# OTA TEST REPORT

Applicant Shenzhen General Test System Co., Ltd

ProductRayZone1800

Issue Date February 23, 2023

Shenzhen 3Good Wireless CommunicationCo., Ltd . tested the above equipment in accordance with the requirements in **ANTI/IEEE Std 149-2008**.The test results show that the equipment tested is capable of demonstrating compliance with theRequirements as documented in this report.

Prepared by: Hui Xiao

Approved by: Wu Zhou

## Shenzhen 3Good Wireless CommunicationCo., Ltd

Room 501-508,jinfulai Building,No.49-1,Dabao Road,Baoan District,Shenzhen

# 1. Test Laboratory

## 1.1 Notes of the Test report

This report shall not be reproduced in full or partial. The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. Measurement Uncertainties were not taken into account and are published for informational purposesonly. This report is written to support regulatory compliance of applicable standards stated above.

## 1.2 Test facility

***GTS1800***Microwave Anechoic Chamber ： testing frequency ranges from 600MHz to 6GHz .

## 1.3 Testing Location

Company: Shenzhen 3Good Wireless CommunicationCo., Ltd

Address:Room501-508,jinfulaiBuilding,No.49-1,DabaoRoad,BaoanDistrict,Shenzhen

Contact: Hui Xiao

Telephone: 18898599500

E-mail: xiaohui@3good.net.cn

## 1.4 Laboratory Environment

| | | |
|---|---|---|
| Temperature | Min.= 19℃, Max.=25℃ | |
| Relative humidity | Min.=40%， Max.=72% | |
| Shield effect | 0.6-7GHz | >100dB |
| Ground resistance | <0.5Ω | |

# 2. General Description of Equipment under Test

## 2.1 Applicant and Manufacturer information

| | |
|---|---|
| **Applicant Name** | Shenzhen General Test System Co., Ltd |
| **Applicant address** | Building C-A7 Suite 805,2190 Liuxian Avenue, Nanshan District, Shenzhen, P.R. China |
| **Manufacturer Name** | Shenzhen General Test System Co., Ltd |
| **Manufacturer address** | Building C-A7 Suite 805,2190 Liuxian Avenue, Nanshan District, Shenzhen, P.R. China |

## 2.2 General information

| EUT Description | |
|---|---|
| Product Name | RayZone1800 |
| Model | GTS-ANT D-H |
| HW Version | RayZone1800 V1.0 |
| SW Version | MaxSign 100 |
| Antenna Type | LDS Antenna |
| Antenna Manufacturer | Shenzhen 3Good Wireless CommunicationCo., Ltd |
| Test Frequency | 600MHz-5.8GHz |

## 2.3 Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:
Test Method: **ANSI/IEEE Std 149-2008**

# 3. Test Conditions

## 3.1 Test Configuration

The method is used to measure the antenna 3D GAIN of EUT in OTA qualified anechoic chamber. Equipment Under Test (EUT) geometry centre vertical projection at the centre of platform, the distance from EUT to measurement antenna is 1m.

