



# 昶音TP7691天线调试报告

Antenna Design And Test Report

报告版本：V1.0

报告日期：2024年4月23日星期二



# 目录

## CONTENTS

01

项目概述

Project Overview

02

测试环境

Test Environment

03

匹配电路

Matching Circuit

04

环境处理

Environmental  
Treatment

05

有源报告

Active Report

06

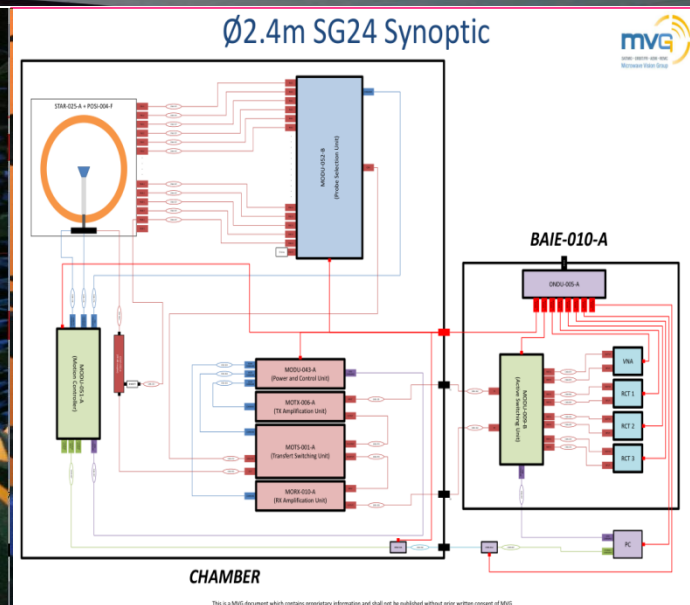
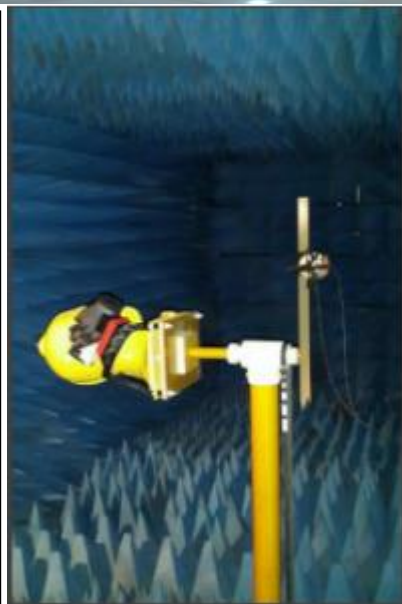
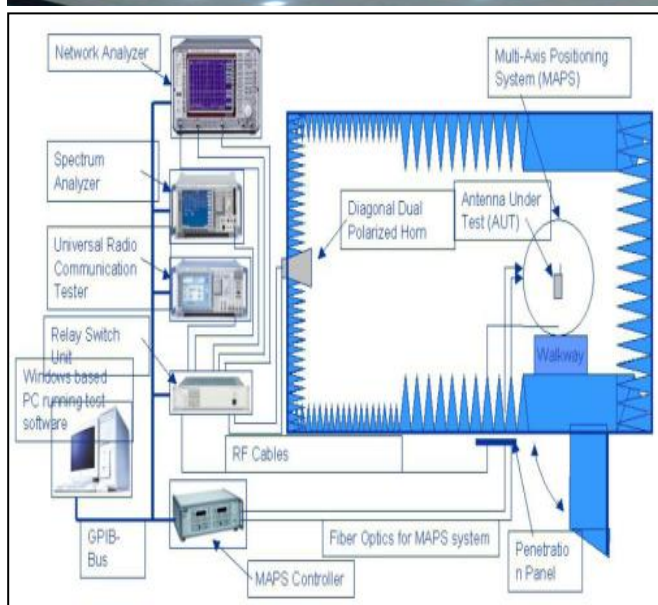
总结

