



## ***ANTENNA PASSIVE TEST REPORT***

**Applicant:** Grandsun  
**Product Name:** 233621 hawk  
**Model No.(EUT):** 233621 hawk  
**Date of Receipt:** 2023-02-08  
**Date of Test:** 2023-02-08

**Tested by:** Max.chen  
**Made by:** Max.chen  
**Checked by:** Noki.ho



**REVISION HISTORY**

| <b>Revision Record</b> |             |                          |
|------------------------|-------------|--------------------------|
| <b>Version</b>         | <b>Date</b> | <b>Reason for change</b> |
| V0.1                   | 2017-05-20  | First edition            |
|                        |             |                          |
|                        |             |                          |



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## 1. GENERAL INFORMATION

### 1.1 Test Location

Company: Shenzhen Grandsun Electronics Co.,Ltd.  
Address: Gaoqiao Industry Zone,Pingdi Town,Longgang District,Shenzhen,China  
Post code: 518117  
Telephone: +86-755-89234568

### 1.2 Test item and results

Test detailed items/section as below:

| NO | Items           |
|----|-----------------|
| 1  | Gain            |
| 2  | Efficiency      |
| 3  | 2-D/3-D pattern |

### 1.3 Laboratory Environment

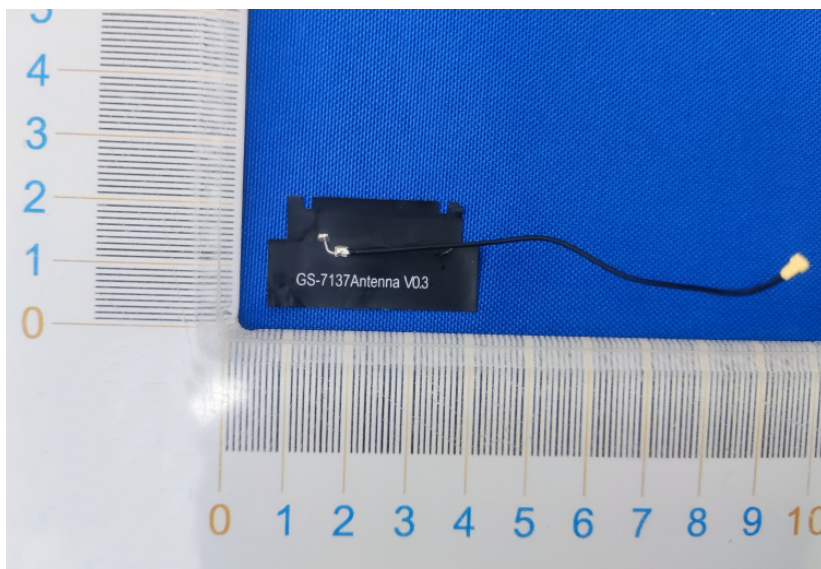
|                   |                   |
|-------------------|-------------------|
| Temperature       | Min.=18℃ Max.=24℃ |
| Relative humidity | Min.=30% Max.=70℃ |
| Shield effect     | 0.5-10GHZ > 100dB |
| Ground resistance | <0.4 Ω            |

### 1.4 Test Equipments List

| Equipment Name   | Model NO.    | Manufacture  | Calibration | Valid Period |
|------------------|--------------|--------------|-------------|--------------|
| Network Analyzer | E5071C       | Keysight     | 2022-04-20  | One year     |
| Chamber          | AMS-8923-195 | EST-LINDGERN | 2022-04-20  | One year     |