## 3.2 Test Measurement

**Spherical coordinate system**

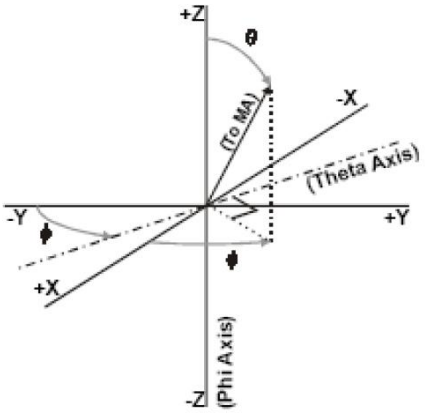
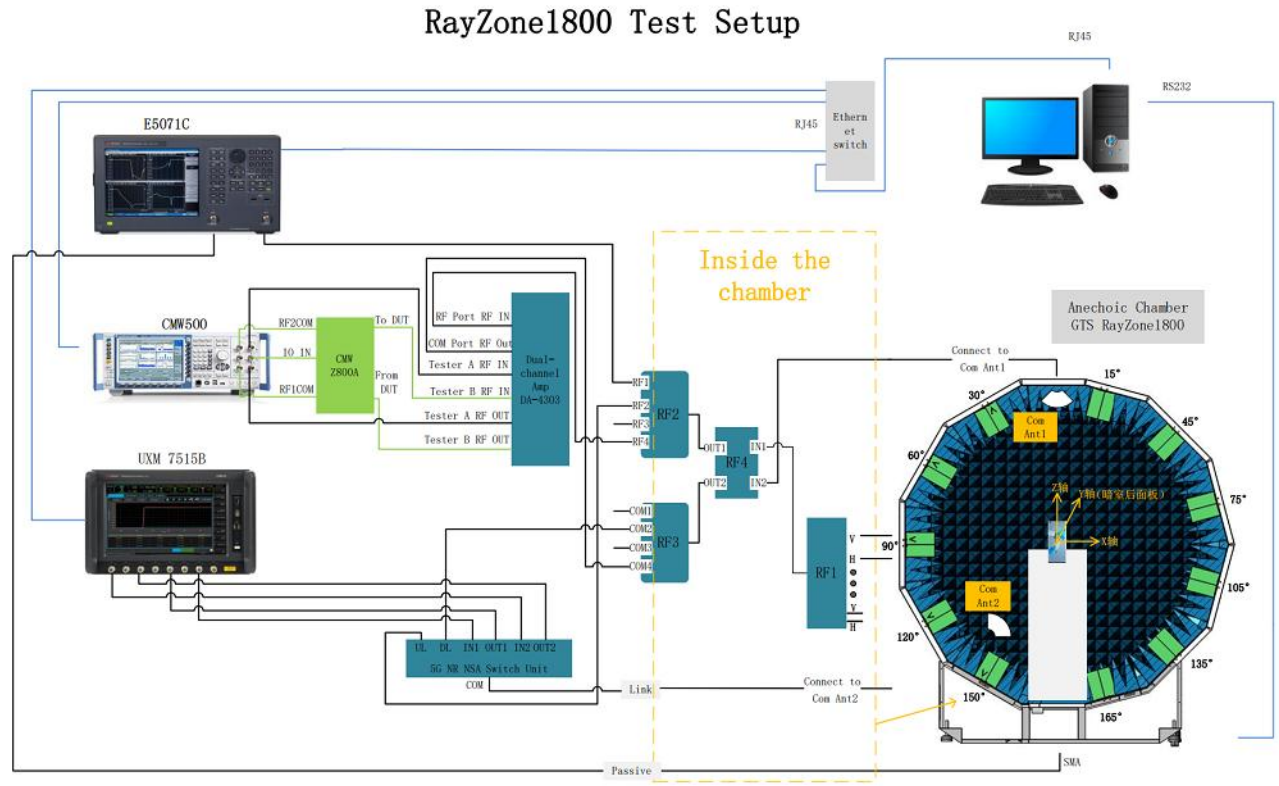



Figure 1 Test coordinate system

Note: Theta is from 0-180degree.Phi is from EUT and record the Date, the step of rotation is 15 degree.

