



# Antenna design and data

Project name: WR-100

Required frequency band: 2.4G WI-FI / domestic 4 G

Research and development project: Li Donghai

Completion date: May 08, 2024



# catalogue

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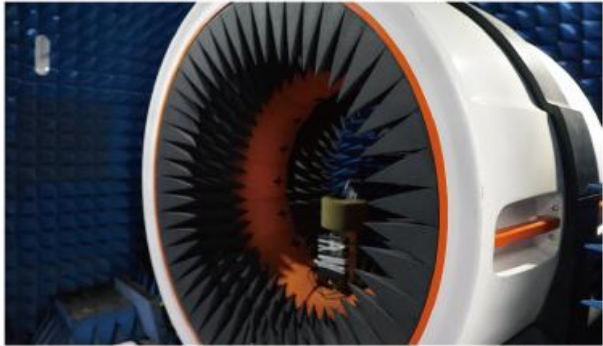
### Planning summary

Project overview

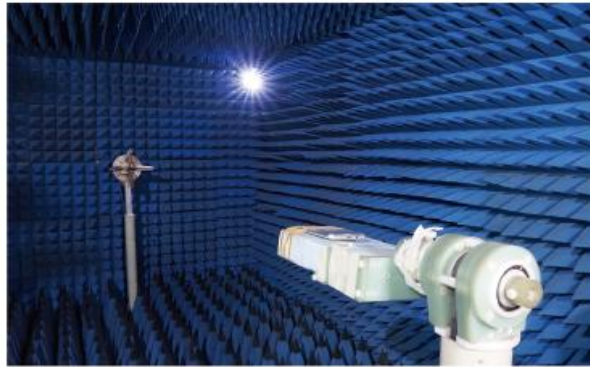
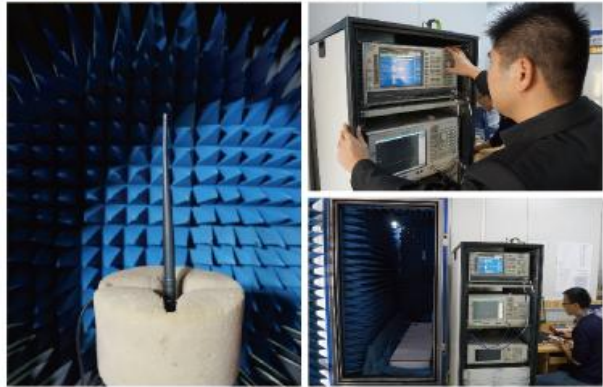


## basic information

【SATIMO】



【广屏】



## test macro

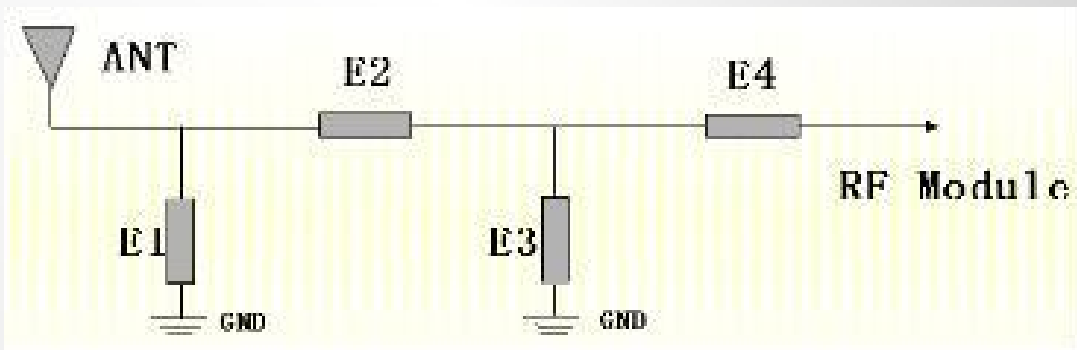
➤ SATIMO Dark room equipped:  
Anritsu MT8820C /Agilent  
E5071C/StarPoint SP9500