### 1.5 Measurement Uncertainty

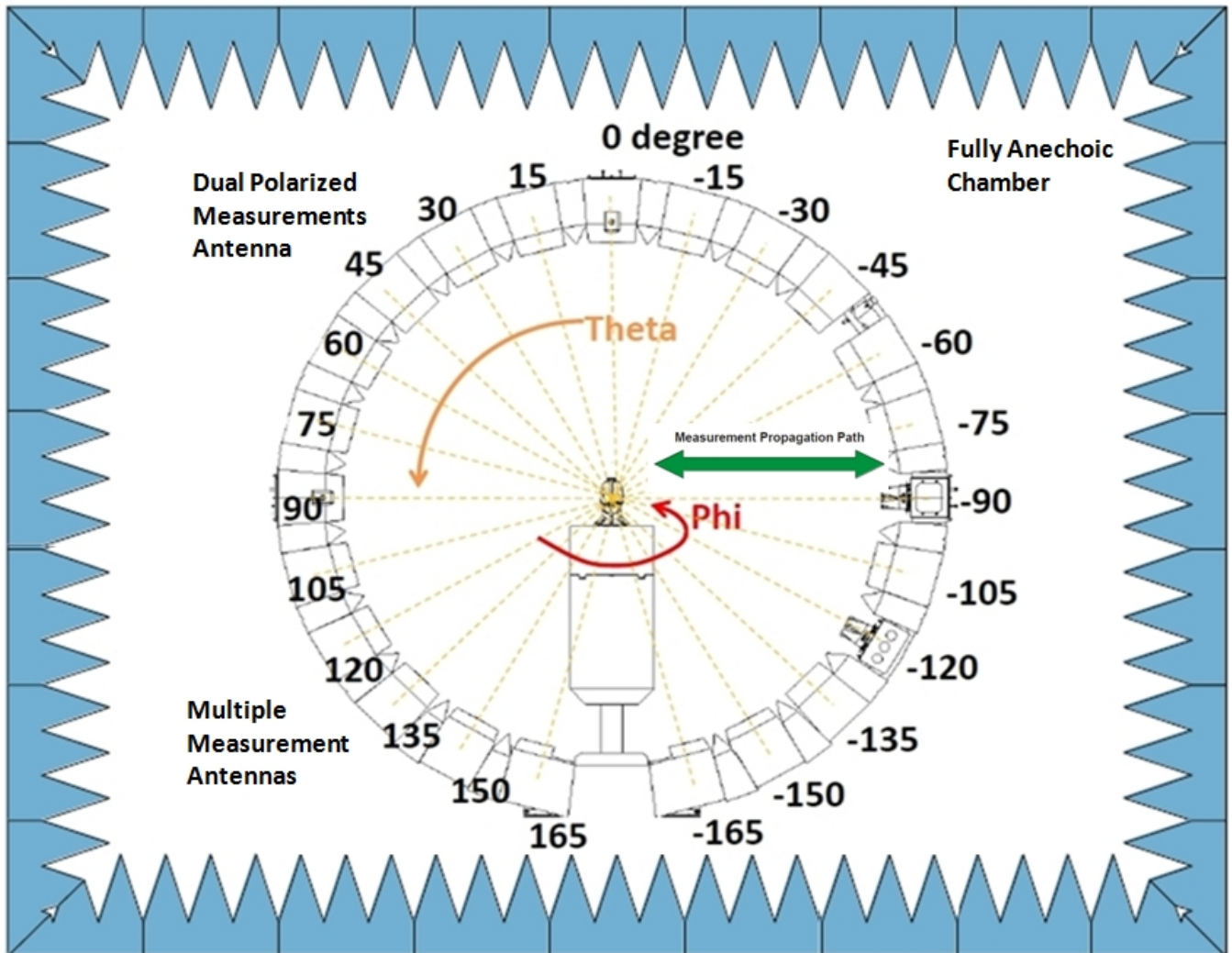
|            |                   |
|------------|-------------------|
| Item       | 2.4GHZ-2.5GHZ(dB) |
| Gain       | 0.3               |
| Efficiency | 0.3               |





## 2. OTA MEASUREMENTS SYSTEM CONFIGURATION

The system is designed for fully-compliant radiated wireless antenna measurements over the frequency range from 700 MHz to 6 GHz with a 1.95-meter path length. The system includes a multi-antenna array with twenty-three (23) dual-polarized measurement antennas spaced every  $15^\circ$  , The chamber size is 5m\*5m\*5m



OTA measurement System Configuration

Note: Phi(The turntable) is from  $0^\circ \sim 180^\circ$  ,Theta(the ring, multiple antennas) is from  $-165^\circ \sim 165^\circ$  , Rotate the AUT and multi-antenna array record the data ,the step of rotation is 15 degree.

