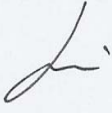


# Antenna approval sheet

|              |                     |
|--------------|---------------------|
| PROJECT NAME | Dipole Antenna      |
| MODEL NAME   | HS9-C/P-03S Rev. IR |
| ITEM No.     | HS9-C/P-03S         |

|                     |                        |                                                                                     |                                                                                      |                                                                                       |
|---------------------|------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Hyesung<br>Co.,Ltd. | MECHANIC<br>DIVISION   | Woker                                                                               | Reviewer                                                                             | Approval                                                                              |
|                     |                        |                                                                                     |                                                                                      |                                                                                       |
|                     |                        |    |   |   |
|                     | ELECTRONIC<br>DIVISION | Woker                                                                               | Reviewer                                                                             | Approval                                                                              |
|                     |                        |                                                                                     |                                                                                      |                                                                                       |
|                     |                        |  |  |  |

As a above mentions, we shall submit to the Antenna (model: HS9-C/P-03S)  
Approval sheet

2009-07-02

**HYESUNG Co., Ltd.**

377-4 Thermitt Bldg 302, Harsang-dong, Sheong-si, Gyeonggi-do,

HO SOO LEE / PRESIDENT

## Specifications Sheet

|                   |                           |                   |               |
|-------------------|---------------------------|-------------------|---------------|
| <b>Object</b>     | External Antenna          | <b>Page</b>       | 1 of 12       |
| <b>Customer</b>   | J COMMUNICATIONS CO., LTD | <b>Date</b>       | JULY 02, 2009 |
| <b>System</b>     | GPRS                      | <b>Rev.</b>       | IR            |
| <b>Model Name</b> | HS9-C/P-03S               | <b>Written by</b> |               |

### Electrical Specifications

|                                |                 |                 |
|--------------------------------|-----------------|-----------------|
| <b>Frequency Range ( MHz )</b> | 824 ~ 960       | 1710 ~ 1990     |
| <b>Band Width ( MHz )</b>      | 136             | 280             |
| <b>V.S.W.R ( Min )</b>         | 4 : 1           | 4 : 1           |
| <b>Gain ( Max )</b>            | 1.4 ± 1 ( dBi ) | 0.2 ± 1 ( dBi ) |
| <b>Input Impedance</b>         | 50 ( Ω )        |                 |
| <b>Polarization</b>            | Linear          |                 |

### Mechanical Specifications

|                              |                  |
|------------------------------|------------------|
| <b>Antenna Size</b>          | Ø11.0 × 104.8 mm |
| <b>Weight</b>                | 11.5 (g)         |
| <b>Radiator Material</b>     | Copper           |
| <b>Operation Temperature</b> | - 30 ~ 70 ( °C ) |
| <b>Operation Humidity</b>    | 10 ~ 90 ( % )    |