➤ The ETS darkroom is equipped with:  
CMW500/Agilent 8960

➤ network analyzer:  
Agilent E5071C



basic information



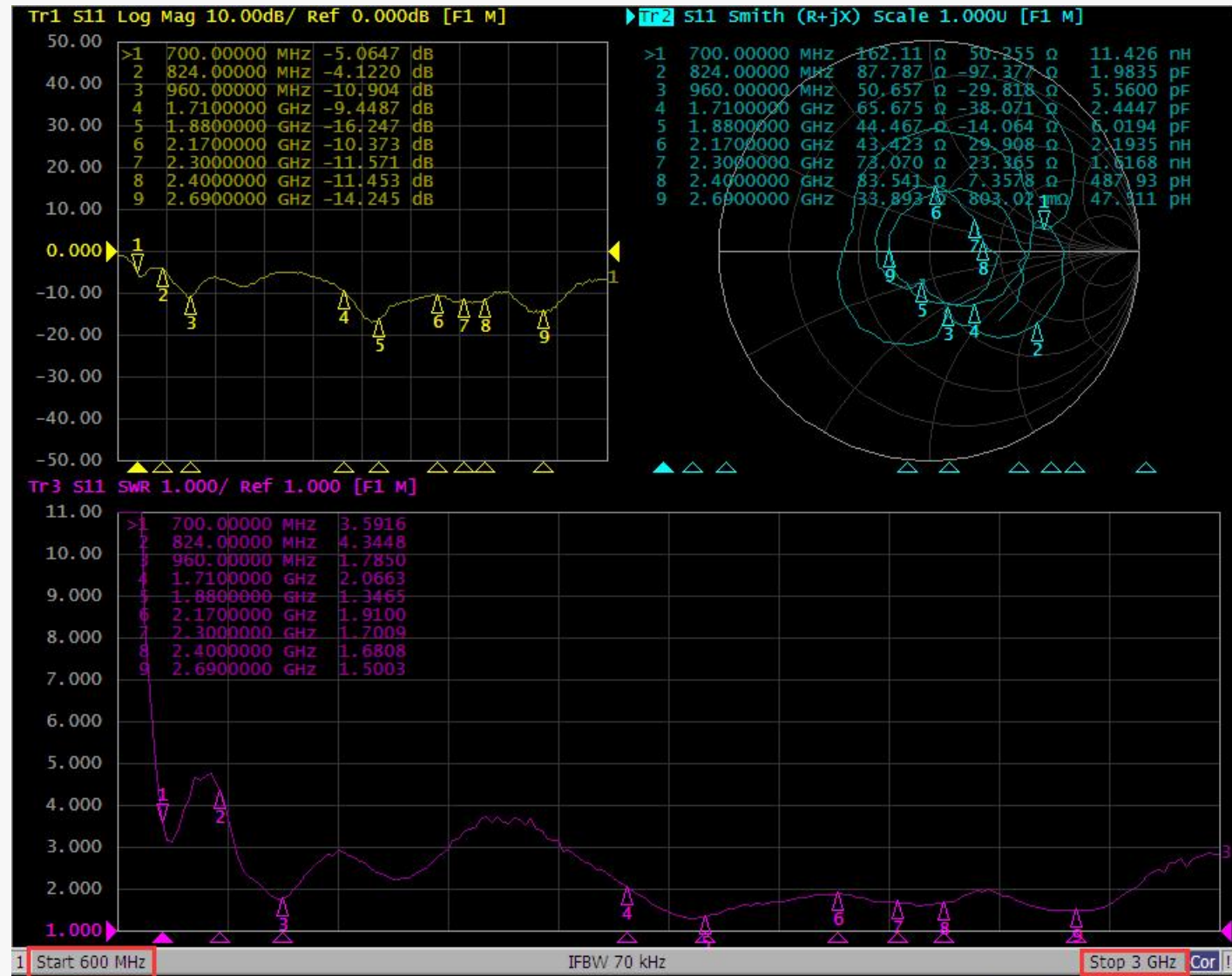
## antenna loading coil

Antenna circuit matching description

**Match without change**



test data: LTE antenna- (SWR / Log Mag / Smith)