Conclusion

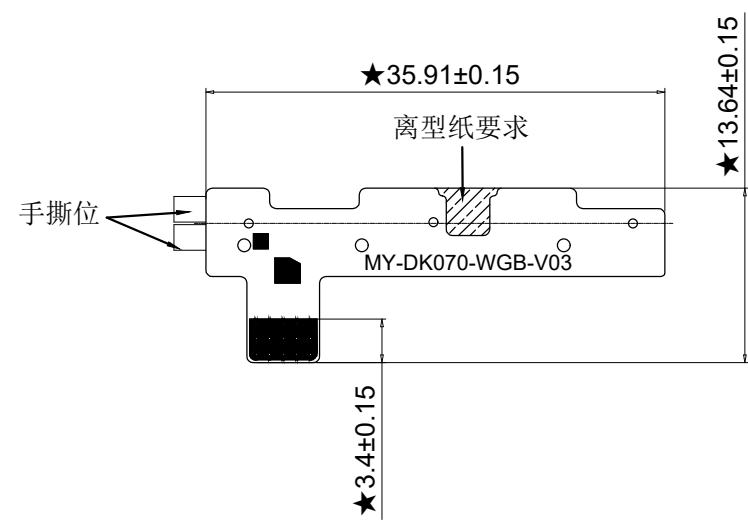
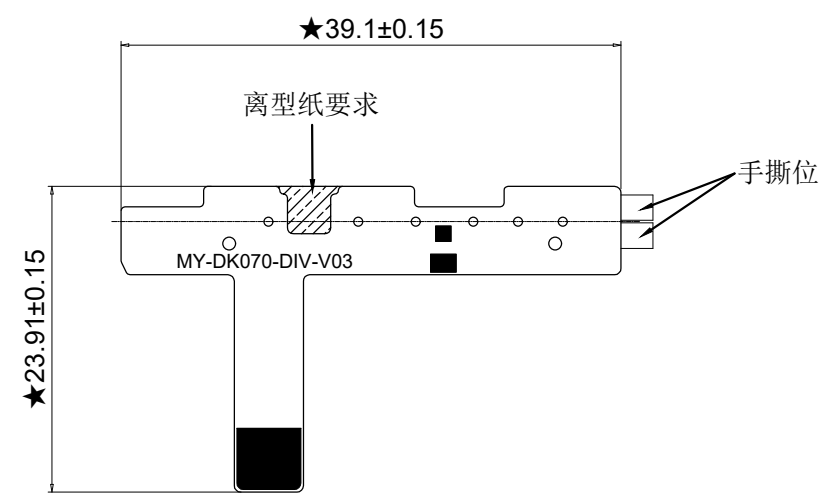
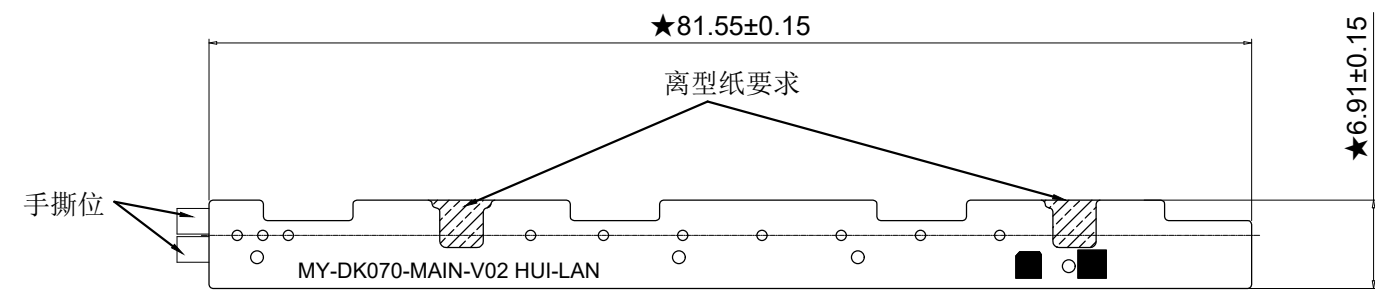
07

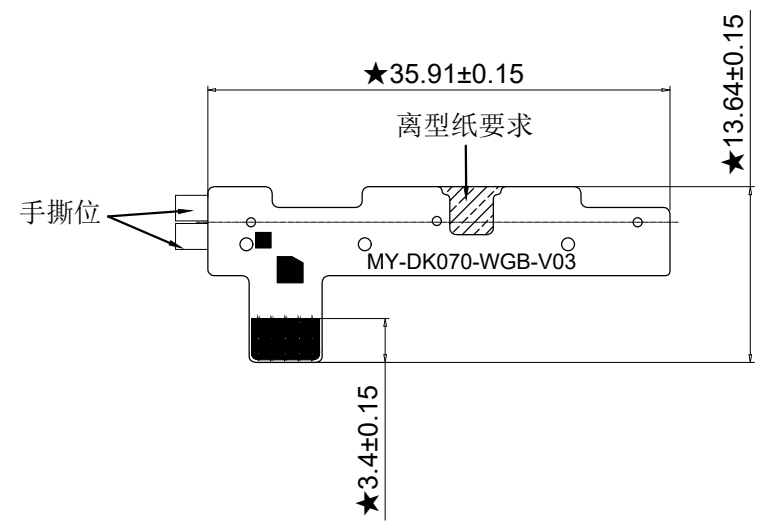
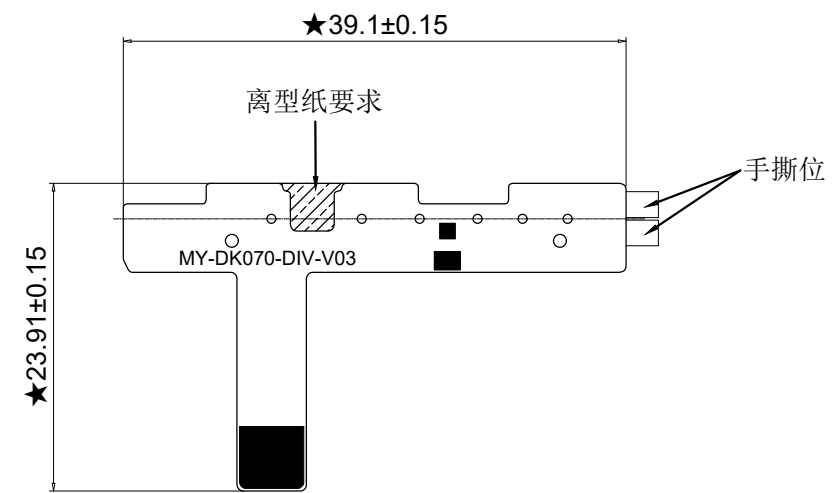
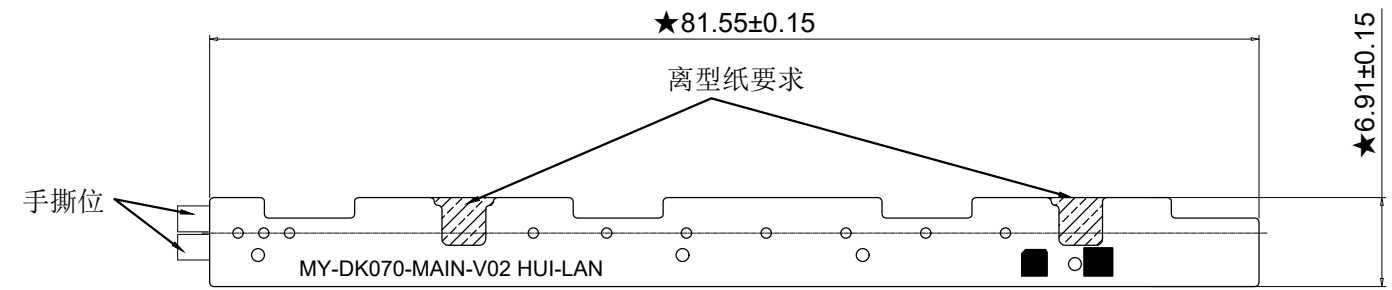
附加说明