**HYESUNG Co., Ltd.**

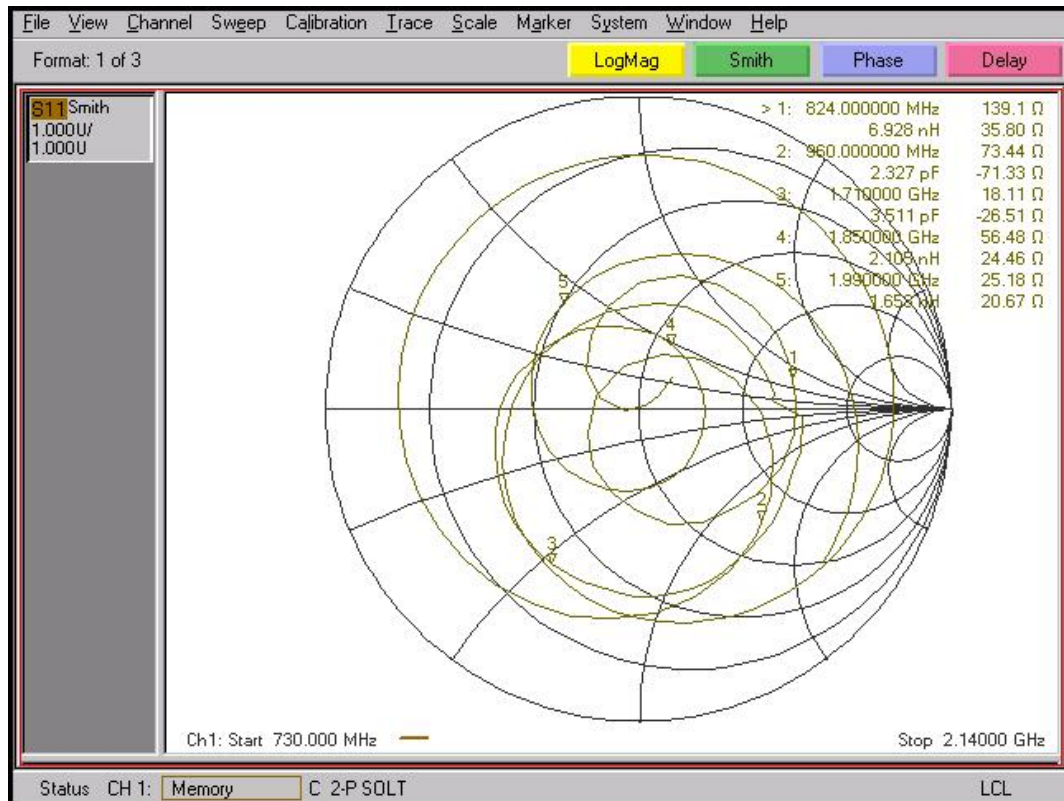
**Fig 1. Return Loss** (Agilent E8357A 300KHz~6GHz PNA Series Network Analyzer)



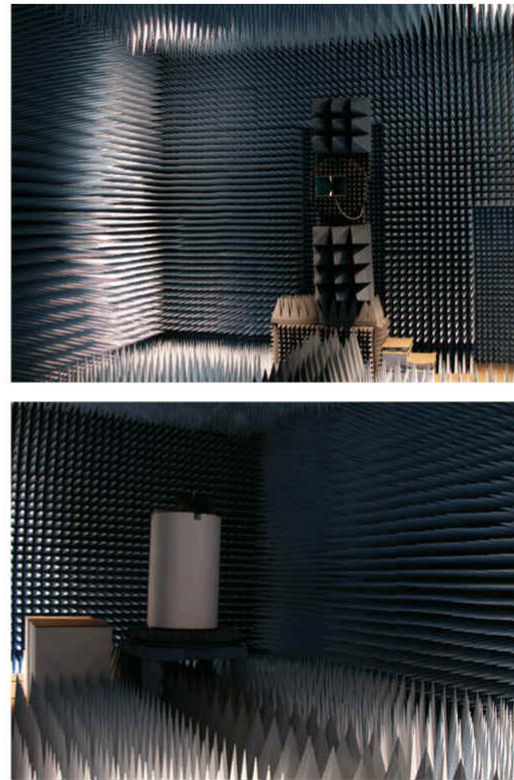
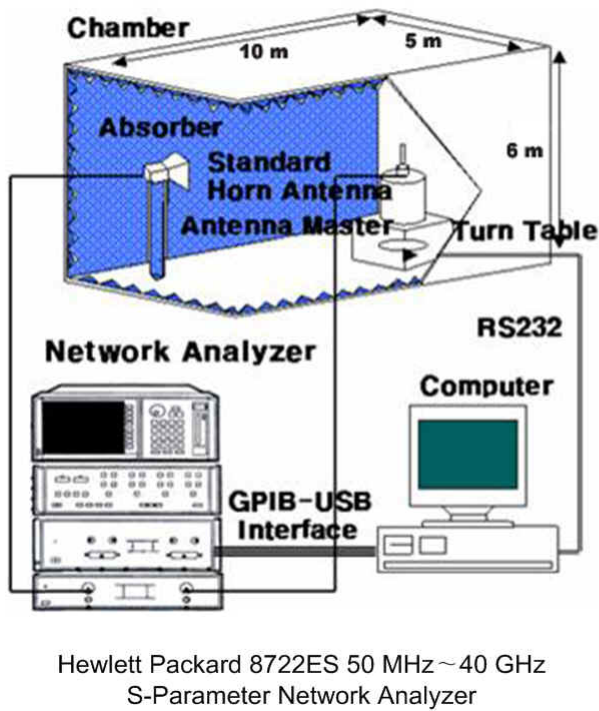
**Fig 2. V.S.W.R** (Agilent E8357A 300KHz~6GHz PNA Series Network Analyzer)



