

## Antenna Specifications

| Design Specifications | Typical                                                                                  | Units |
|-----------------------|------------------------------------------------------------------------------------------|-------|
| Antenna type          | frame LDS+foam                                                                           |       |
| working Frequency     | 824-960,1710-2690MHz & 1575.42MHz & 2400-2500MHz                                         |       |
| Gain                  | 【DIV: -13.2 ~ -1.96】&【GPS :-1.18; WIFI: 3.06 ~ 3.57】                                     | dBi   |
| Antenna efficiency    | 【DIV: 3.10~23.50】&【GPS:28.84; WIFI: 50.08~60.31】                                         | %     |
| VSWR                  | <11                                                                                      |       |
| Ploriaztion           | Linear polarization                                                                      |       |
| Axial Ratio           | When the antenna is circular polarization, note the axial ratio in the working bandwidth | N/A   |
| Radiation pattern     | omnidirectional                                                                          |       |
| impedance             | 50 ohm                                                                                   |       |
| Power handling        | 33                                                                                       | dBm   |
| Interface             | Spring foot contact                                                                      |       |
| Overall dimensions    | See drawing section                                                                      |       |
| Weight                | no requirement                                                                           |       |
| Operatin Temp         | -30 ----- 70                                                                             | °     |
| Storing Temp          | -30 ----- 70                                                                             | °     |

# 407D Law Enforcement Camera GWD Antenna Specification

## 1、 Indication

The report mainly provides the test status of various electrical performance parameters of the 407D Law Enforcement Camera GWD Antenna. (As shown in Figure 1 below)



Figure 1 407D Law Enforcement Camera GWD Antenna

## 2、 Electrical Performance

### 2.1 Specification standard

407D Law Enforcement Camera GWD Antenna working band is at 824-960,1710-2690MHz & 1575.42MHz & 2400-2500MHz.

### 2.2 Antenna matching circuit

407D Law Enforcement Camera GWD Antenna matches the original matching circuit.

### 2.3 VSWR Test

#### A. Test setup

VSWR measurements (S11) were performed using Agilent E5071B Network Analyzer and the previously described test fixture. A ferrite-loaded coaxial cable was used to mitigate surface currents on the outside of the cabling. The testing was performed in free space ETS AMP8500S chamber.

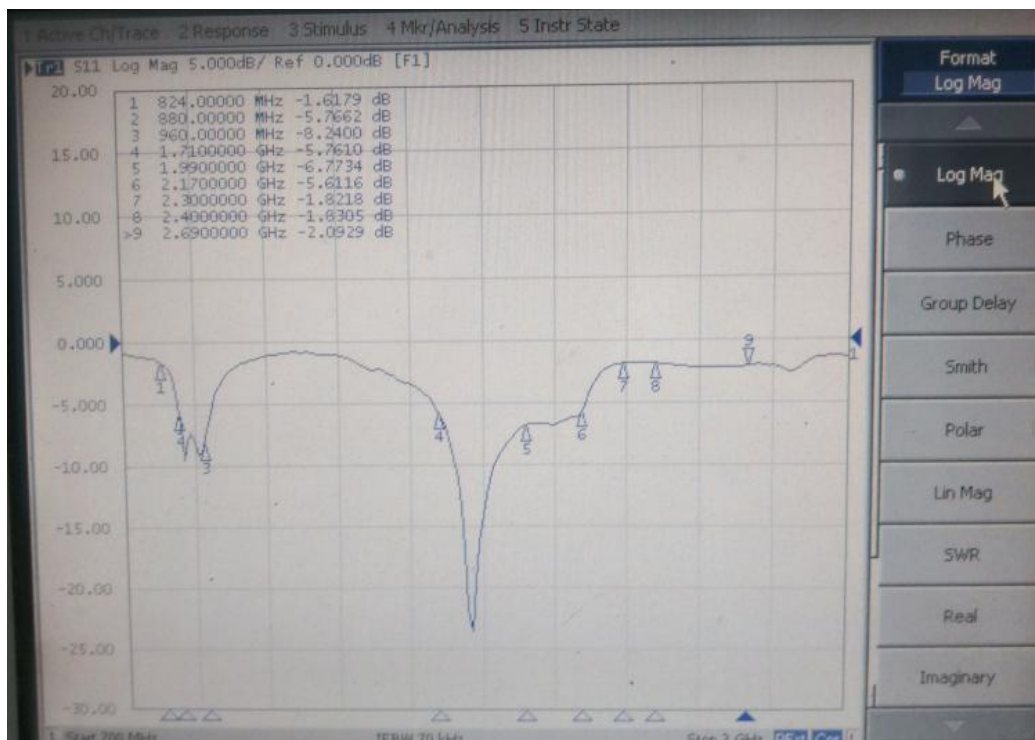
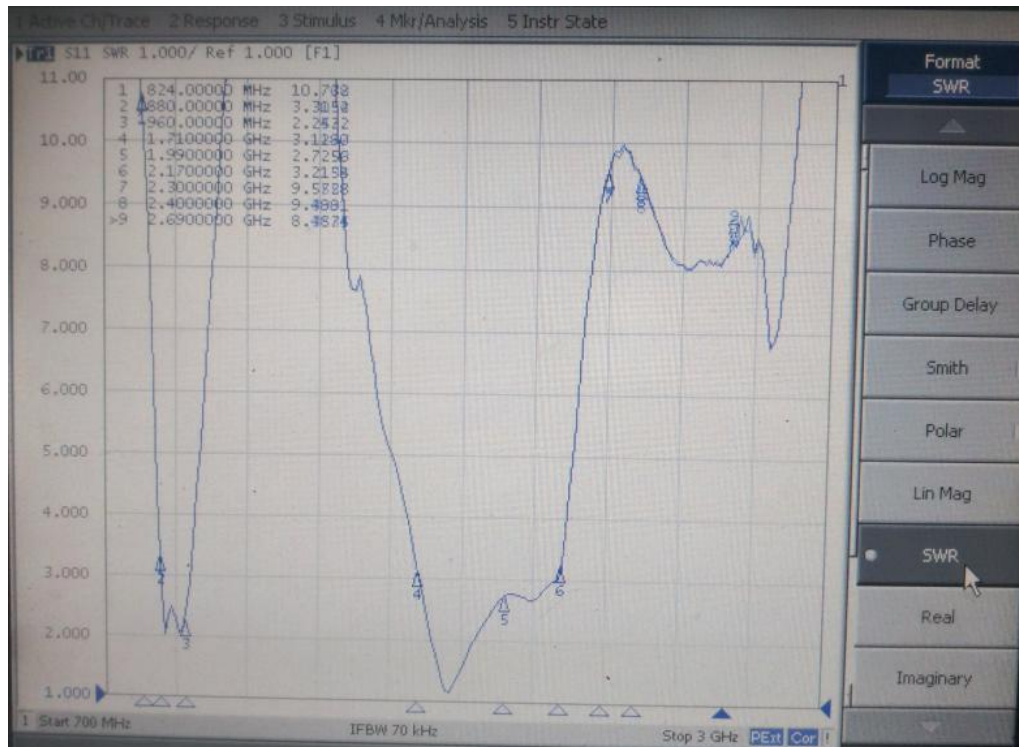
#### B. VSWR

The table below shows the standing wave ratio value of the edge frequency of the working band of 407D Law Enforcement Camera GWD Antenna matches the original matching circuit.