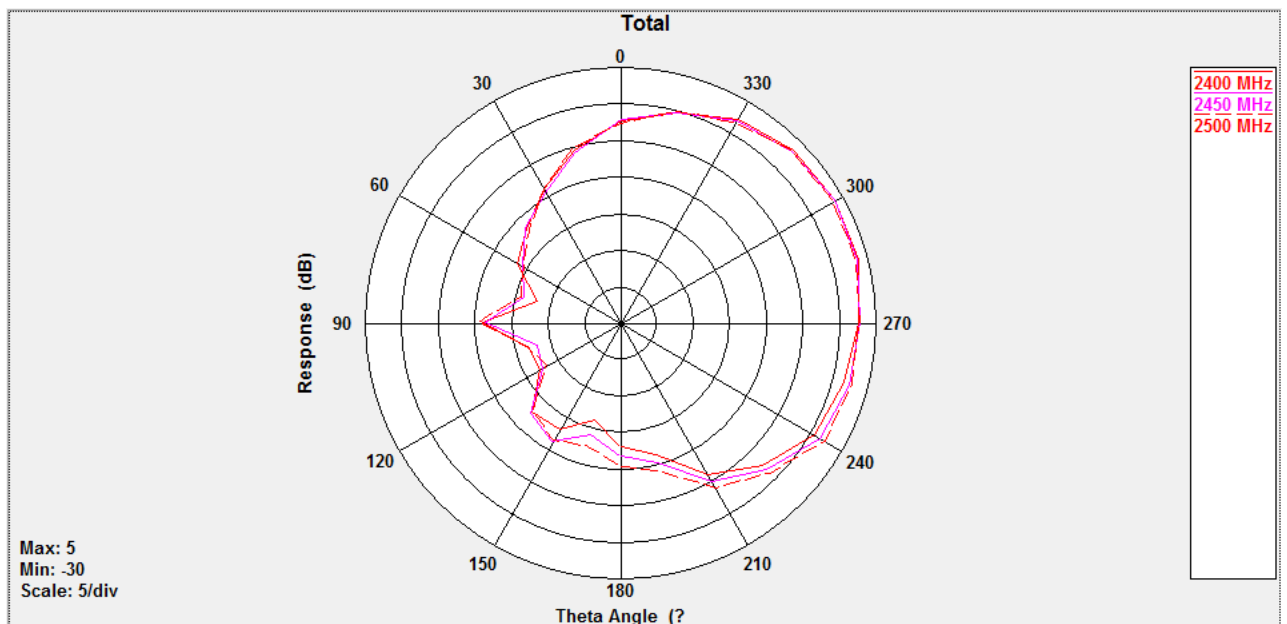


### 3. TEST RESULTS

#### 3.1 Efficiency & Gain

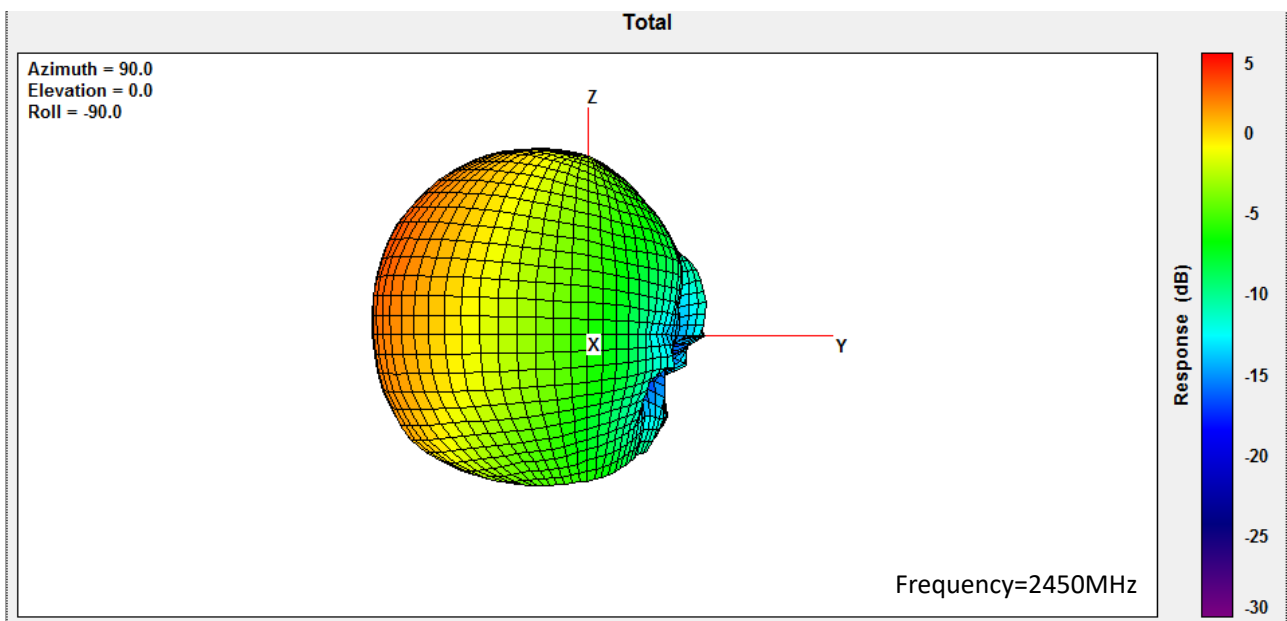
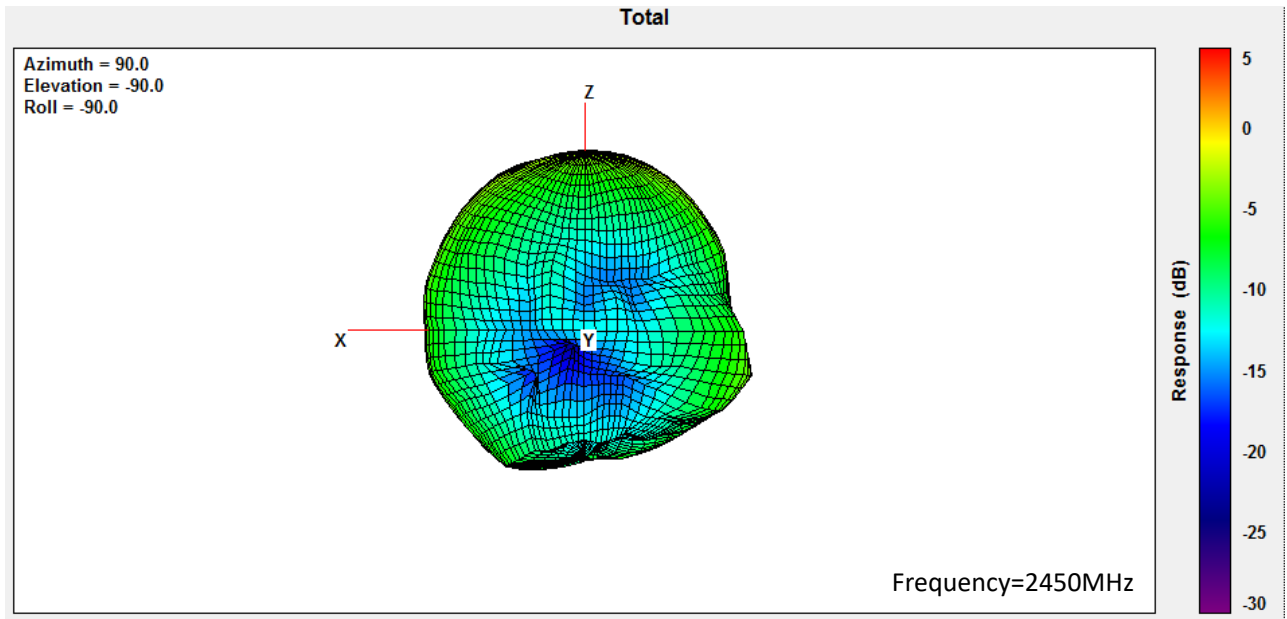
| BT Antenna      |                 |                |            |
|-----------------|-----------------|----------------|------------|
| Frequency (Mhz) | Efficiency (dB) | Efficiency (%) | Gain (dBi) |
| 2400            | -2.99           | 50.12          | 3.24       |
| 2410            | -2.91           | 51.12          | 3.31       |
| 2420            | -2.68           | 53.83          | 3.46       |
| 2430            | -2.90           | 51.25          | 3.49       |
| 2440            | -2.89           | 51.32          | 3.52       |
| 2450            | -2.89           | 51.29          | 3.63       |
| 2460            | -2.92           | 51.03          | 3.52       |
| 2470            | -2.83           | 52.02          | 3.41       |
| 2480            | -2.89           | 51.34          | 3.32       |
| 2490            | -2.75           | 53.07          | 3.10       |
| 2500            | -2.75           | 53.03          | 2.98       |