**Fig 3. Smith Chart** (Agilent E8357A 300KHz ~ 6GHz PNA Series Network Analyzer)



**Fig 4. Measurement Configuration**



**Fig 5. Axis Definitions (Antenna Center)**

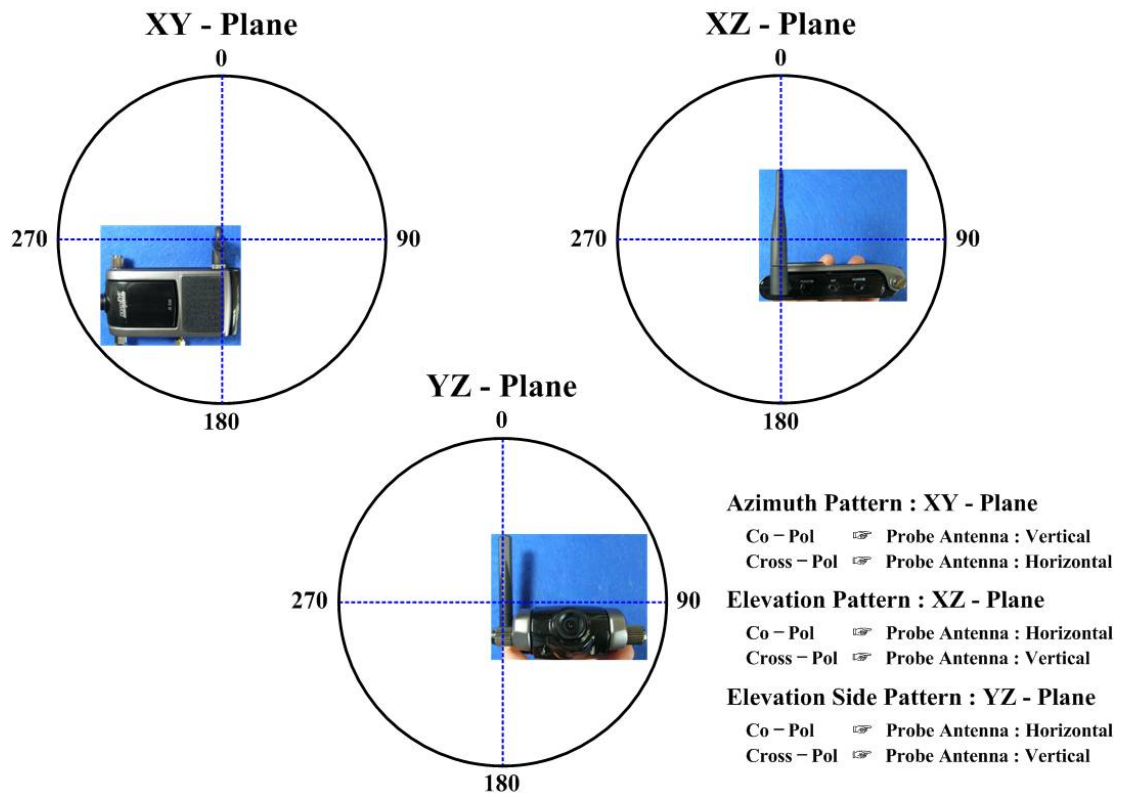
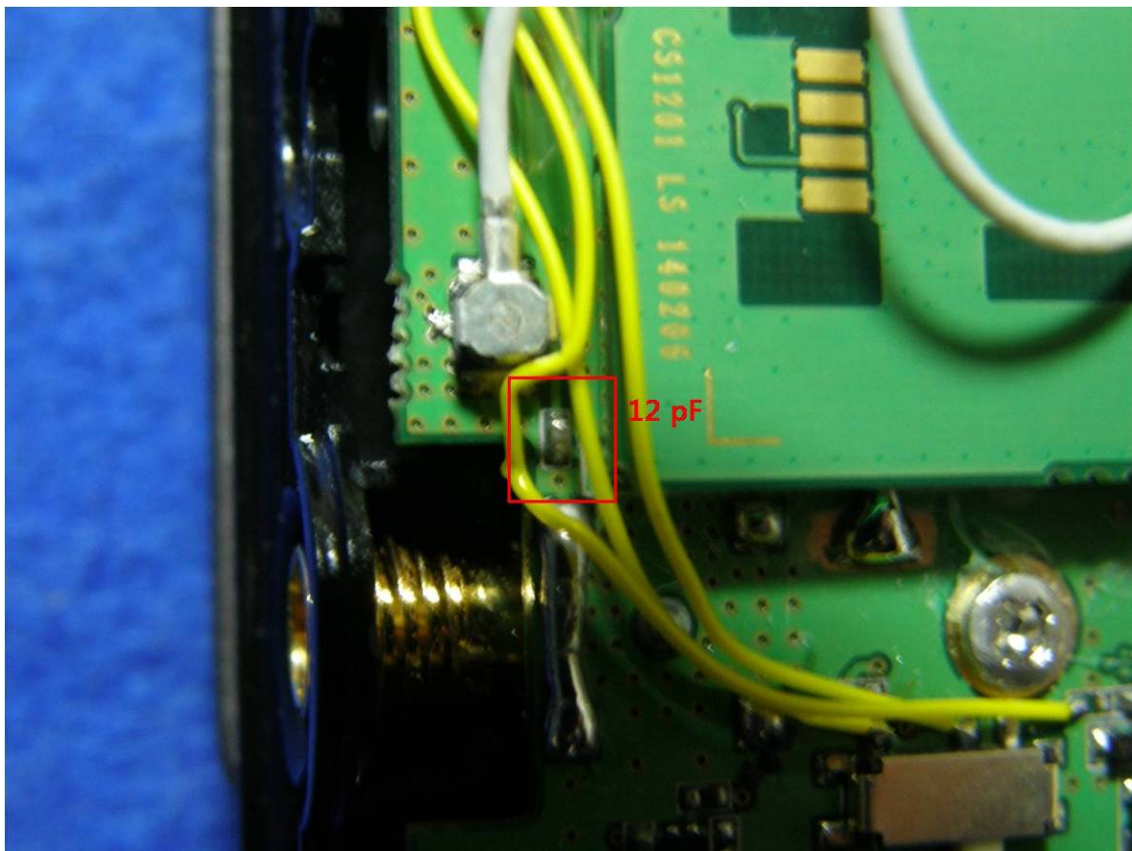