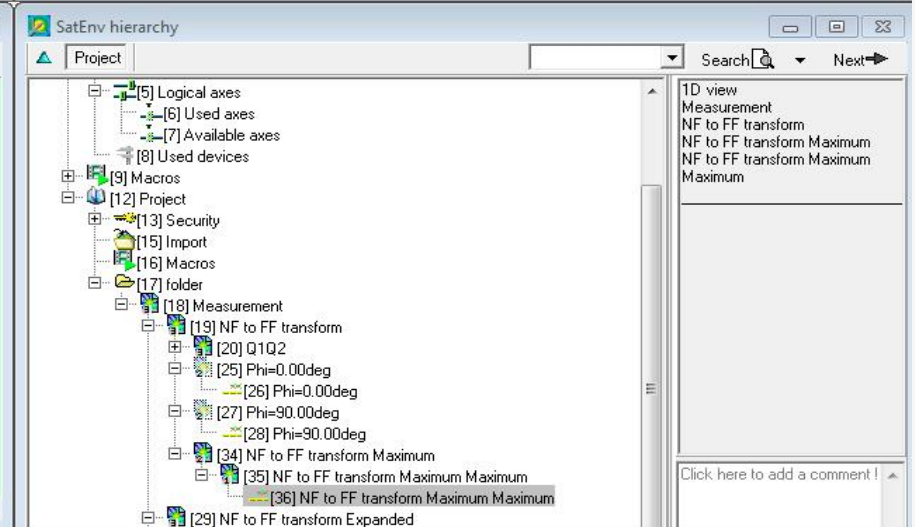
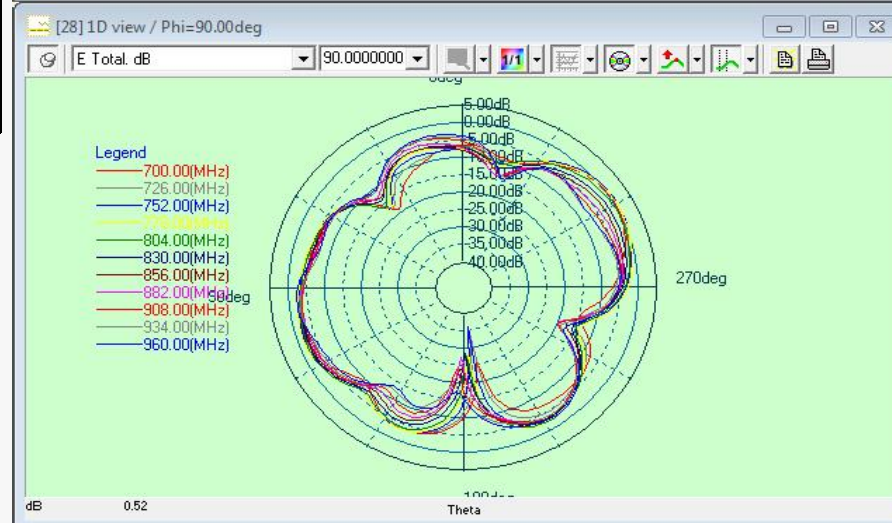