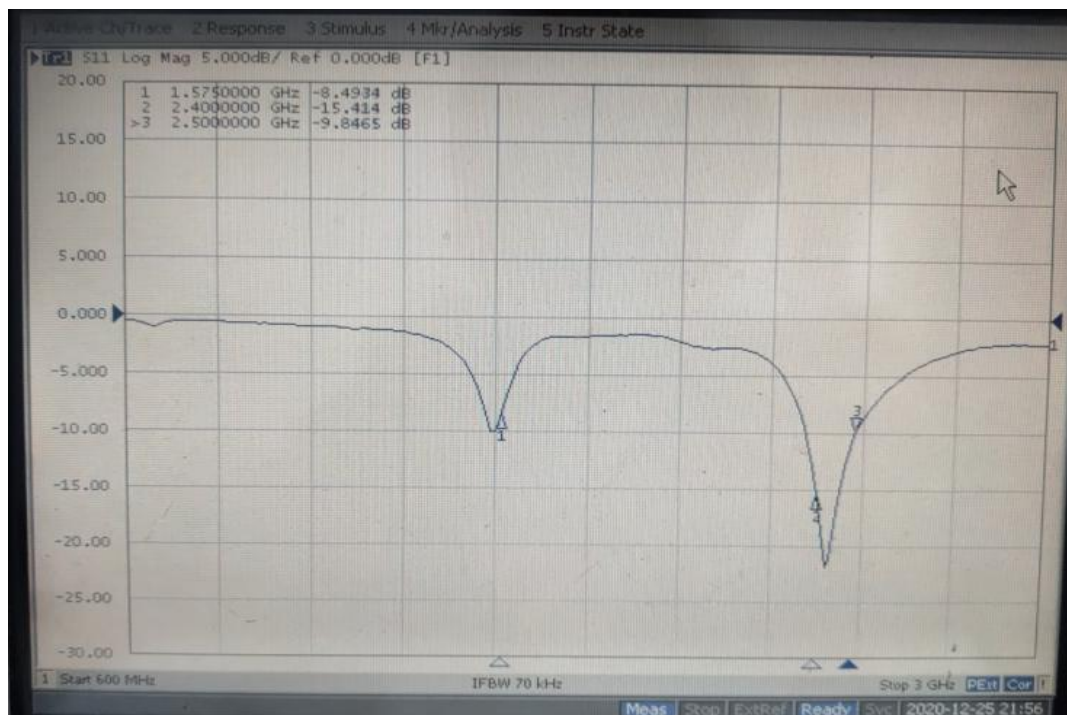
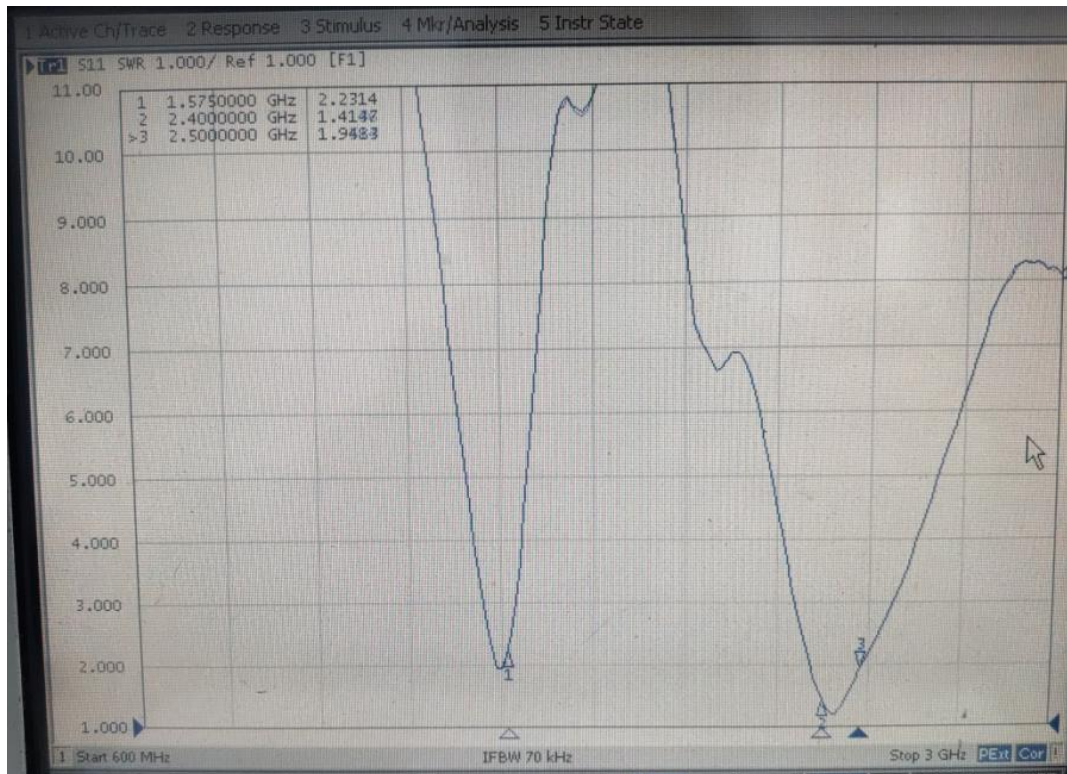
| Frequency band      | frequency (MHz) | VSWR  |
|---------------------|-----------------|-------|
| <b>DIV</b>          | 824             | 10.76 |
|                     | 960             | 2.26  |
|                     | 1710            | 3.12  |
|                     | 2170            | 3.21  |
|                     | 2300            | 9.55  |
|                     | 2690            | 8.48  |
| <b>GPS&amp;WIFI</b> | 1575.42         | 2.23  |
|                     | 2400            | 1.41  |
|                     | 2500            | 1.94  |

## 2.3.1 S11 parameter

DIV:



## GPS&WIFI:



## Antenna Specifications

### 2.3.2 Antenna Passive Efficiency

DIV:

| Frequency ID               | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | 11     | 12     | 13     | 14     | 15     | 16     | 17     | 18     | 19     | 20     | 21     | 22     | 23     | 24     | 25     | 26     |
|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Frequency (MHz)            | 820.0  | 830.0  | 840.0  | 850.0  | 860.0  | 870.0  | 880.0  | 890.0  | 900.0  | 910.0  | 920.0  | 930.0  | 940.0  | 950.0  | 960.0  | 1710.0 | 1745.0 | 1780.0 | 1815.0 | 1850.0 | 1885.0 | 1920.0 | 1955.0 | 1990.0 | 2025.0 | 2060.0 |
| Point Values               |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Ant. Port Input Pwr. (dBm) | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   |
| Tot. Rad. Pwr. (dBm)       | -15.06 | -14.30 | -13.99 | -12.87 | -11.88 | -10.90 | -10.14 | -9.70  | -9.68  | -9.08  | -8.30  | -7.90  | -7.37  | -7.08  | -7.41  | -8.19  | -9.20  | -9.33  | -7.64  | -6.73  | -6.29  | -6.28  | -6.70  | -7.20  | -8.17  | -8.06  |
| Peak EIRP (dBm)            | -13.22 | -12.23 | -11.71 | -10.66 | -9.75  | -8.79  | -7.96  | -6.39  | -6.05  | -6.13  | -6.05  | -5.86  | -5.50  | -5.32  | -5.73  | -3.93  | -4.34  | -3.78  | -2.41  | -2.83  | -3.02  | -2.45  | -1.96  | -1.96  | -3.34  | -3.59  |
| Directivity (dBi)          | 1.84   | 2.07   | 2.28   | 2.20   | 2.13   | 2.11   | 2.18   | 3.31   | 3.64   | 2.95   | 2.26   | 2.05   | 1.88   | 1.76   | 1.68   | 4.26   | 4.86   | 5.55   | 5.24   | 3.89   | 3.27   | 3.83   | 4.75   | 5.24   | 4.84   | 4.46   |
| Efficiency (dB)            | -15.06 | -14.30 | -13.99 | -12.87 | -11.88 | -10.90 | -10.14 | -9.70  | -9.68  | -9.08  | -8.30  | -7.90  | -7.37  | -7.08  | -7.41  | -8.19  | -9.20  | -9.33  | -7.64  | -6.73  | -6.29  | -6.28  | -6.70  | -7.20  | -8.17  | -8.06  |
| Efficiency (%)             | 3.10   | 3.70   | 4.00   | 5.20   | 6.50   | 8.10   | 9.70   | 10.70  | 10.80  | 12.30  | 14.80  | 16.20  | 18.30  | 19.60  | 18.20  | 15.20  | 12.00  | 11.70  | 17.20  | 21.30  | 23.50  | 23.50  | 21.40  | 19.10  | 15.20  | 15.60  |
| Gain (dBi)                 | -13.22 | -12.23 | -11.71 | -10.66 | -9.75  | -8.79  | -7.96  | -6.39  | -6.05  | -6.13  | -6.05  | -5.86  | -5.50  | -5.32  | -5.73  | -3.93  | -4.34  | -3.78  | -2.41  | -2.83  | -3.02  | -2.45  | -1.96  | -1.96  | -3.34  | -3.59  |
| NHPRP ±Pi/4 (dBm)          | -16.70 | -15.94 | -15.55 | -14.41 | -13.41 | -12.50 | -11.81 | -11.52 | -11.56 | -11.04 | -10.50 | -10.28 | -9.87  | -9.75  | -10.10 | -11.22 | -12.41 | -12.62 | -10.92 | -9.83  | -9.36  | -8.76  | -8.90  | -9.27  | -10.47 | -10.44 |
| NHPRP ±Pi/6 (dBm)          | -17.95 | -17.19 | -16.81 | -15.72 | -14.77 | -13.93 | -13.31 | -13.08 | -13.05 | -12.41 | -11.82 | -11.60 | -11.21 | -11.07 | -11.44 | -12.87 | -14.20 | -14.61 | -12.79 | -11.54 | -11.05 | -10.37 | -10.45 | -10.70 | -11.78 | -11.61 |
| NHPRP ±Pi/8 (dBm)          | -18.94 | -18.16 | -17.78 | -16.73 | -15.84 | -15.05 | -14.49 | -14.32 | -14.23 | -13.52 | -12.91 | -12.71 | -12.36 | -12.23 | -12.63 | -14.10 | -15.52 | -15.83 | -13.92 | -12.64 | -12.31 | -11.74 | -11.83 | -11.88 | -12.71 | -12.45 |
| Upper Hem. PRP (dBm)       | -18.33 | -17.73 | -17.54 | -16.40 | -15.34 | -14.25 | -13.25 | -12.42 | -12.09 | -11.58 | -11.12 | -11.02 | -10.72 | -10.60 | -11.04 | -12.89 | -14.16 | -12.72 | -10.82 | -10.47 | -10.05 | -10.04 | -10.40 | -11.09 | -12.05 | -11.89 |
| Lower Hem. PRP (dBm)       | -17.83 | -16.93 | -16.53 | -15.41 | -14.49 | -13.60 | -13.06 | -13.03 | -13.40 | -12.68 | -11.52 | -10.81 | -10.07 | -9.64  | -9.88  | -9.98  | -10.86 | -11.99 | -10.49 | -9.11  | -8.67  | -8.65  | -9.12  | -9.47  | -10.46 | -10.37 |
| Upper Hem. PRP (%)         | 1.47   | 1.69   | 1.76   | 2.29   | 2.92   | 3.76   | 4.74   | 5.73   | 6.18   | 6.95   | 7.72   | 7.90   | 8.46   | 8.71   | 7.88   | 5.14   | 3.84   | 5.35   | 8.27   | 8.97   | 9.89   | 9.91   | 9.12   | 7.77   | 6.23   | 6.47   |
| Lower Hem. PRP (%)         | 1.65   | 2.03   | 2.23   | 2.88   | 3.56   | 4.36   | 4.95   | 4.98   | 4.57   | 5.39   | 7.05   | 8.30   | 9.84   | 10.86  | 10.27  | 10.04  | 8.20   | 6.33   | 8.94   | 12.29  | 13.59  | 13.64  | 12.25  | 11.29  | 8.99   | 9.18   |