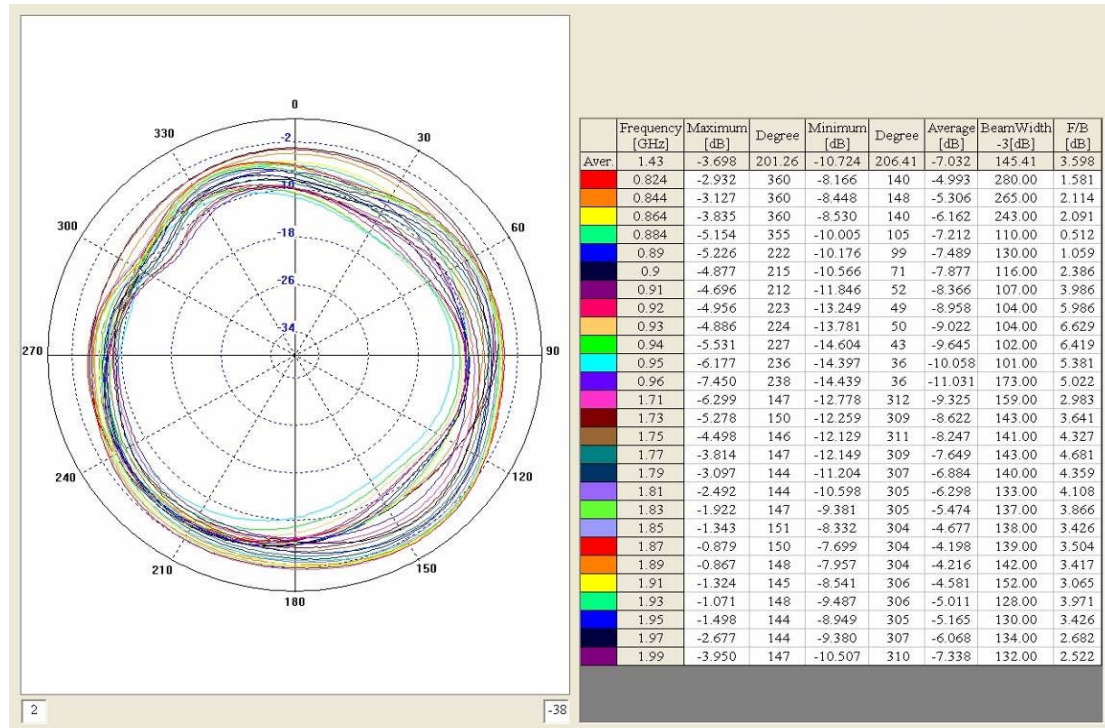
Fig 6. Matching



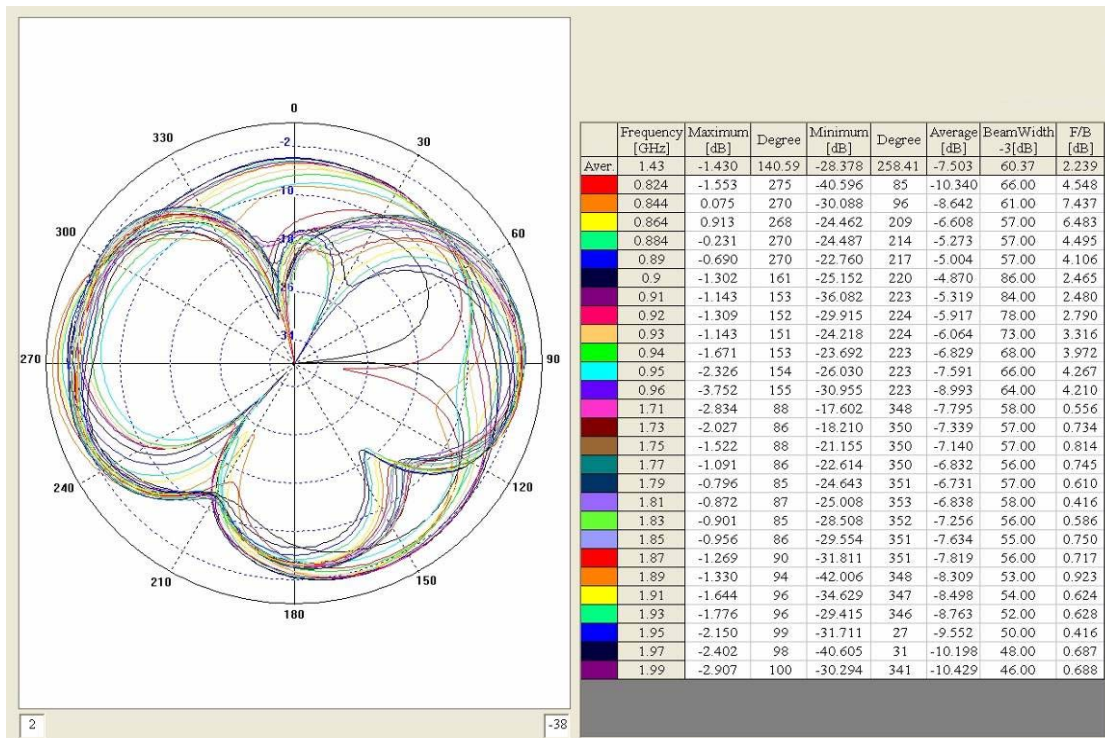
**Fig 7. Gain Patterns**