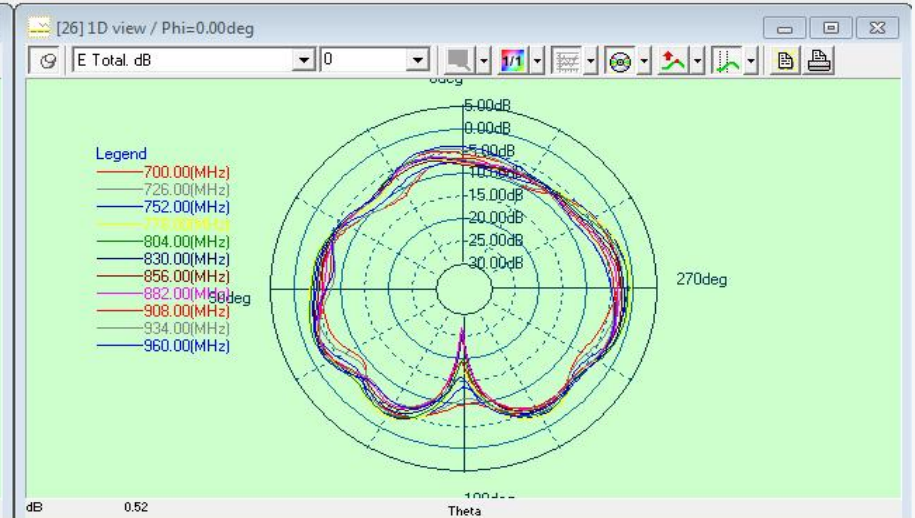
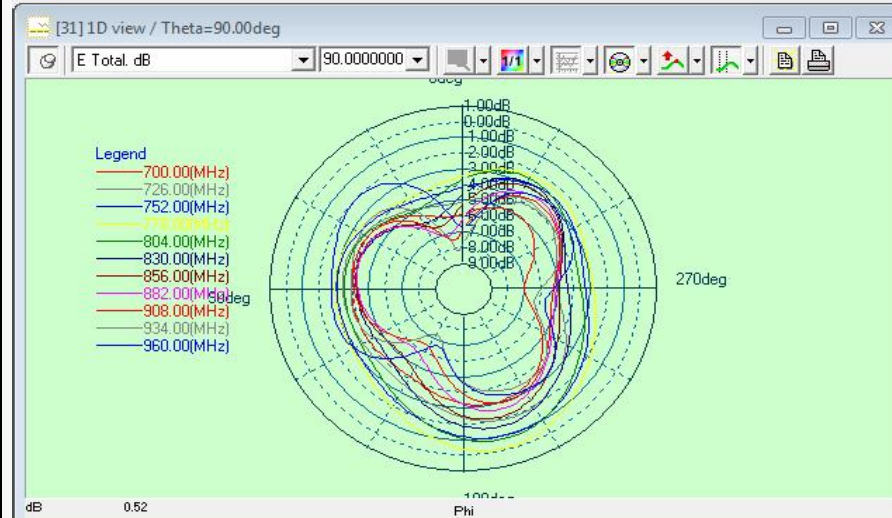