Additional Notes



3座远场3D全电波微波暗室实验室系统，1座MVG SG24LT (Satmio) 近场3D微波暗室实验室系统（与国家相关实验室同步）



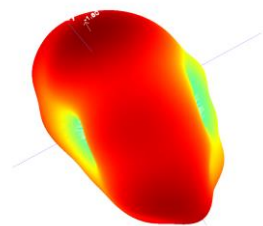


| Band      | Max Peak<br>Antenna Gain<br>(dBi) |
|-----------|-----------------------------------|
| BT        | 2.32                              |
| 2.4G WiFi | 2.32                              |
| 5.2G WiFi | 3.12                              |
| 5.8G WiFi | 3.89                              |
|           |                                   |
| GSM 850   | 2.35                              |
| PCS 1900  | -0.34                             |
|           |                                   |
| WCDMA B2  | 2.35                              |
| WCDMA B5  | -0.34                             |
|           |                                   |
| LTE B2    | 2.35                              |
| LTE B4    | 1.54                              |
| LTE B5    | -0.34                             |
| LTE B12   | -0.76                             |
| LTE B13   | -0.76                             |
| LTE B66   | 1.54                              |

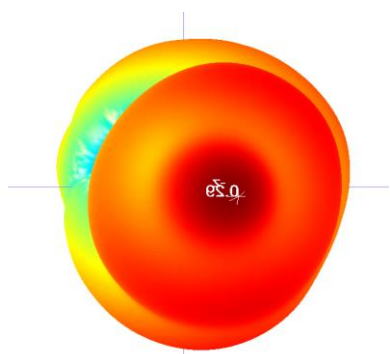
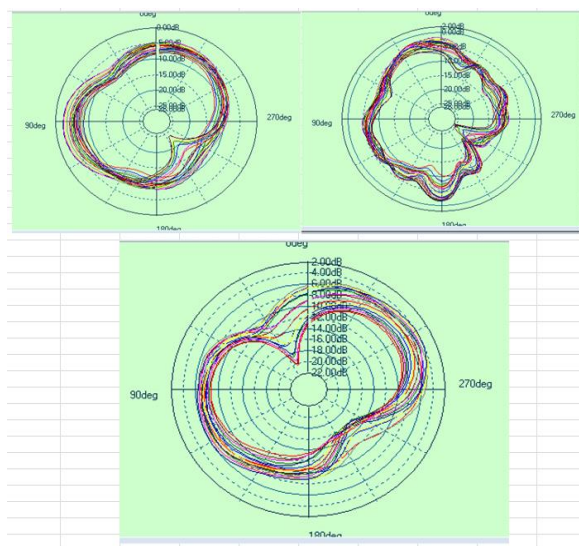
| MAIN ant             |                 |                     |
|----------------------|-----------------|---------------------|
| frequency<br>频率(MHz) | gain<br>增益(dBi) | efficiency<br>效率(%) |
| 700                  | -1.13           | 21.35               |
| 720                  | -1.02           | 22.68               |
| 740                  | -0.89           | 23.45               |
| 760                  | -0.76           | 24.13               |
| 780                  | -0.87           | 23.57               |
| 800                  | -0.64           | 21.32               |
| 820                  | -0.51           | 23.25               |
| 840                  | -0.48           | 24.35               |
| 860                  | 0.39            | 25.29               |
| 880                  | -0.45           | 25.25               |
| 900                  | -0.34           | 26.78               |
| 920                  | -0.19           | 28.48               |
| 940                  | 0.02            | 29.49               |
| 960                  | -0.18           | 27.12               |
| 2300                 | 1.87            | 38.25               |
| 2320                 | 1.82            | 39.02               |
| 2340                 | 1.78            | 38.48               |
| 2360                 | 1.68            | 35.45               |
| 2380                 | 1.87            | 38.41               |
| 2400                 | 1.67            | 35.18               |
| 2420                 | 1.42            | 36.47               |
| 2440                 | 1.52            | 36.89               |
| 2460                 | 1.48            | 35.16               |
| 2480                 | 1.45            | 35.46               |
| 2500                 | 1.79            | 38.12               |
| 2520                 | 1.88            | 39.15               |
| 2540                 | 1.82            | 38.78               |
| 2560                 | 1.69            | 37.81               |
| 2580                 | 1.84            | 39.57               |
| 2600                 | 1.87            | 40.16               |
| 2620                 | 1.85            | 39.87               |
| 2640                 | 1.77            | 38.06               |
| 2660                 | 1.84            | 38.87               |
| 2680                 | 1.80            | 38.02               |
| 2690                 | 1.79            | 37.26               |
| 2700                 | 1.71            | 37.02               |