**a. Azimuth Pattern**

**Co - pol**



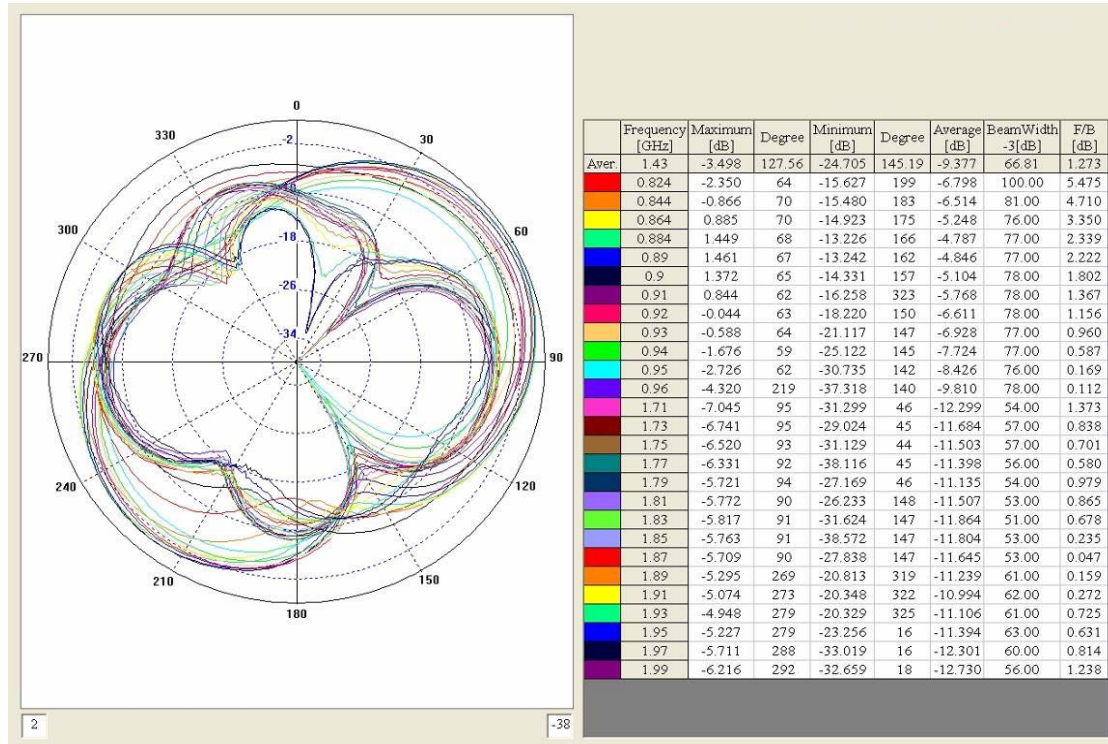
**Cross - pol**