test data:

## LTE antenna passive data- (efficiency / gain / orientation diagram)

700-960MHZ Efficiency

| Frequency | Efficiency | Gain. dBi |
|-----------|------------|-----------|
| 700MHz    | 29%        | 0.45      |
| 726MHz    | 34%        | 0.87      |
| 752MHz    | 40%        | 1.00      |
| 778MHz    | 43%        | 0.84      |
| 804MHz    | 39%        | -0.06     |
| 830MHz    | 33%        | -1.47     |
| 856MHz    | 29%        | -2.15     |
| 882MHz    | 27%        | -2.65     |
| 908MHz    | 26%        | -2.90     |
| 934MHz    | 25%        | -2.80     |
| 960MHz    | 28%        | -1.69     |



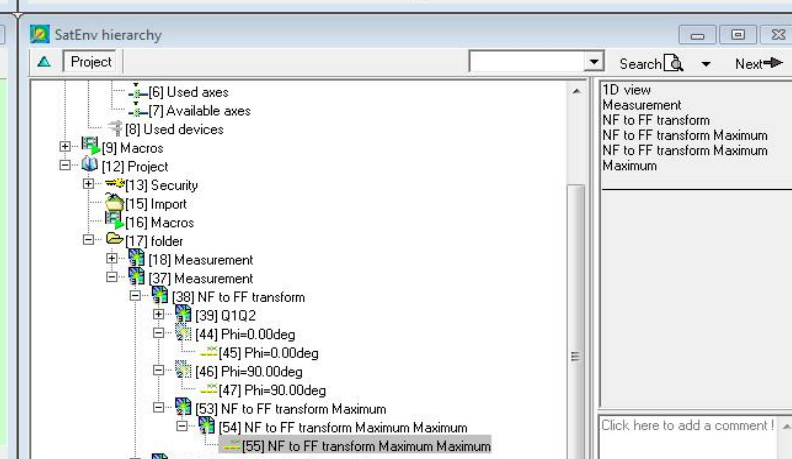
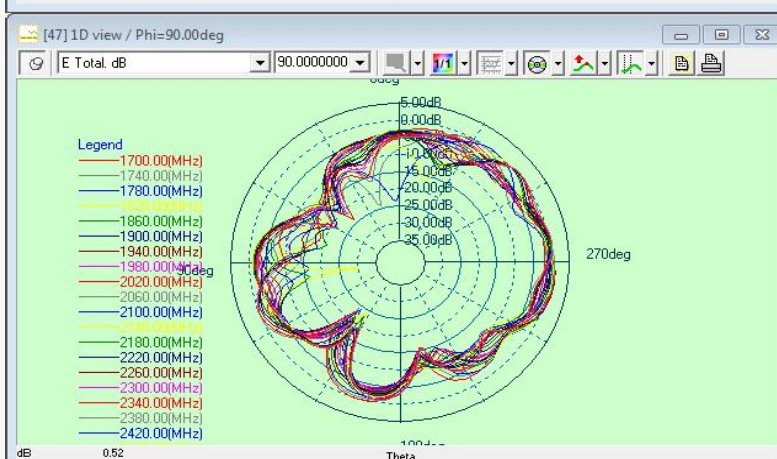
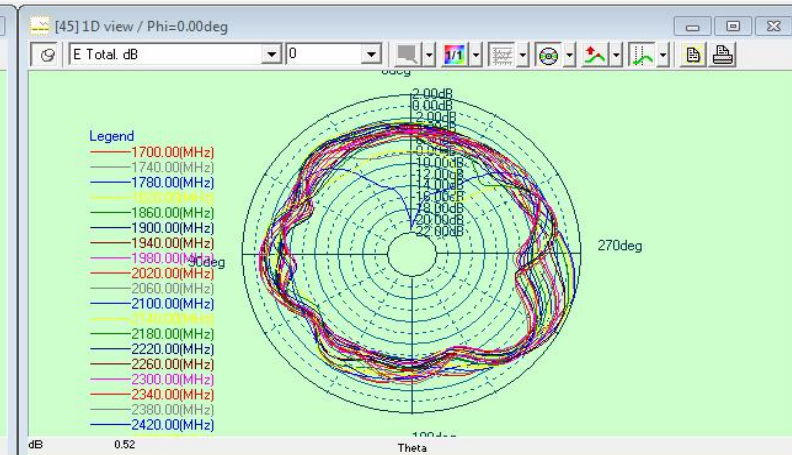
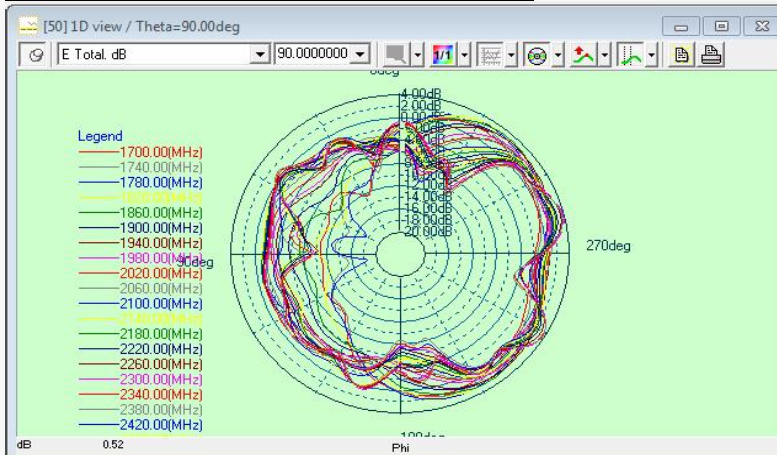


test data:

LTE antenna passive data- (efficiency / gain / orientation diagram)

| 1700-2700MHZ Efficiency |            |           |
|-------------------------|------------|-----------|
| Frequency               | Efficiency | Gain. dBi |
| 1700MHz                 | 49%        | 2.49      |
| 1740MHz                 | 49%        | 2.90      |
| 1780MHz                 | 54%        | 3.64      |
| 1820MHz                 | 53%        | 3.76      |
| 1860MHz                 | 50%        | 3.71      |
| 1900MHz                 | 48%        | 3.39      |
| 1940MHz                 | 51%        | 3.57      |
| 1980MHz                 | 46%        | 2.92      |
| 2020MHz                 | 47%        | 3.00      |
| 2060MHz                 | 50%        | 2.99      |
| 2100MHz                 | 48%        | 2.86      |
| 2140MHz                 | 51%        | 3.07      |
| 2180MHz                 | 49%        | 2.73      |
| 2220MHz                 | 46%        | 2.41      |
| 2260MHz                 | 42%        | 2.09      |
| 2300MHz                 | 41%        | 1.99      |
| 2340MHz                 | 43%        | 2.11      |
| 2380MHz                 | 41%        | 1.87      |
| 2420MHz                 | 44%        | 2.55      |
| 2460MHz                 | 45%        | 3.49      |
| 2500MHz                 | 46%        | 3.64      |

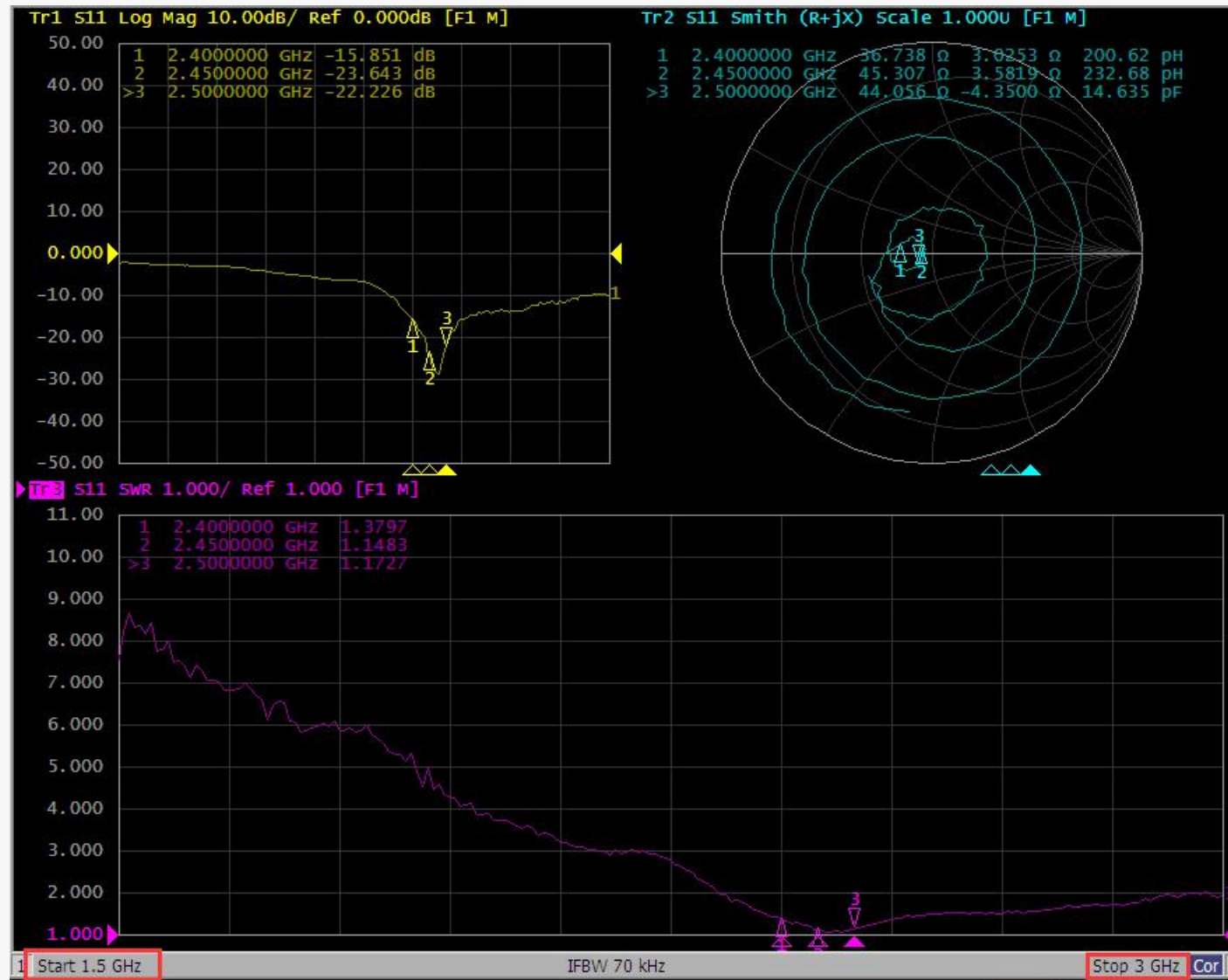
|         |     |      |
|---------|-----|------|
| 2540MHz | 47% | 3.58 |
| 2580MHz | 50% | 3.66 |
| 2620MHz | 54% | 3.82 |
| 2660MHz | 52% | 3.67 |
| 2700MHz | 53% | 3.71 |