| DIV ant              |                 |                     |
|----------------------|-----------------|---------------------|
| frequency<br>频率(MHz) | gain<br>增益(dBi) | efficiency<br>效率(%) |
| 1710                 | 1.54            | 39.25               |
| 1730                 | 1.65            | 40.25               |
| 1750                 | 1.68            | 40.25               |
| 1770                 | 1.71            | 40.98               |
| 1790                 | 1.87            | 42.05               |
| 1810                 | 1.78            | 41.12               |
| 1830                 | 1.67            | 39.25               |
| 1850                 | 1.57            | 38.45               |
| 1870                 | 1.69            | 39.25               |
| 1890                 | 1.87            | 39.80               |
| 1910                 | 1.89            | 40.15               |
| 1930                 | 1.98            | 42.05               |
| 1950                 | 2.12            | 43.12               |
| 1970                 | 2.27            | 43.87               |
| 1990                 | 2.35            | 44.15               |
| 2010                 | 2.25            | 43.02               |
| 2030                 | 2.05            | 42.15               |
| 2050                 | 1.98            | 40.58               |
| 2070                 | 1.82            | 39.78               |
| 2090                 | 1.68            | 39.02               |
| 2110                 | 1.54            | 38.15               |
| 2130                 | 1.48            | 37.78               |
| 2150                 | 1.40            | 35.15               |
| 2170                 | 1.38            | 33.15               |
| 2190                 | 1.24            | 31.08               |
| 2210                 | 1.15            | 30.13               |
| 2230                 | 1.02            | 29.07               |
| 2250                 | 0.92            | 28.18               |
| 2270                 | 1.02            | 29.25               |
| 2290                 | 1.13            | 30.36               |
| 2310                 | 1.48            | 32.15               |
| 2330                 | 1.54            | 35.26               |
| 2350                 | 1.38            | 34.15               |
| 2370                 | 1.25            | 30.16               |
| 2390                 | 1.02            | 29.58               |
| 2410                 | 1.12            | 30.23               |
| 2430                 | 0.97            | 28.18               |
| 2450                 | 0.78            | 26.35               |
| 2470                 | 1.25            | 28.12               |
| 2490                 | 1.34            | 29.46               |
| 2510                 | 1.25            | 28.15               |
| 2530                 | 1.02            | 27.10               |
| 2550                 | 0.87            | 26.78               |
| 2570                 | 0               | 21.75               |
| 2590                 | -0.07           | 21.90               |
| 2610                 | -0.53           | 21.60               |
| 2630                 | -1.05           | 21.91               |
| 2650                 | -1.4            | 20.41               |
| 2670                 | -0.57           | 20.39               |
| 2690                 | 0.24            | 20.04               |

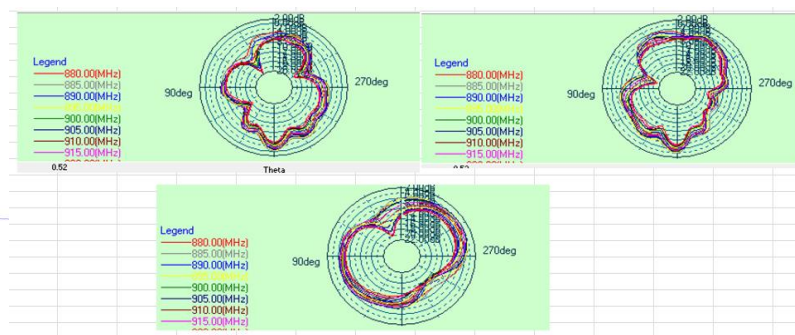
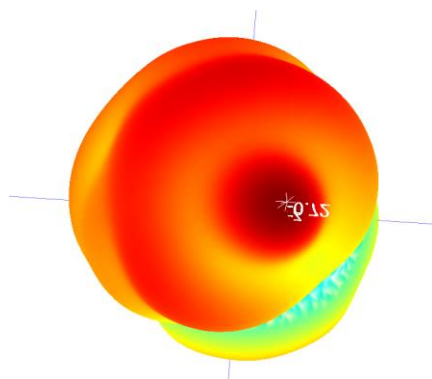
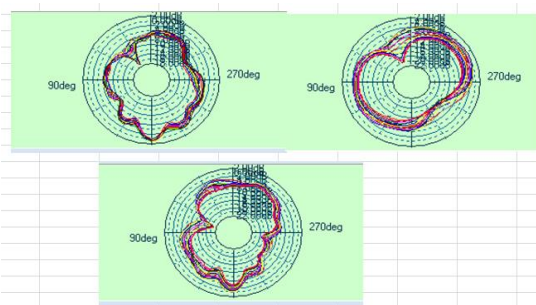
| 3in1 ant             |                 |                     |
|----------------------|-----------------|---------------------|
| frequency<br>频率(MHz) | gain<br>增益(dBi) | efficiency<br>效率(%) |
| 1530                 | 1.24            | 33.25               |
| 1540                 | 1.35            | 34.89               |
| 1550                 | 1.42            | 36.56               |
| 1560                 | 1.51            | 38.42               |
| 1570                 | 1.67            | 40.12               |
| 1575                 | 1.54            | 39.54               |
| 1580                 | 1.45            | 38.14               |
| 1590                 | 1.32            | 37.16               |
| 1600                 | 1.24            | 36.25               |
| 1610                 | 1.12            | 35.10               |
| 1620                 | 1.02            | 34.12               |
| 1630                 | 0.99            | 33.54               |
| 2400                 | 1.82            | 36.56               |
| 2410                 | 1.85            | 37.25               |
| 2420                 | 1.90            | 37.89               |
| 2430                 | 1.95            | 38.49               |
| 2440                 | 2.00            | 39.65               |
| 2450                 | 2.15            | 40.02               |
| 2460                 | 2.23            | 41.45               |
| 2470                 | 2.32            | 42.15               |
| 2480                 | 2.16            | 41.45               |
| 2490                 | 2.02            | 40.16               |
| 2500                 | 1.88            | 38.98               |
| 5000                 | 2.64            | 30.12               |
| 5050                 | 2.75            | 31.35               |
| 5100                 | 2.81            | 32.56               |
| 5150                 | 2.86            | 33.35               |
| 5200                 | 3.02            | 34.56               |
| 5250                 | 3.12            | 35.67               |
| 5300                 | 3.00            | 34.15               |
| 5350                 | 2.91            | 33.89               |
| 5400                 | 2.98            | 34.25               |
| 5450                 | 3.01            | 35.68               |
| 5500                 | 3.12            | 36.89               |
| 5550                 | 3.25            | 37.48               |
| 5600                 | 3.65            | 40.02               |
| 5650                 | 3.81            | 41.25               |
| 5700                 | 3.89            | 42.12               |
| 5750                 | 3.45            | 38.78               |
| 5800                 | 3.40            | 37.46               |
| 5850                 | 3.13            | 36.25               |
| 5900                 | 3.02            | 34.12               |