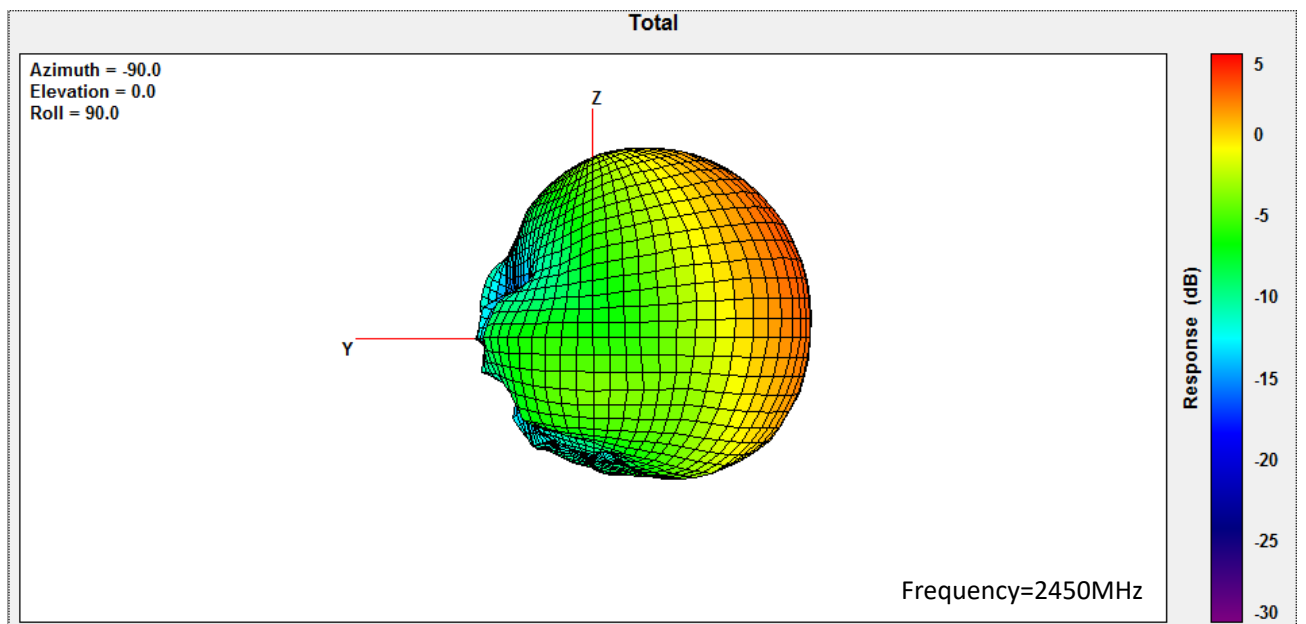
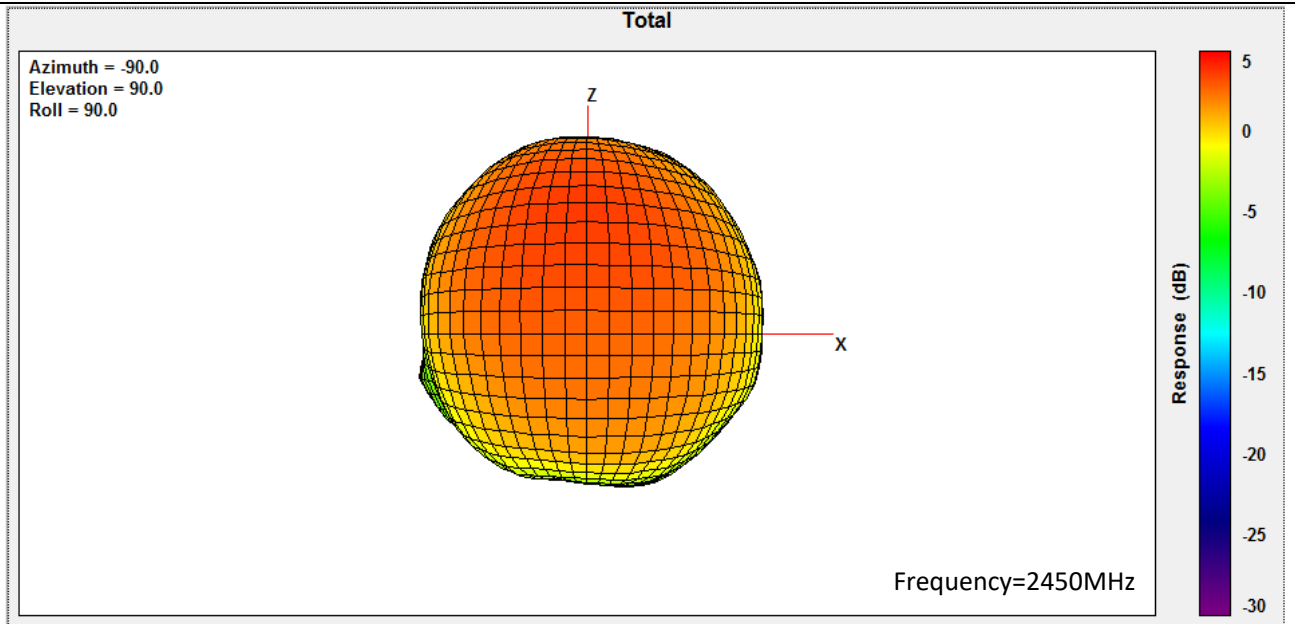
#### 3.2 2-D antenna pattern (Phi=90°)