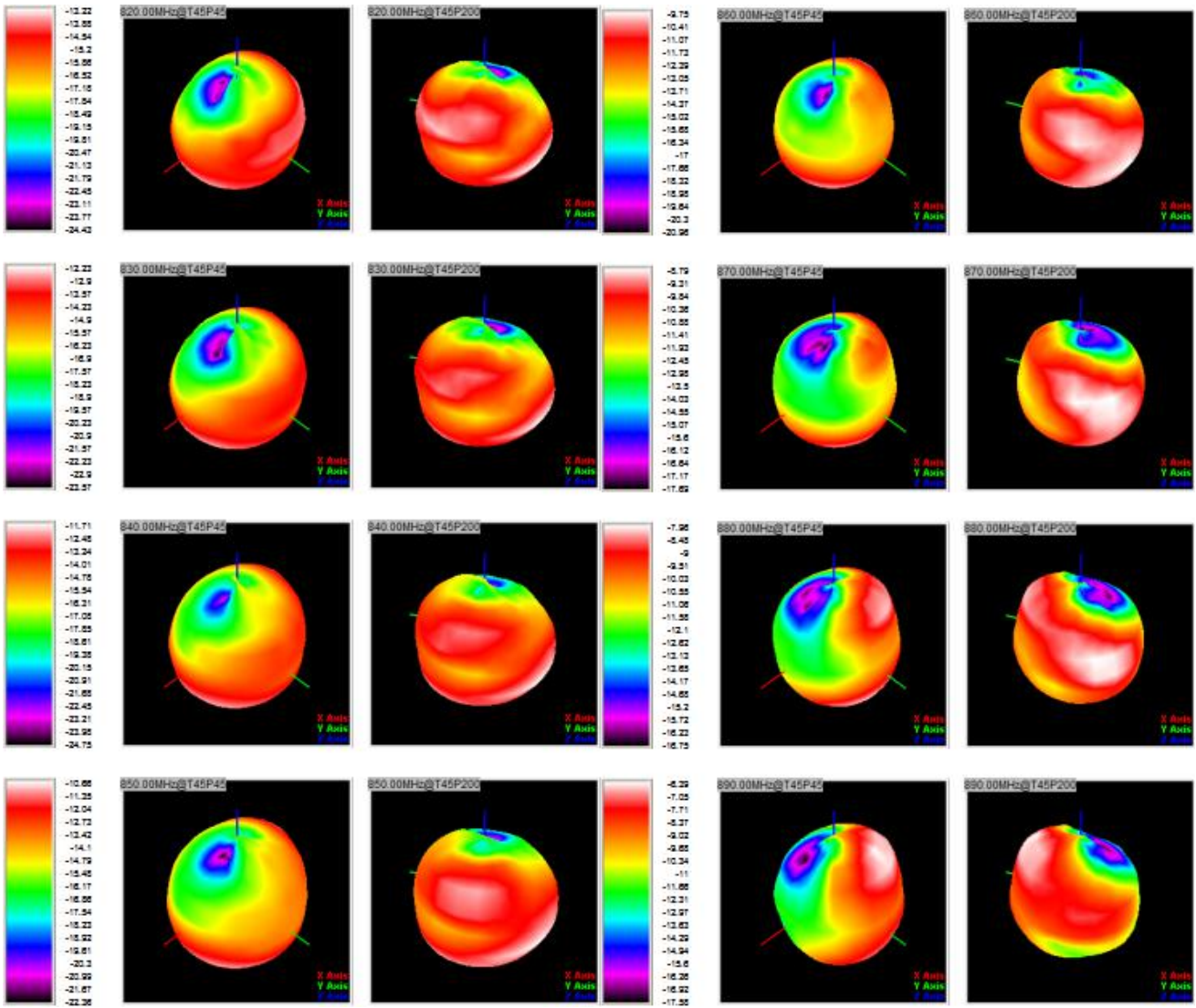
| Frequency ID               | 27     | 28     | 29     | 30     | 31     | 32     | 33     | 34     | 35     | 36     | 37     | 38     | 39     | 40     | 41     | 42     | 43     | 44     |
|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Frequency (MHz)            | 2095.0 | 2130.0 | 2165.0 | 2200.0 | 2235.0 | 2270.0 | 2305.0 | 2340.0 | 2375.0 | 2410.0 | 2445.0 | 2480.0 | 2515.0 | 2550.0 | 2585.0 | 2620.0 | 2655.0 | 2690.0 |
| Point Values               |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Ant. Port Input Pwr. (dBm) | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   |
| Tot. Rad. Pwr. (dBm)       | -8.41  | -9.37  | -11.10 | -11.91 | -10.87 | -9.82  | -9.36  | -10.20 | -10.81 | -10.19 | -10.82 | -11.07 | -11.06 | -10.66 | -11.38 | -12.04 | -12.04 | -11.83 |
| Peak EIRP (dBm)            | -3.97  | -4.71  | -6.01  | -6.37  | -4.90  | -4.39  | -3.97  | -4.76  | -4.27  | -3.69  | -3.96  | -3.58  | -4.67  | -1.69  | -3.43  | -3.11  | -3.77  | -3.13  |
| Directivity (dBi)          | 4.43   | 4.66   | 5.10   | 5.54   | 5.98   | 5.43   | 5.39   | 5.45   | 6.54   | 6.50   | 6.86   | 7.49   | 6.39   | 8.97   | 7.94   | 8.93   | 8.28   | 8.70   |
| Efficiency (dB)            | -8.41  | -9.37  | -11.10 | -11.91 | -10.87 | -9.82  | -9.36  | -10.20 | -10.81 | -10.19 | -10.82 | -11.07 | -11.06 | -10.66 | -11.38 | -12.04 | -12.04 | -11.83 |
| Efficiency (%)             | 14.40  | 11.60  | 7.80   | 6.40   | 8.20   | 10.40  | 11.60  | 9.50   | 8.30   | 9.60   | 8.30   | 7.80   | 7.80   | 8.60   | 7.30   | 6.20   | 6.20   | 6.60   |
| Gain (dBi)                 | -3.97  | -4.71  | -6.01  | -6.37  | -4.90  | -4.39  | -3.97  | -4.76  | -4.27  | -3.69  | -3.96  | -3.58  | -4.67  | -1.69  | -3.43  | -3.11  | -3.77  | -3.13  |
| NHPRP ±Pi/4 (dBm)          | -10.57 | -11.49 | -13.30 | -14.69 | -13.67 | -12.91 | -12.49 | -13.06 | -13.57 | -13.02 | -13.91 | -13.61 | -14.14 | -13.04 | -14.73 | -14.87 | -15.29 | -14.88 |
| NHPRP ±Pi/6 (dBm)          | -11.74 | -12.78 | -15.03 | -16.71 | -15.57 | -14.81 | -14.33 | -14.83 | -15.41 | -15.09 | -16.01 | -15.43 | -15.86 | -14.73 | -16.54 | -16.82 | -17.36 | -16.99 |
| NHPRP ±Pi/8 (dBm)          | -12.62 | -13.75 | -16.29 | -18.21 | -16.83 | -16.10 | -15.64 | -16.09 | -16.76 | -16.65 | -17.55 | -16.73 | -17.16 | -16.09 | -17.98 | -18.44 | -19.03 | -18.73 |
| Upper Hem. PRP (dBm)       | -12.13 | -12.98 | -14.94 | -16.51 | -15.59 | -14.15 | -13.18 | -13.80 | -14.33 | -13.66 | -14.09 | -14.09 | -13.97 | -13.65 | -14.20 | -14.18 | -13.79 | -13.48 |
| Lower Hem. PRP (dBm)       | -10.80 | -11.85 | -13.41 | -13.76 | -12.66 | -11.82 | -11.69 | -12.69 | -13.37 | -12.79 | -13.58 | -14.07 | -14.17 | -13.69 | -14.59 | -16.15 | -16.85 | -16.84 |
| Upper Hem. PRP (%)         | 6.12   | 5.04   | 3.20   | 2.23   | 2.76   | 3.85   | 4.81   | 4.17   | 3.69   | 4.30   | 3.90   | 3.90   | 4.01   | 4.31   | 3.80   | 3.82   | 4.18   | 4.49   |
| Lower Hem. PRP (%)         | 8.32   | 6.54   | 4.56   | 4.21   | 5.42   | 6.57   | 6.77   | 5.38   | 4.60   | 5.26   | 4.39   | 3.92   | 3.82   | 4.27   | 3.48   | 2.43   | 2.06   | 2.07   |