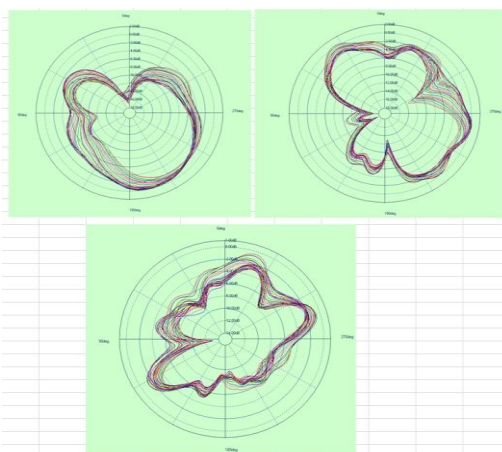
B12/13



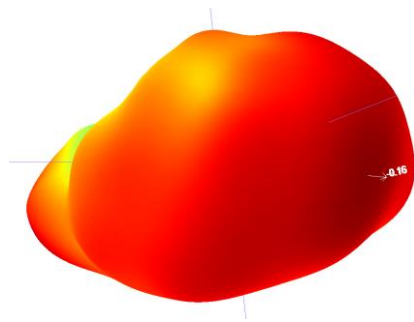
GSM850/W5/GSM850



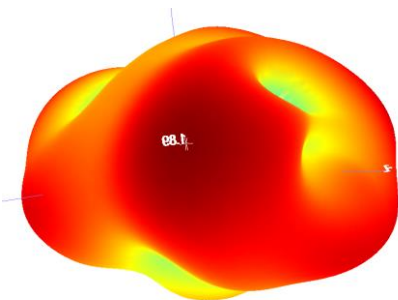
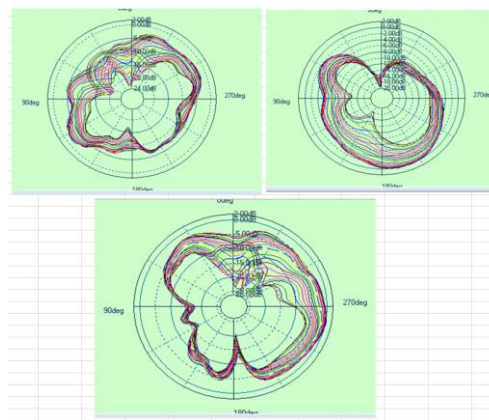
GSM900



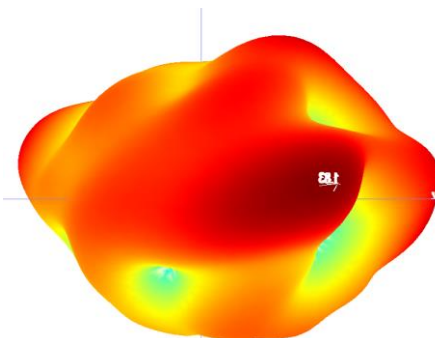
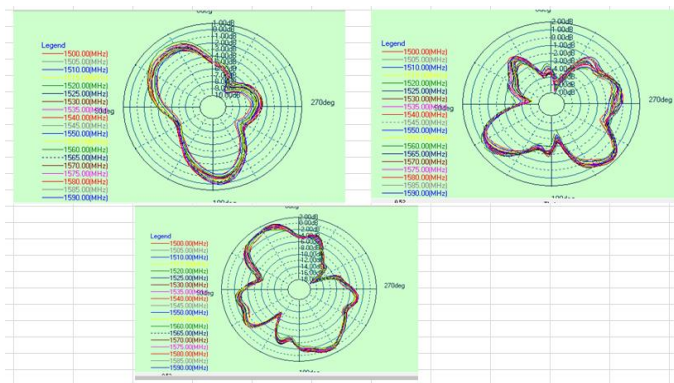
DCS1800/LTE B3/66