test data:

WIFI antenna- (SWR / Log Mag / Smith)



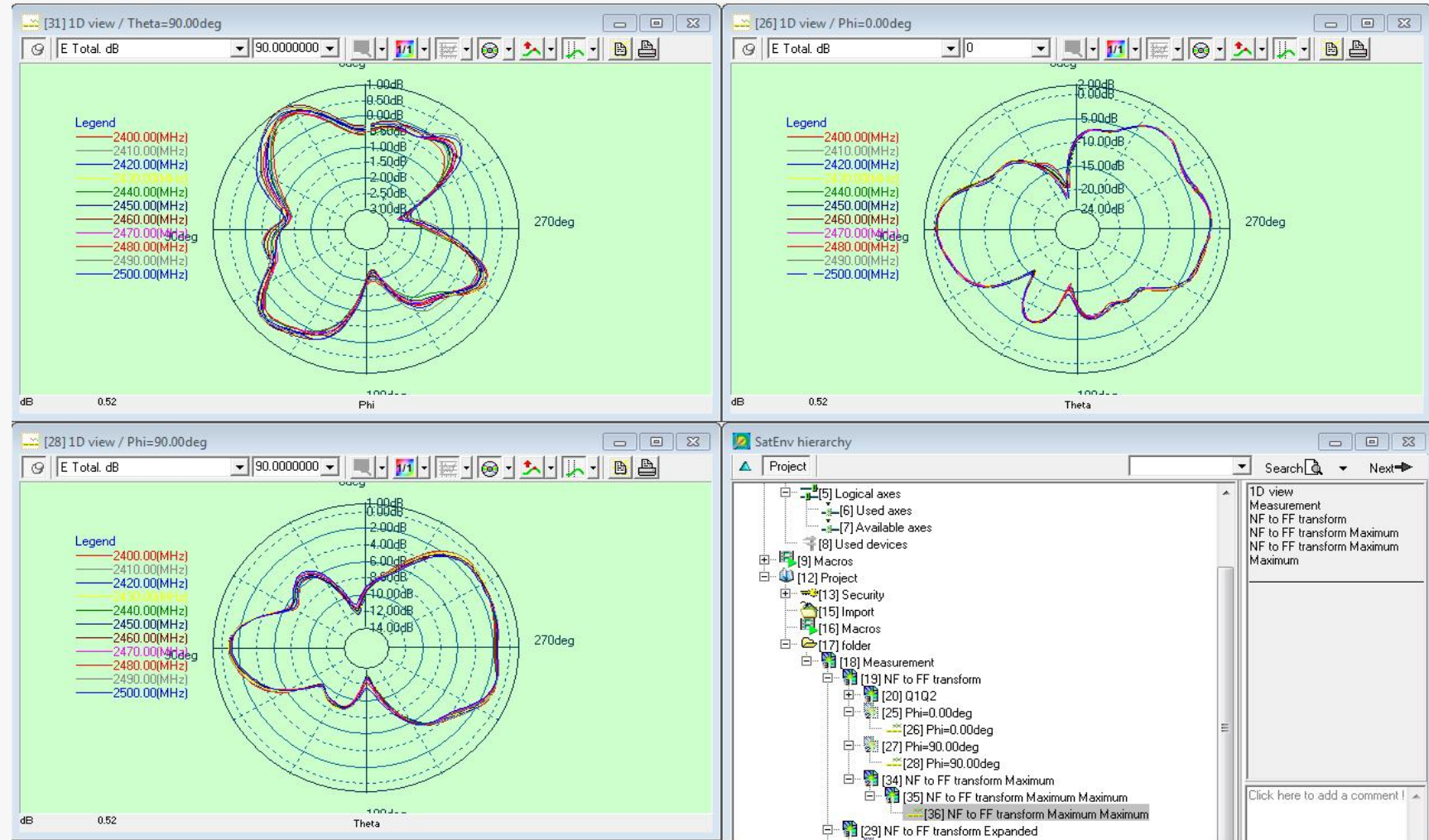


test data:

## WIFI Antenna Passive Data- (Efficiency / Gain / Direction Map)

2400-2500MHZ Efficiency

| Frequency | Efficiency | Gain. dBi |
|-----------|------------|-----------|
| 2400MHz   | 47%        | 0.96      |
| 2410MHz   | 47%        | 0.90      |
| 2420MHz   | 47%        | 0.95      |
| 2430MHz   | 47%        | 0.96      |
| 2440MHz   | 46%        | 0.79      |
| 2450MHz   | 46%        | 0.91      |
| 2460MHz   | 47%        | 1.09      |
| 2470MHz   | 45%        | 0.86      |
| 2480MHz   | 46%        | 0.86      |
| 2490MHz   | 48%        | 1.09      |
| 2500MHz   | 47%        | 0.98      |





## test data

4G active data-Active data

| Band     | Channel | free space (FS) |        | Band     | Channel | free space (FS) |        |
|----------|---------|-----------------|--------|----------|---------|-----------------|--------|
|          |         | TRP             | TIS    |          |         | TRP             | TIS    |
| FDD B1   | L       | 20.28           |        | FDD B3   | L       | 20.76           |        |
|          | M       | 20.02           |        |          | M       | 20.62           |        |
|          | H       | 20.26           | -94.63 |          | H       | 20.87           | -93.23 |
| FDD B7   | L       | 21.54           |        | FDD B8   | L       | 17.66           |        |
|          | M       | 21.68           |        |          | M       | 18.04           |        |
|          | H       | 20.78           | -92.85 |          | H       | 19.31           | -90.02 |
| FDD B20  | L       | 17.09           |        | FDD B28  | L       | 19.99           |        |
|          | M       | 18.63           |        |          | M       | 17.70           |        |