**Test Setup**




# 4. Test Results

## 4.1 Gain and Efficiency

**M ain ANT**

| Model | Test State | Frequency (MHz) | Efficiency (%) | Gain (dBi) | Frequency (MHz) | Efficiency (%) | Gain (dBi) | Note |
|---|---|---|---|---|---|---|---|---|
| | Free Space | 700 | 14.47 | -4.18 | 1700 | 24.62 | 0.23 | |
| | | 710 | 20.39 | -2.59 | 1720 | 26.63 | 0.68 | |
| | | 720 | 22.26 | -2.2 | 1740 | 29.04 | 0.89 | |
| | | 730 | 23.05 | -2.08 | 1760 | 30.04 | 1.11 | |
| | | 740 | 24.56 | -1.84 | 1780 | 35.16 | 2.14 | |
| | | 750 | 24.06 | -1.93 | 1800 | 34.71 | 2.28 | |
| | | 760 | 23.16 | -2.22 | 1820 | 34.65 | 2.1 | |
| | | 770 | 16.93 | -3.69 | 1840 | 38.95 | 2.22 | |
| | | 780 | 14.91 | -4.28 | 1860 | 41.19 | 2.2 | |
| | | 790 | 13.9 | -4.55 | 1880 | 43.12 | 2.33 | |
| | | | | | 1900 | 40.65 | 2.28 | |
| | | 800 | 28.86 | -1.59 | 1920 | 40.01 | 2.1 | |
| | | 810 | 28.88 | -1.5 | 1940 | 41.48 | 1.81 | |
| | | 820 | 26.98 | -1.69 | 1960 | 39.55 | 1.47 | |
| | | 830 | 23.95 | -1.93 | 1980 | 38.18 | 1.26 | |
| | | 840 | 21.58 | -2.3 | 2000 | 33.28 | 0.65 | |
| | | 850 | 20.38 | -2.83 | 2020 | 29.26 | -0.31 | |
| | | 860 | 19.36 | -2.82 | 2040 | 27.51 | -1.21 | |
| | | 870 | 18.77 | -2.97 | 2060 | 23.95 | -1.93 | |
| | | 880 | 20.51 | -2.85 | 2080 | 21.58 | -2.3 | |
| | | 890 | 19.99 | -2.95 | 2100 | 20.38 | -2.83 | |
| | | | | | 2110 | 19.36 | -2.82 | |
| | | 880 | 25.99 | -1.54 | 2120 | 18.77 | -2.97 | |
| | | 890 | 31.66 | -0.39 | 2130 | 20.51 | -2.85 | |
| | | 900 | 37.26 | 0.44 | 2140 | 19.99 | -2.95 | |
| | | 910 | 38.84 | 0.52 | 2150 | 21.33 | -2.47 | |
| | | 920 | 39.74 | 0.34 | 2160 | 19.93 | -2.33 | |
| | | 930 | 33.84 | -0.91 | 2170 | 17.54 | -2.95 | |
| | | 940 | 28.06 | -2.48 | | | | |
| | | 950 | 24.17 | -2.57 | | | | |
| | | 960 | 20.92 | -2.51 | | | | |
| | | Note:Main antenna | | | | | | |

# DIV ANT

| Model | Test State | Frequency (MHz) | Efficiency (%) | Gain (dBi) | Frequency (MHz) | Efficiency (%) | Gain (dBi) | Note |
|---|---|---|---|---|---|---|---|---|
| | Free Space | 700 | 1.29 | -14.96 | 2160 | 5.67 | -8.2 | |
| | | 710 | 1.92 | -12.71 | 2180 | 6.56 | -7.37 | |
| | | 720 | 2.44 | -11.97 | 2200 | 8.64 | -5.75 | |
| | | 730 | 2.61 | -11.53 | 2220 | 10.87 | -4.13 | |
| | | 740 | 2.84 | -11.76 | 2240 | 13.24 | -2.9 | |
| | | 750 | 3.07 | -11.26 | 2260 | 15.45 | -2.08 | |
| | | 760 | 3.46 | -11.33 | 2280 | 15.88 | -2.04 | |
| | | 770 | 3.39 | -11.23 | 2300 | 17.48 | -1.93 | |
| | | 780 | 4.21 | -10.6 | 2320 | 18.57 | -1.77 | |
| | | 790 | 5.58 | -9.14 | 2340 | 20.09 | -1.51 | |
| | | 800 | 8.27 | -7.66 | 2360 | 20.34 | -1.65 | |
| | | 810 | 8.61 | -7.65 | 2380 | 21.27 | -1.78 | |
| | | 820 | 8.47 | -7.63 | 2400 | 23.15 | -1.86 | |
| | | 830 | 8.56 | -7.4 | 2420 | 23.77 | -2.01 | |
| | | 840 | 8.33 | -7.41 | 2440 | 26.2 | -1.97 | |
| | | 850 | 9.16 | -7.22 | 2460 | 28.14 | -2.32 | |
| | | 860 | 10.52 | -6.27 | 2480 | 29.69 | -2.45 | |
| | | 870 | 12.65 | -5.4 | 2500 | 34.22 | -1.61 | |
| | | 880 | 14.77 | -4.39 | 2520 | 36.54 | -1.03 | |
| | | 890 | 18 | -3.26 | 2540 | 37.98 | -0.44 | |
| | | 900 | 19.6 | -2.61 | 2560 | 39.75 | -0.03 | |
| | | 910 | 21.71 | -2.26 | 2580 | 37.57 | -0.31 | |
| | | 920 | 24.13 | -1.81 | 2600 | 34.61 | -0.72 | |
| | | 930 | 24.19 | -2.46 | 2620 | 28.86 | -1.56 | |
| | | 940 | 24.33 | -2.75 | 2640 | 26.87 | -1.88 | |
| | | 950 | 24.38 | -2.91 | 2660 | 25.54 | -2.19 | |
| | | 960 | 24.52 | -3.3 | 2680 | 24.03 | -2.71 | |
| | | 700 | 1.29 | -14.96 | 2700 | 20.55 | -3.5 | |
| | | Note: DIV antenna | | | | | | |