### 3.3 3-D antenna pattern



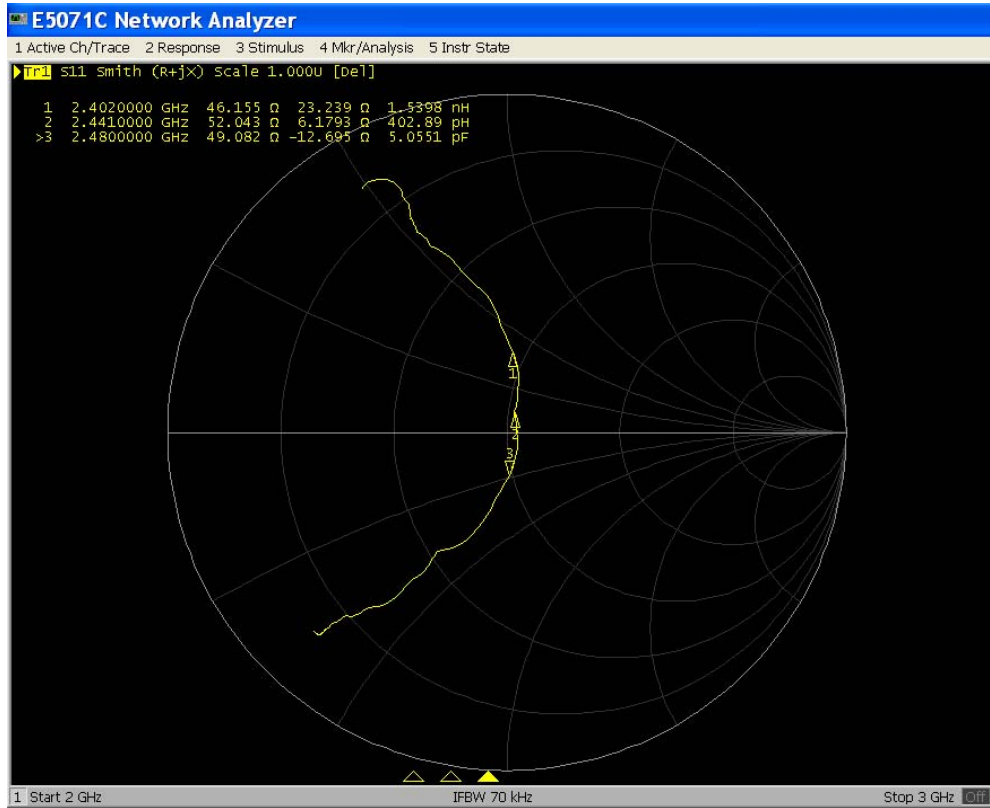




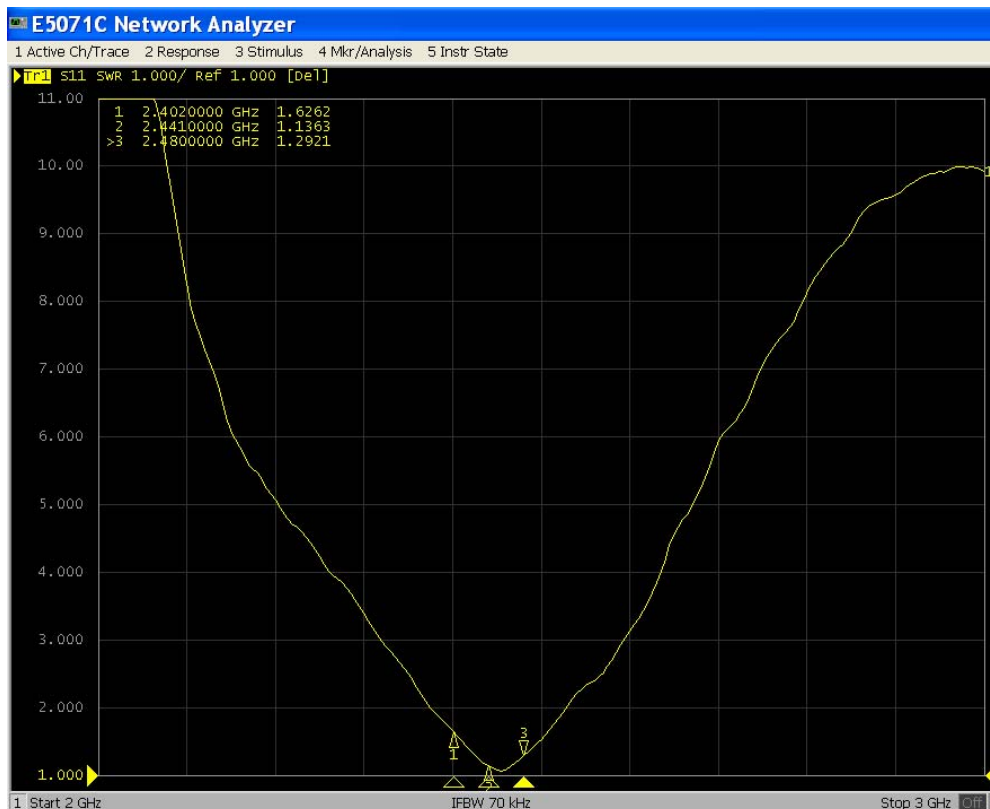


### 3.4 Passive pattern

#### 3.4.1 Impedance



#### 3.4.2 VSWR





### 3.4.3 Return loss

