Dimension



< FRONT VIEW >



< SIDE VIEW >