# G/W/B ANT

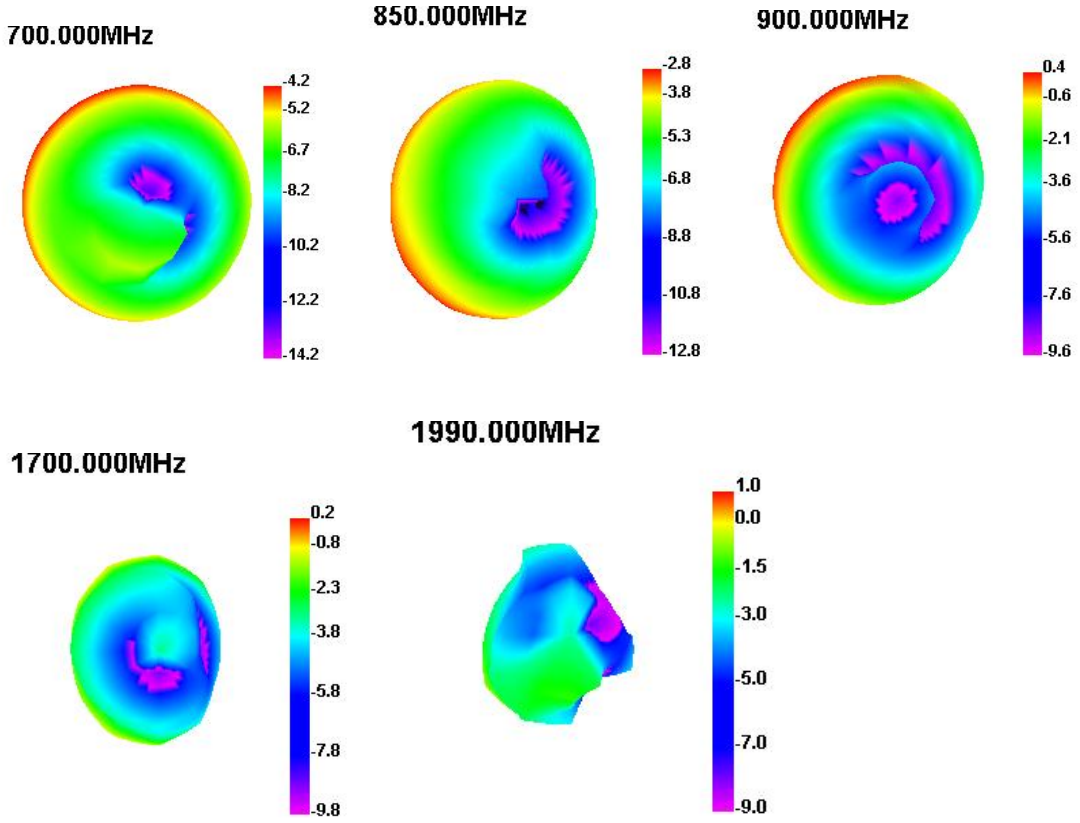
| Model | Test State | Frequency (MHz) | Efficiency (%) | Gain (dBi) | Frequency (MHz) | Efficiency (%) | Gain (dBi) | Note |
|---|---|---|---|---|---|---|---|---|
| | Free Space | 1560 | 36.41 | 0.77 | 5350 | 28.45 | -1.76 | |
| | | 1565 | 36.2 | 0.65 | 5370 | 27.88 | -1.91 | |
| | | 1570 | 35.81 | 0.52 | 5390 | 26.59 | -2.22 | |
| | | 1575 | 34.82 | 0.36 | 5410 | 32.41 | -1.1 | |
| | | 1580 | 33.54 | 0.14 | 5430 | 31.35 | -1.4 | |
| | | 1585 | 32.73 | 0 | 5450 | 31.98 | -1.03 | |
| | | | | | 5470 | 32.54 | -1 | |
| | | 2400 | 35.93 | 1.63 | 5490 | 30.25 | -1.44 | |
| | | 2410 | 35.35 | 1.62 | 5510 | 29.5 | -1.56 | |
| | | 2420 | 35.13 | 1.83 | 5530 | 30.35 | -1.47 | |
| | | 2430 | 34.6 | 1.92 | 5550 | 28.83 | -1.55 | |
| | | 2440 | 35.35 | 2.14 | 5570 | 29.11 | -1.61 | |
| | | 2450 | 35.74 | 2.24 | 5590 | 28.41 | -1.75 | |
| | | 2460 | 34.73 | 2.1 | 5610 | 28.32 | -1.67 | |
| | | 2470 | 32.65 | 1.74 | 5630 | 28.1 | -1.69 | |
| | | 2480 | 31.61 | 1.54 | 5650 | 27.98 | -1.71 | |