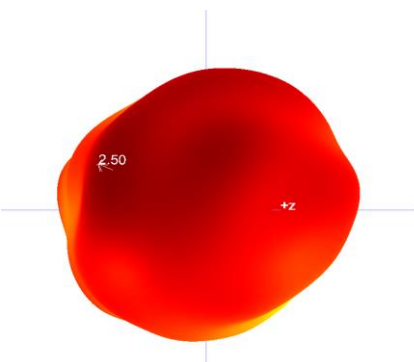
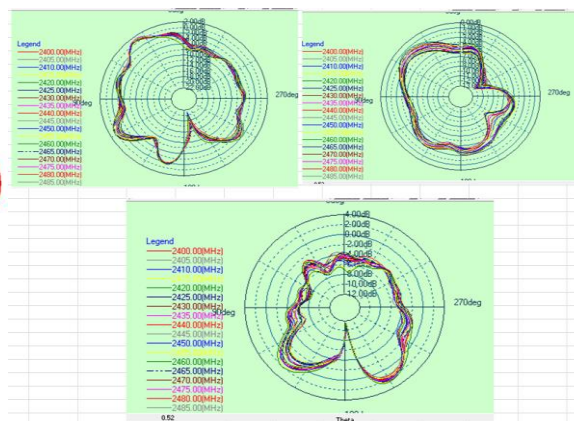
PCS1900/W2/LTE B2



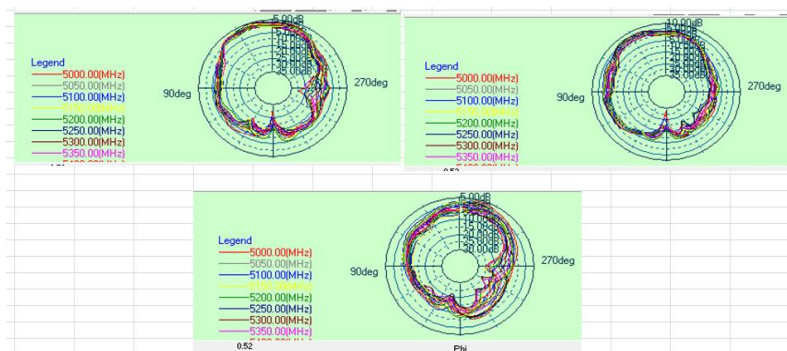
GPS



WIFI 2.4G



WIFI 5G



| 1# | BAND    | GSM900  |      |        | DCS1800  |      |        | GSM850   |      |        | PCS1900 |      |        |
|----|---------|---------|------|--------|----------|------|--------|----------|------|--------|---------|------|--------|
| 2G | CHANNEL | L       | M    | H      | L        | M    | H      | L        | M    | H      | L       | M    | H      |
|    | TRP     | 27.0    | 27.5 | 27.9   | 24.2     | 25.6 | 25.5   | 25.6     | 26.8 | 27.3   | 25.4    | 25.2 | 26.1   |
|    | TIS     |         |      | -103.3 |          |      | -103.5 |          |      | -101.8 |         |      | -104.5 |
|    | BAND    |         |      |        | WCDMA B2 |      |        | WCDMA B5 |      |        |         |      |        |
| 3G | CHANNEL |         |      |        | L        | M    | H      | L        | M    | H      |         |      |        |
|    | TRP     |         |      |        | 18.8     | 19.2 | 19.7   | 15.5     | 16.2 | 16.5   |         |      |        |
|    | TIS     |         |      |        |          |      | -106.4 |          |      | -102.7 |         |      |        |
|    | BAND    | LTE B2  |      |        | LTE B4   |      |        | LTE B5   |      |        | LTE B12 |      |        |
| 4G | CHANNEL | L       | M    | H      | L        | M    | H      | L        | M    | H      | L       | M    | H      |
|    | TRP     | 18.6    | 18.9 | 19.3   | 17.5     | 18.0 | 18.1   | 16.1     | 17.3 | 17.5   | 15.9    | 16.6 | 17.1   |
|    | TIS     |         |      | -95.5  |          |      | -94.4  |          |      | -90.2  |         |      | -90.6  |
|    | BAND    | LTE B13 |      |        | LTE B66  |      |        |          |      |        |         |      |        |
| 4G | CHANNEL | L       | M    | H      | L        | M    | H      |          |      |        |         |      |        |
|    | TRP     | 16.3    | 16.5 | 16.0   | 17.1     | 17.2 | 18.4   |          |      |        |         |      |        |
|    | TIS     |         |      | -89.2  |          |      | -94.6  |          |      |        |         |      |        |



| 1#   | BAND    | B    |      |       | G    |      |       |
|------|---------|------|------|-------|------|------|-------|
| WIFI | CHANNEL | L    | M    | H     | L    | M    | H     |
|      | TRP     | 12.6 | 12.9 | 11.8  | 10.2 | 10.5 | 9.7   |
|      | TIS     |      |      | -80.9 |      |      | -69.3 |
|      | BAND    | N    |      |       |      |      |       |
| WIFI | CHANNEL | L    | M    | H     | L    | M    | H     |
|      | TRP     | 10.1 | 10.2 | 9.4   |      |      |       |
|      | TIS     |      |      | -65.3 |      |      |       |
|      | BAND    | A    |      |       | AC   |      |       |
| WIFI | CHANNEL | L    | M    | H     | L    | M    | H     |
|      | TRP     | 12.8 | 13.1 | 13.6  | 11.8 | 12.3 | 12.5  |
|      | TIS     |      |      | -72.2 |      |      | -66.7 |