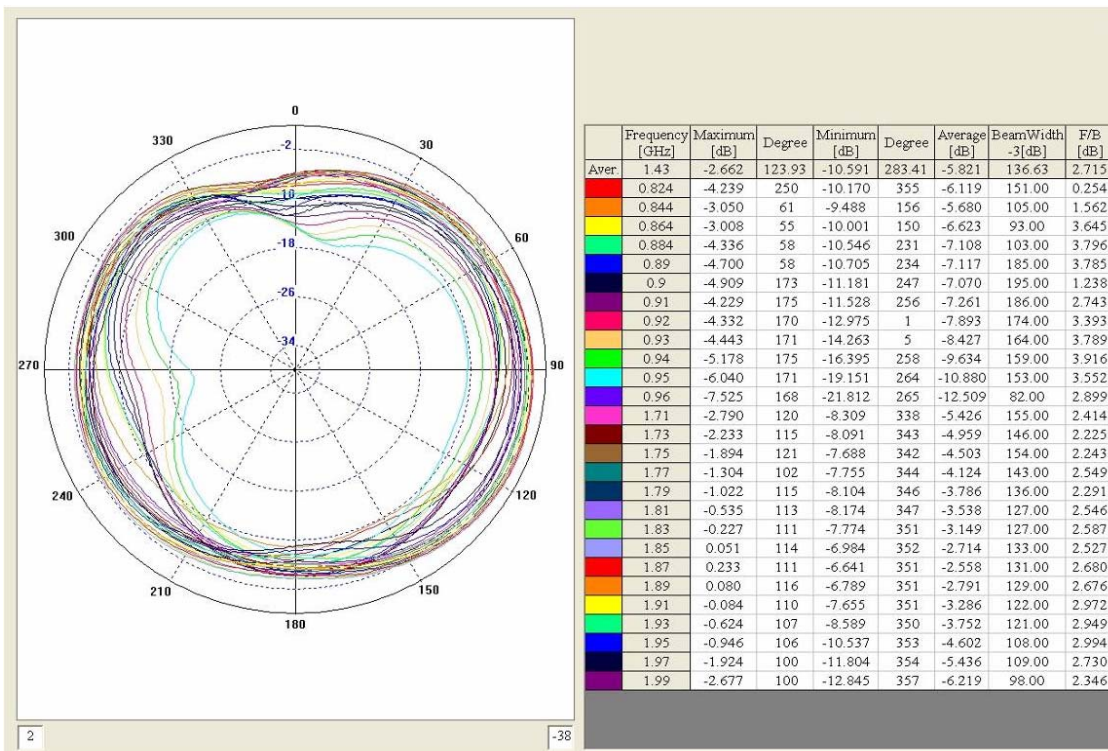


## b. Elevation Pattern

### Co - pol



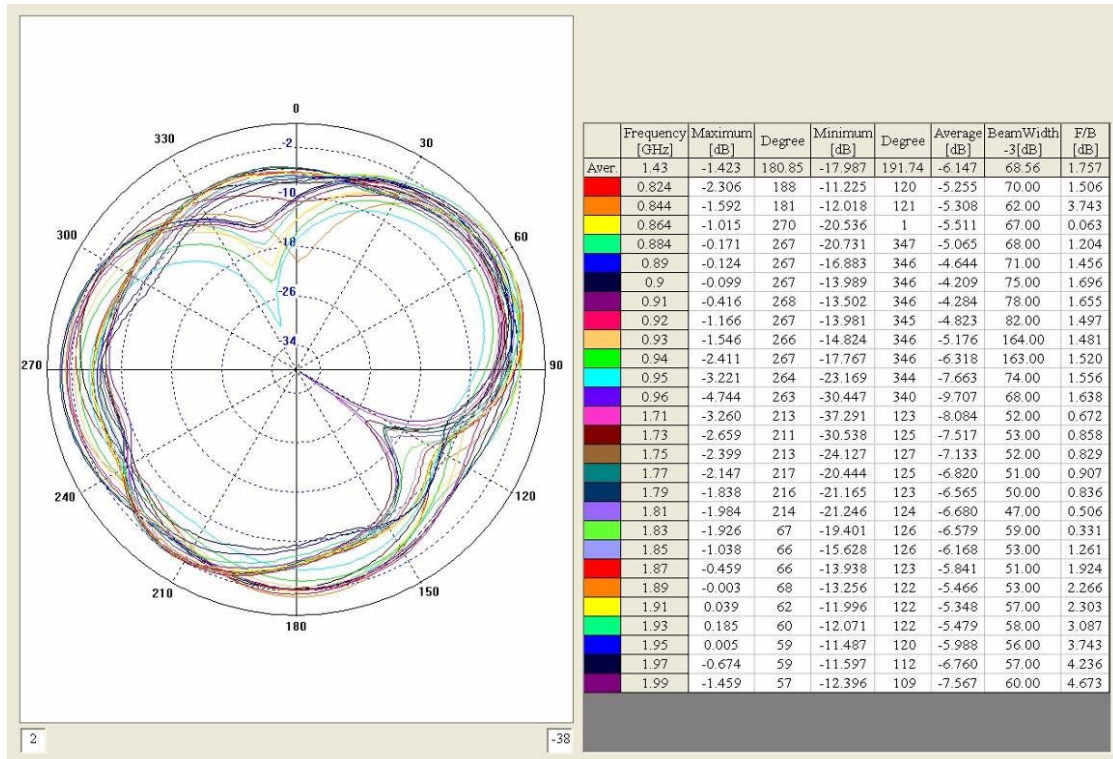