**GPS&WIFI:**

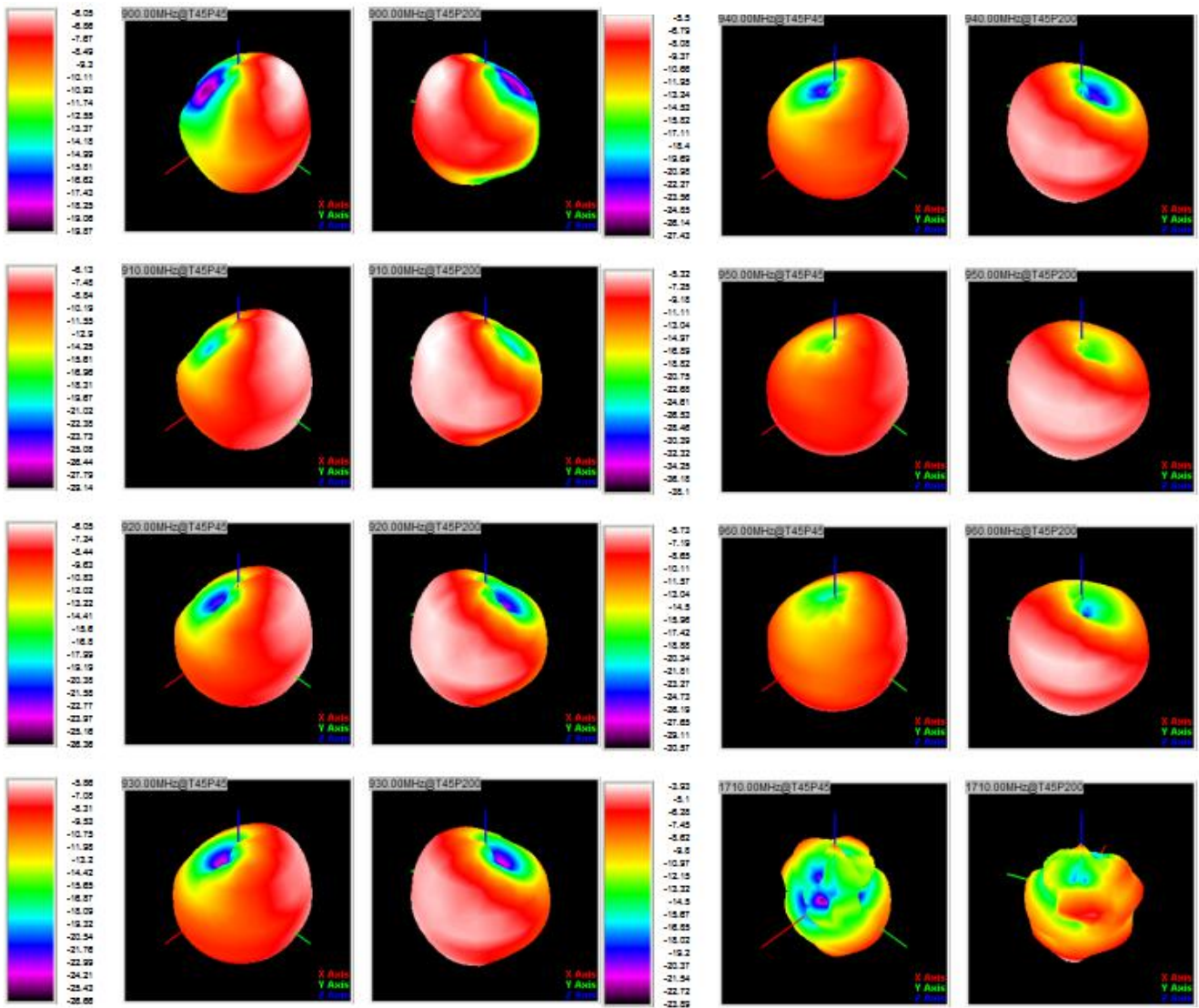
| Freq(MHz) | Gain(dB) | Efficiency(dB) | Efficiency(%) |
|-----------|----------|----------------|---------------|
| 1550      | -0.40    | -5.29          | 29.55         |
| 1552      | -0.46    | -5.31          | 29.42         |
| 1554      | -0.54    | -5.33          | 29.32         |
| 1556      | -0.62    | -5.33          | 29.33         |
| 1558      | -0.71    | -5.33          | 29.31         |
| 1560      | -0.78    | -5.32          | 29.39         |
| 1562      | -0.87    | -5.33          | 29.29         |
| 1564      | -0.95    | -5.33          | 29.32         |
| 1566      | -1.00    | -5.33          | 29.30         |
| 1568      | -1.04    | -5.32          | 29.39         |
| 1570      | -1.07    | -5.31          | 29.47         |
| 1572      | -1.12    | -5.33          | 29.31         |
| 1574      | -1.15    | -5.36          | 29.11         |
| 1576      | -1.18    | -5.40          | 28.84         |
| 1578      | -1.21    | -5.46          | 28.46         |
| 1580      | -1.27    | -5.54          | 27.92         |
| 2400      | 3.06     | -3.00          | 50.08         |
| 2410      | 3.13     | -2.75          | 53.12         |
| 2420      | 3.19     | -2.60          | 54.90         |
| 2430      | 3.25     | -2.50          | 56.22         |
| 2440      | 3.28     | -2.43          | 57.10         |
| 2450      | 3.36     | -2.33          | 58.51         |
| 2460      | 3.34     | -2.30          | 58.88         |
| 2470      | 3.30     | -2.25          | 59.59         |
| 2480      | 3.29     | -2.20          | 60.31         |
| 2490      | 3.46     | -2.22          | 60.02         |
| 2500      | 3.57     | -2.32          | 58.61         |