|          | H       | 17.43           | -86.01 |          | H       | 16.13           | -85.35 |
| T DD B38 | L       | 20.38           |        | T DD B39 | L       | 20.95           |        |
|          | M       | 20.80           | 20mhz  |          | M       | 19.75           | 20mhz  |
|          | H       | 21.23           | -94.64 |          | H       | 21.75           | -91.22 |
| TDD B41  | L       | 19.52           |        |          |         |                 |        |
|          | M       | 20.41           | 20mhz  |          |         |                 |        |
|          | H       | 20.69           | -92.11 |          |         |                 |        |



test data

WI-FI active data-Active data

| Antenna Performance Table |           |             |           |  |           |  |
|---------------------------|-----------|-------------|-----------|--|-----------|--|
|                           |           | Channel No. | TRP (dBm) |  | TIS (dBm) |  |
| 2.4G                      | b pattern | 1           | 13.91     |  | -85.93    |  |
|                           |           | 6           | 13.88     |  | -83.60    |  |
|                           |           | 11          | 14.19     |  | -86.79    |  |
|                           | g pattern | 1           | 15.65     |  | -73.22    |  |
|                           |           | 6           | 15.52     |  | -70.92    |  |
|                           |           | 11          | 15.91     |  | -74.16    |  |
|                           | n pattern | 1           | 15.7      |  | -68.25    |  |
|                           |           | 6           | 15.5      |  | -66.84    |  |
|                           |           | 11          | 16.04     |  | -69.75    |  |



# Planning summary

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1. FDD is 10 mhz, and TDD is 20 mhz.
2. No environmental treatment.

THANK YOU