### Cross - pol





### c. Elevation Side Pattern

Co - pol



Cross - pol

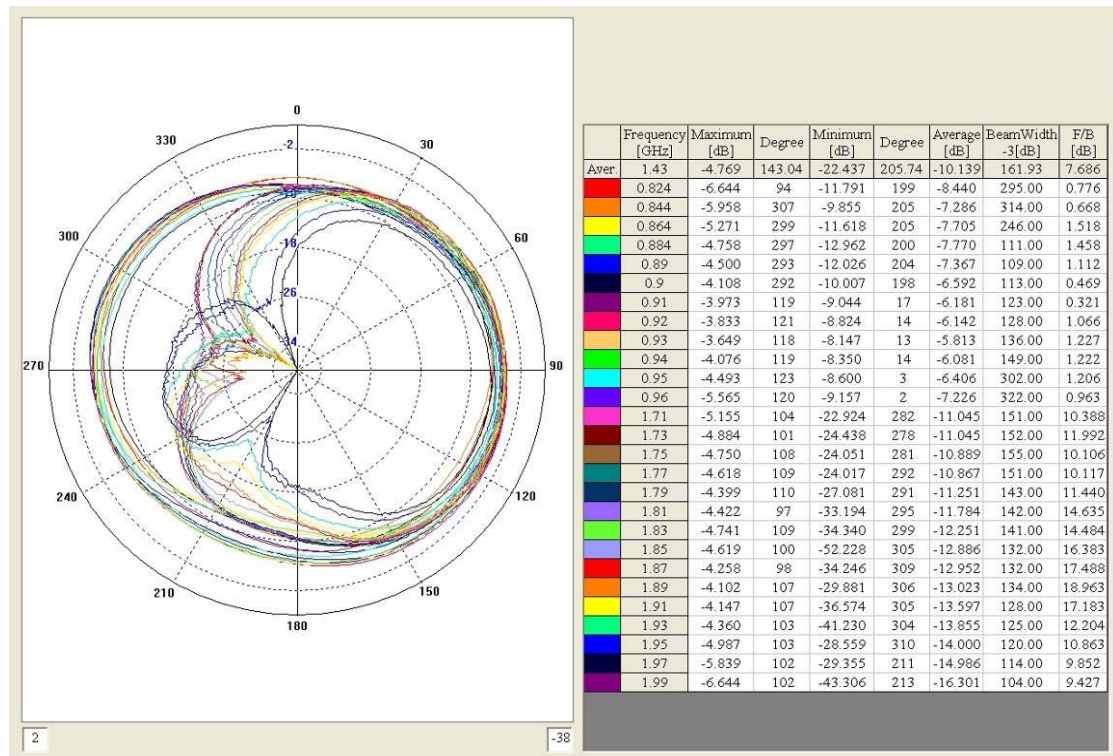




Fig 8. Photo