## 2.3.3 Pattern

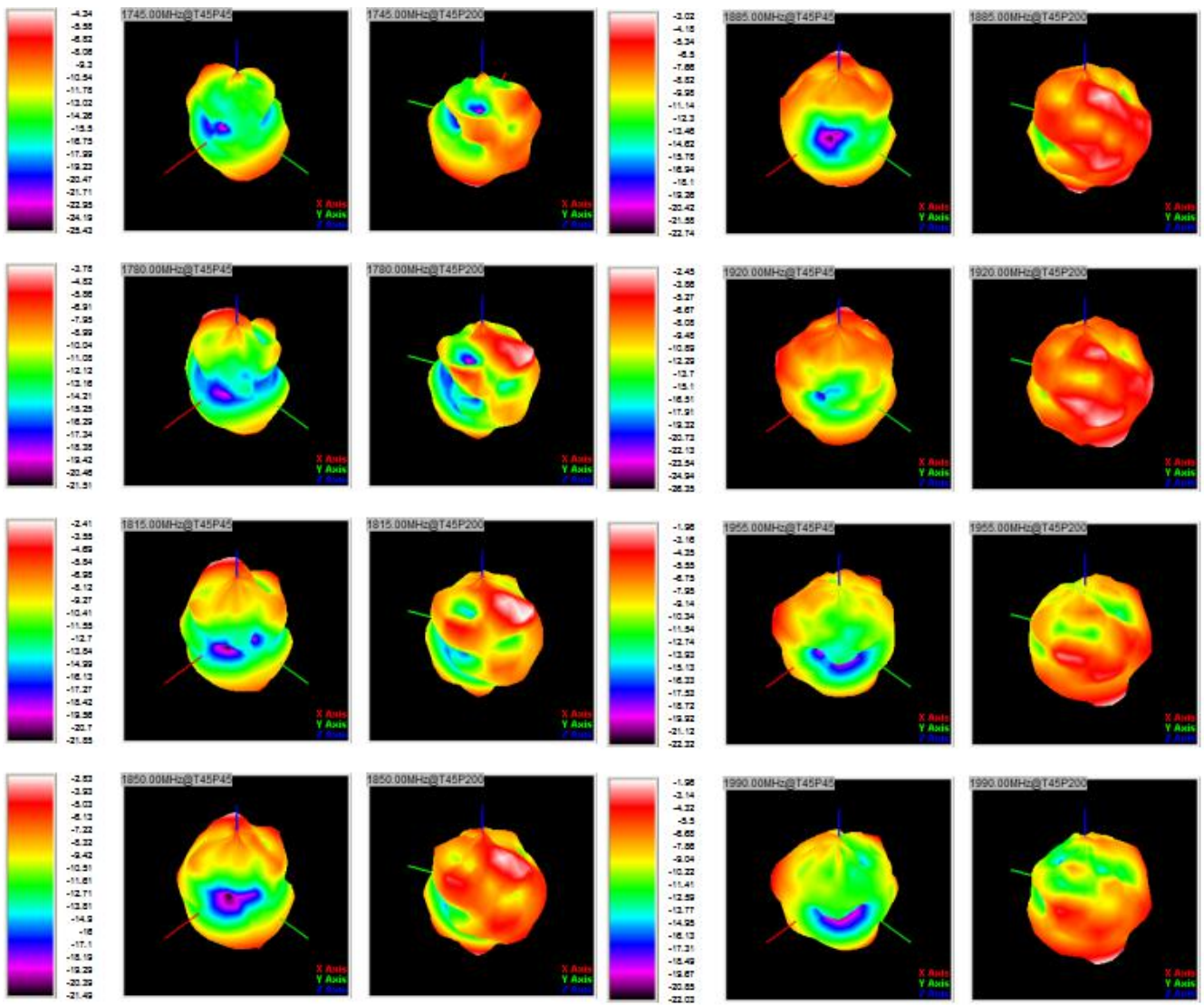
DIV:



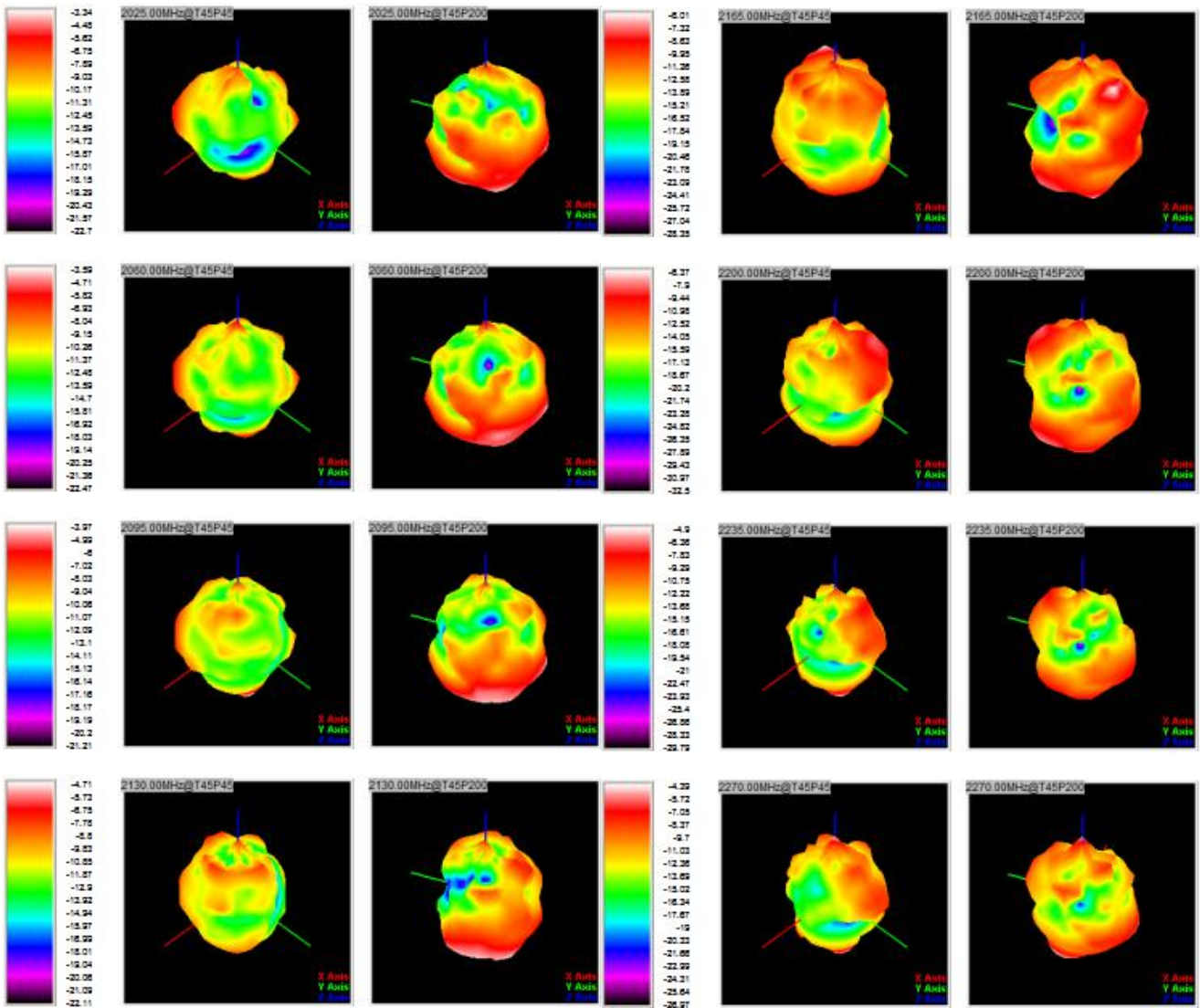
# Antenna Specifications



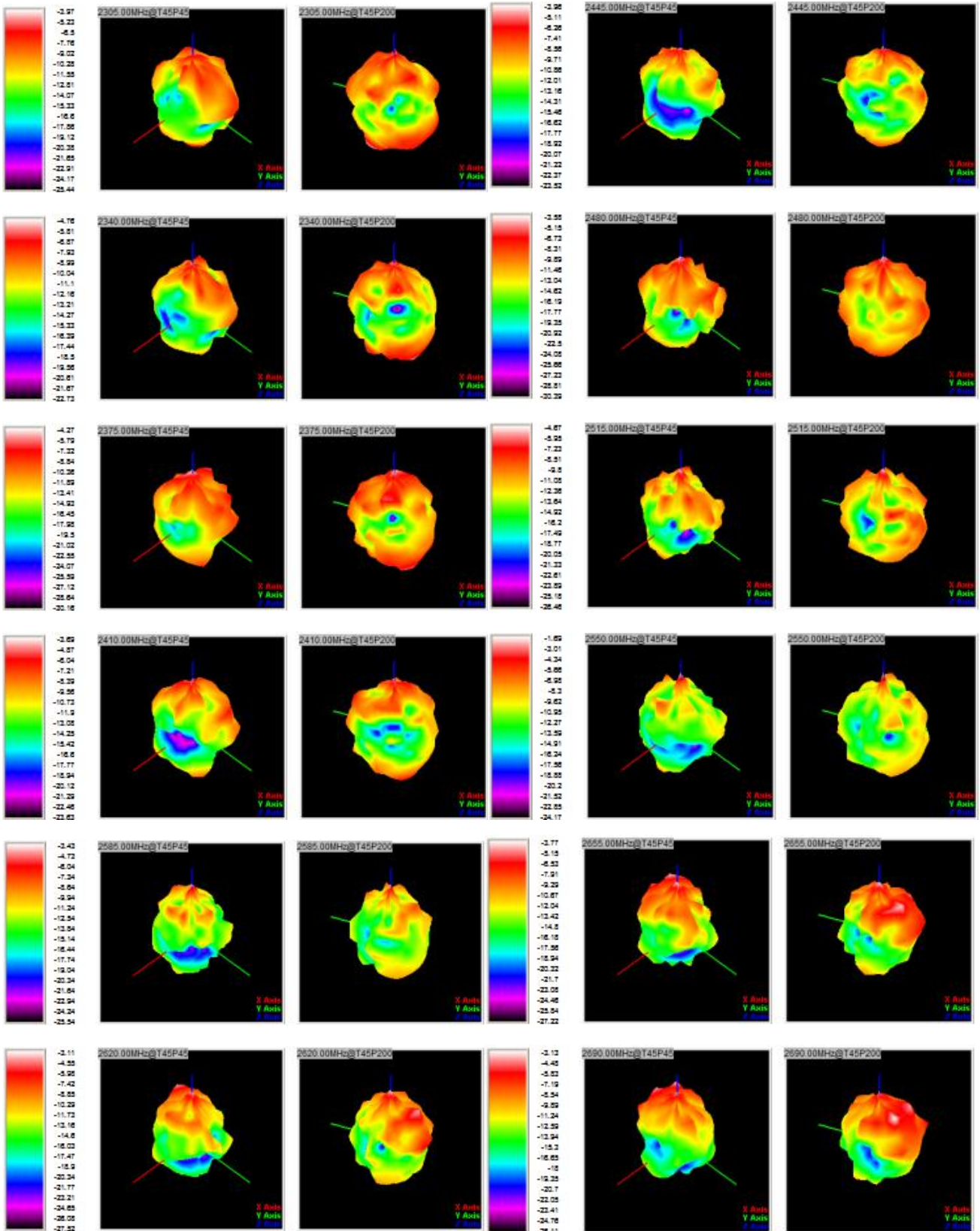
# Antenna Specifications



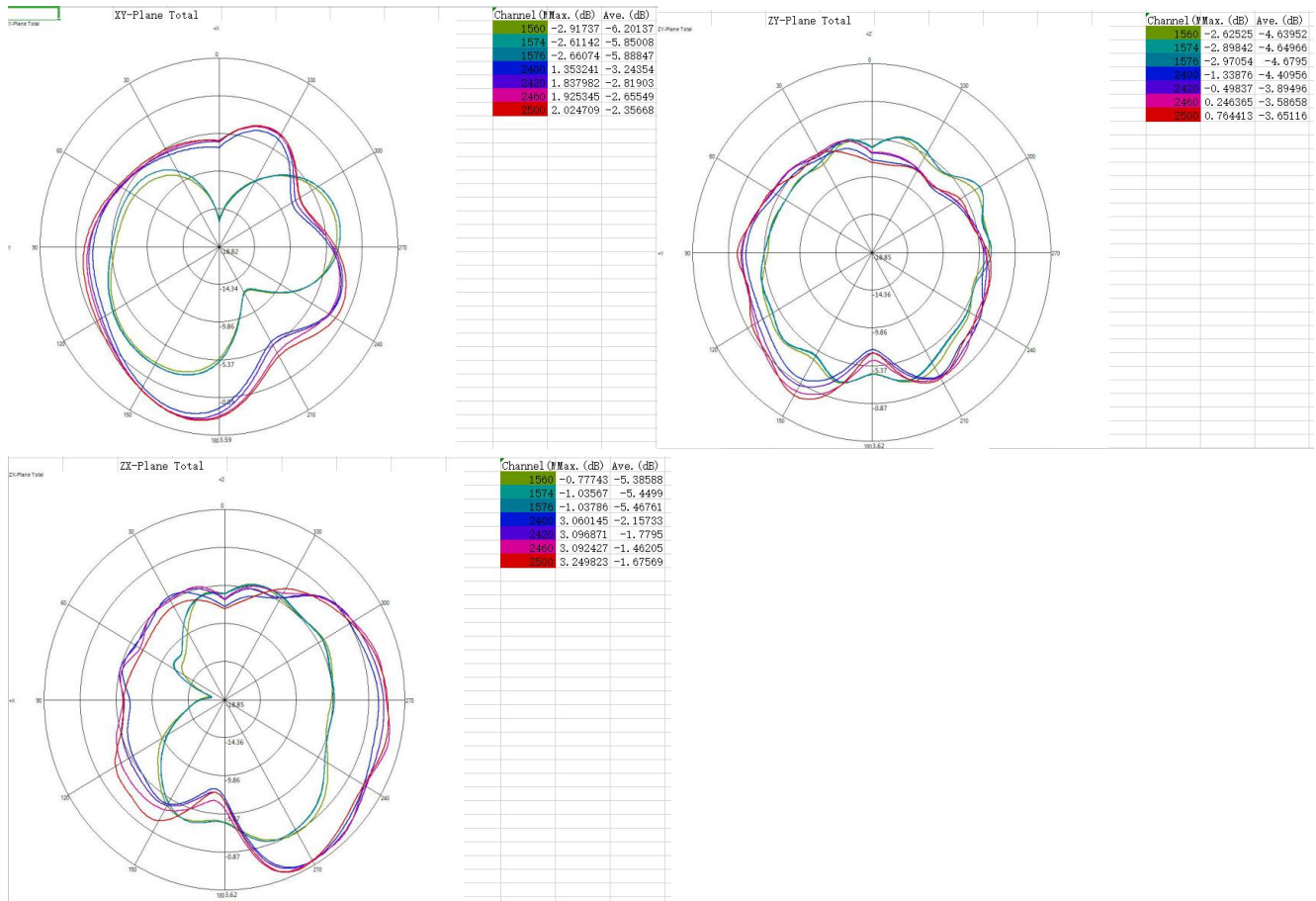
# Antenna Specifications



# Antenna Specifications



## GPS&WIFI:



## 3、Suggestion And Solution

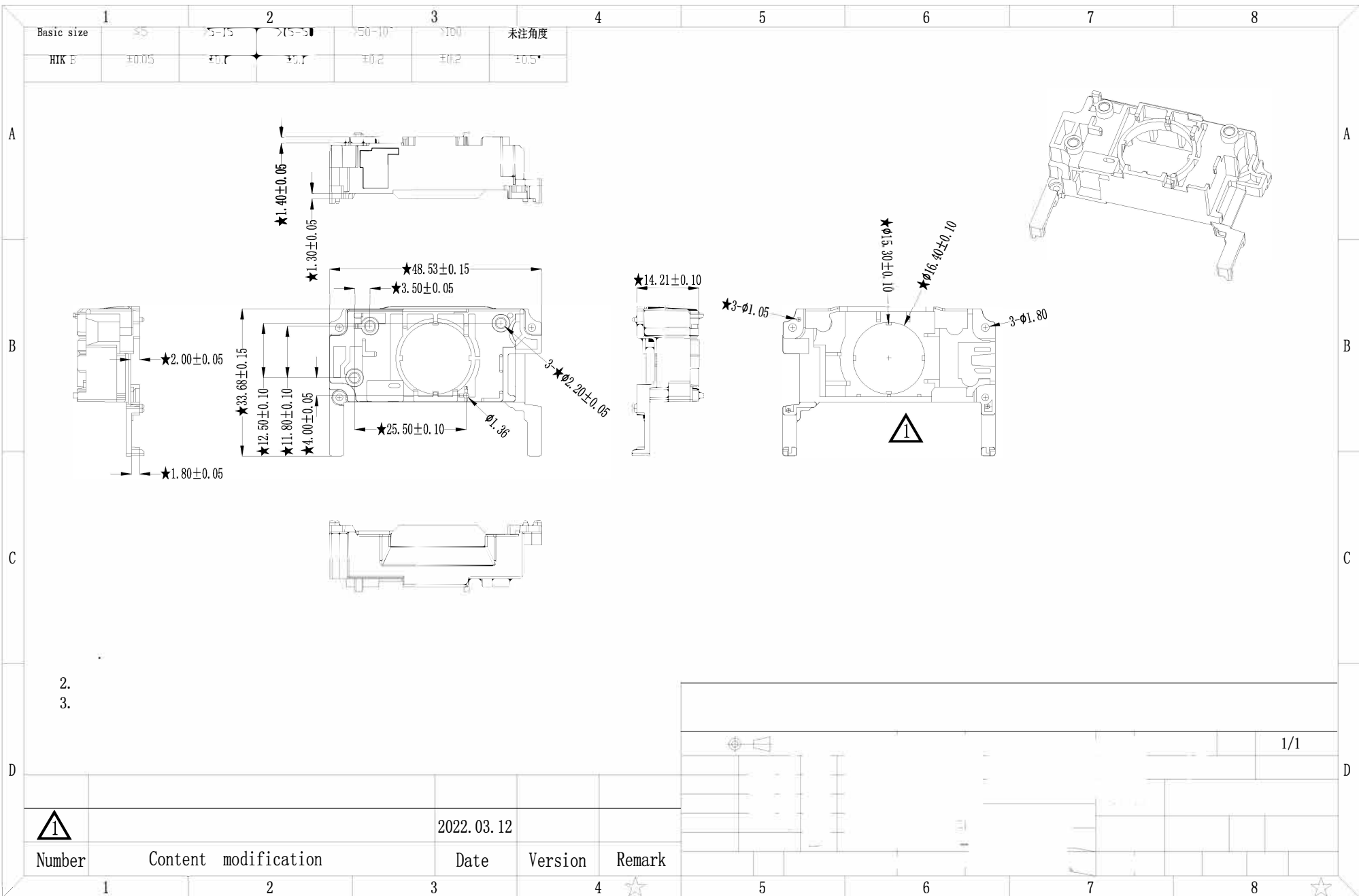
This report is according to the customer provide 407D Law Enforcement Camera GWD Antenna the final version of the electrical performance of antenna.

As can be seen from the above test data, this antenna provides better electrical performance.

We are looking forward to your confirmation. Thank you for your cooperation!

## 4、Appearance Drawing





Number

Content modification

2022.03.12

Date

Version

Remark