# Active Report

## GPS实测:



| SATELLITES CNR                                                               | SATELLITES LOC | INFORMATION | NMEA LOG  | GPS TEST | MPE STATUS | SATELLITES CNR                                                                | SATELLITES LOC | INFORMATION | NMEA LOG  | GPS TEST | MPE STATUS | SATELLITES CNR                                                                     | SATELLITES LOC | INFORMATION | NMEA LOG  | GPS TEST | MPE STATUS |
|------------------------------------------------------------------------------|----------------|-------------|-----------|----------|------------|-------------------------------------------------------------------------------|----------------|-------------|-----------|----------|------------|------------------------------------------------------------------------------------|----------------|-------------|-----------|----------|------------|
| G-GPS R:GLN B:BD E:GAL Q:QZS L:L1S H:RNSS S:SBAS                             |                |             |           |          |            | G-GPS R:GLN B:BD E:GAL Q:QZS L:L1S H:RNSS S:SBAS                              |                |             |           |          |            | G-GPS R:GLN B:BD E:GAL Q:QZS L:L1S H:RNSS S:SBAS                                   |                |             |           |          |            |
| Average CNR                                                                  |                |             |           |          |            | Average CNR                                                                   |                |             |           |          |            | Average CNR                                                                        |                |             |           |          |            |
| G31.7+/- R30.5+/- B31.6+/- E26.4+/- Q29.0+/- L+/-+/-+/-+/-+/- S32.0+/-+/-+/- |                |             |           |          |            | G38.6+/- R37.5+/- B36.9+/- E+/-+/-+/- Q33.8+/-+/- L+/-+/-+/-+/-+/- S+/-+/-+/- |                |             |           |          |            | G35.8+/- R35.3+/- B37.6+/- E38.2+/-+/- Q37.5+/-+/- L+/-+/-+/-+/-+/- S39.0+/-+/-+/- |                |             |           |          |            |
| <input type="checkbox"/> Show in single page                                 |                |             |           |          |            | <input type="checkbox"/> Show in single page                                  |                |             |           |          |            | <input type="checkbox"/> Show in single page                                       |                |             |           |          |            |
| SVID                                                                         | Fq             | CNR         | Elevation | Azimuth  |            | SVID                                                                          | Fq             | CNR         | Elevation | Azimuth  |            | SVID                                                                               | Fq             | CNR         | Elevation | Azimuth  |            |
| 2                                                                            | L1             | 37.3        | 37.00     | 166.00   |            | 2                                                                             | L1             | 44.4        | 38.00     | 166.00   |            | 2                                                                                  | L1             | 35.3        | 38.00     | 166.00   |            |
| 4                                                                            | L1             | 0.0         | 36.00     | 208.00   |            | 4                                                                             | L1             | 43.1        | 35.00     | 207.00   |            | 4                                                                                  | L1             | 30.5        | 35.00     | 207.00   |            |
| 7                                                                            | L1             | 22.7        | 31.00     | 323.00   |            | 7                                                                             | L1             | 38.2        | 32.00     | 323.00   |            | 7                                                                                  | L1             | 35.1        | 32.00     | 323.00   |            |
| 8                                                                            | L1             | 32.5        | 73.00     | 338.00   |            | 8                                                                             | L1             | 41.5        | 72.00     | 341.00   |            | 8                                                                                  | L1             | 39.6        | 72.00     | 341.00   |            |
| 9                                                                            | L1             | 40.5        | 38.00     | 258.00   |            | 9                                                                             | L1             | 37.4        | 38.00     | 257.00   |            | 9                                                                                  | L1             | 42.0        | 38.00     | 257.00   |            |
| 16                                                                           | L1             | 36.5        | 24.00     | 59.00    |            | 16                                                                            | L1             | 35.2        | 0.00      | 0.00     |            | 21                                                                                 | L1             | 46.7        | 46.00     | 150.00   |            |
| 21                                                                           | L1             | 41.4        | 45.00     | 152.00   |            | 21                                                                            | L1             | 41.0        | 46.00     | 150.00   |            | 31                                                                                 | L1             | 33.8        | 8.00      | 134.00   |            |
| 26                                                                           | L1             | 19.2        | 9.00      | 82.00    |            | 31                                                                            | L1             | 28.1        | 8.00      | 134.00   |            | 65                                                                                 | L1             | 0.0         | 3.00      | 201.00   |            |
| 30                                                                           | L1             | 25.2        | 3.00      | 318.00   |            | 65                                                                            | L1             | 0.0         | 3.00      | 201.00   |            | 66                                                                                 | L1             | 0.0         | 18.00     | 247.00   |            |
| 31                                                                           | L1             | 30.2        | 8.00      | 133.00   |            | 66                                                                            | L1             | 0.0         | 18.00     | 247.00   |            | 67                                                                                 | L1             | 0.0         | 11.00     | 298.00   |            |
| 65                                                                           | L1             | 0.0         | 3.00      | 201.00   |            | 67                                                                            | L1             | 0.0         | 11.00     | 298.00   |            | 75                                                                                 | L1             | 44.2        | 23.00     | 88.00    |            |
| 66                                                                           | L1             | 0.0         | 18.00     | 248.00   |            | 75                                                                            | L1             | 33.1        | 23.00     | 88.00    |            | 76                                                                                 | L1             | 40.7        | 44.00     | 20.00    |            |
| 67                                                                           | L1             | 19.6        | 11.00     | 299.00   |            | 76                                                                            | L1             | 40.5        | 44.00     | 20.00    |            | 77                                                                                 | L1             | 0.0         | 21.00     | 329.00   |            |
| 75                                                                           | L1             | 26.7        | 23.00     | 87.00    |            | 77                                                                            | L1             | 0.0         | 21.00     | 329.00   |            | 85                                                                                 | L1             | 37.9        | 12.00     | 28.00    |            |
| 76                                                                           | L1             | 29.1        | 43.00     | 19.00    |            | 85                                                                            | L1             | 32.6        | 12.00     | 28.00    |            | 86                                                                                 | L1             | 41.0        | 57.00     | 57.00    |            |
| 77                                                                           | L1             | 0.0         | 21.00     | 328.00   |            | 86                                                                            | L1             | 42.6        | 57.00     | 57.00    |            | 87                                                                                 | L1             | 31.5        | 53.00     | 173.00   |            |
| 83                                                                           | L1             | 0.0         | 39.00     | 35.00    |            | 87                                                                            | L1             | 40.7        | 53.00     | 173.00   |            | 88                                                                                 | L1             | 0.0         | 4.00      | 197.00   |            |
| 85                                                                           | L1             | 34.7        | 13.00     | 28.00    |            | 88                                                                            | L1             | 0.0         | 4.00      | 197.00   |            | 1                                                                                  | L1             | 36.4        | 0.00      | 0.00     |            |
| 86                                                                           | L1             | 42.5        | 57.00     | 58.00    |            | 1                                                                             | L1             | 36.8        | 0.00      | 0.00     |            | 2                                                                                  | L1             | 33.6        | 46.00     | 234.00   |            |
| 87                                                                           | L1             | 0.0         | 52.00     | 173.00   |            | 2                                                                             | L1             | 33.3        | 46.00     | 234.00   |            | 3                                                                                  | L1             | 35.7        | 61.00     | 189.00   |            |
| 88                                                                           | L1             | 0.0         | 6.00      | 27.00    |            | 3                                                                             | L1             | 32.5        | 61.00     | 189.00   |            | 4                                                                                  | L1             | 34.4        | 0.00      | 0.00     |            |
| 1                                                                            | L1             | 30.1        | 46.00     | 125.00   |            | 4                                                                             | L1             | 29.8        | 0.00      | 0.00     |            | 6                                                                                  | L1             | 41.1        | 80.00     | 169.00   |            |
| 2                                                                            | L1             | 27.0        | 46.00     | 235.00   |            | 6                                                                             | L1             | 40.9        | 80.00     | 169.00   |            | 7                                                                                  | L1             | 34.5        | 65.00     | 303.00   |            |
| 3                                                                            | L1             | 35.3        | 61.00     | 189.00   |            | 7                                                                             | L1             | 38.2        | 65.00     | 303.00   |            | 9                                                                                  | L1             | 38.6        | 0.00      | 0.00     |            |
| 4                                                                            | L1             | 0.0         | 32.00     | 111.00   |            | 9                                                                             | L1             | 40.7        | 0.00      | 0.00     |            | 10                                                                                 | L1             | 40.9        | 56.00     | 294.00   |            |
| 5                                                                            | L1             | 0.0         | 23.00     | 254.00   |            | 10                                                                            | L1             | 30.4        | 56.00     | 294.00   |            | 16                                                                                 | L1             | 43.9        | 80.00     | 169.00   |            |
| 6                                                                            | L1             | 36.5        | 80.00     | 168.00   |            | 16                                                                            | L1             | 41.3        | 80.00     | 169.00   |            | 27                                                                                 | L1             | 40.3        | 47.00     | 47.00    |            |
| 7                                                                            | L1             | 30.1        | 65.00     | 303.00   |            | 27                                                                            | L1             | 41.3        | 47.00     | 47.00    |            | 30                                                                                 | L1             | 27.6        | 74.00     | 182.00   |            |
| 9                                                                            | L1             | 32.2        | 78.00     | 313.00   |            | 30                                                                            | L1             | 38.7        | 74.00     | 182.00   |            | 36                                                                                 | L1             | 29.4        | 38.00     | 328.00   |            |

2#



报告中天线匹配电路是否改动，天线有关的环境处理是否增加，将直接影响天线性能，请仔细确认查看。

02

贵司如有最新试产或更新产品（如软件，**ESD**，物料等）请尽快提供我司进行验证，以确认天线性能是否有变化影响。

# 03

倘若贵司需要送第三方检测机构复测或客户测试，请务必先与我司进行天线相关测试确认，因主板·装配的一致性，以及天线组装的差异等因素，均可能导致天线参数的偏差。

# 谢谢

---

THANK YOU

如有疑问 请联系我们

日常服务时间：周一至周六 9:00-18:00

总机热线：0755-36615535 销售热线：0755-36615535 传真：0755-82916227

 网址：www.mayaant.com

保密要求

深圳市玛雅通讯设备有限公司已拥有专有技术所提供的资料，未经深圳市玛雅通讯设备有限公司事先书面同意不允许透露给任何人或公司。