| | | 2490 | 32.32 | 1.53 | 5670 | 29.45 | -1.37 | |
| | | 2500 | 31.77 | 1.51 | 5690 | 30.38 | -1.11 | |
| | | | | | 5710 | 29.58 | -1.13 | |
| | | 5150 | 28.12 | -0.85 | 5730 | 31.06 | -1.11 | |
| | | 5170 | 26.44 | -1.11 | 5750 | 30.86 | -1.18 | |
| | | 5190 | 25.81 | -1.3 | 5770 | 27.97 | -1.87 | |
| | | 5210 | 26.6 | -1.32 | 5790 | 27.13 | -1.56 | |
| | | 5230 | 26.89 | -1.44 | 5810 | 25.74 | -1.48 | |
| | | 5250 | 25.83 | -1.93 | 5830 | 25.64 | -1.22 | |
| | | 5270 | 25.57 | -2.09 | 5850 | 25.85 | -1.3 | |
| | | 5290 | 26.64 | -1.78 | | | | |
| | | 5310 | 26.14 | -1.99 | | | | |
| | | 5330 | 25.95 | -2.04 | | | | |
| | | Note: WIFI and BT share an antenna | | | | | | |

# 5. Equipment List

| Type of Equipment | Manufacture | Model Number |
|---|---|---|
| Network Analyzer | Agilent Technologies | E5071B |
| Switch control System | GTS | RayZone1800 |
| Software | GTS | MaxSign 100 Patten Measurement software |

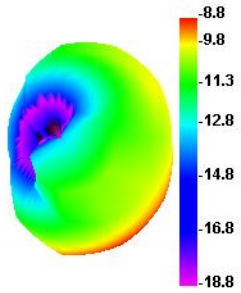
## ANNEX A 3-D Patten Plots

**Main ANT:**

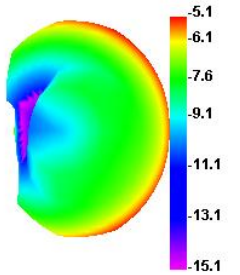


## DIV ANT:

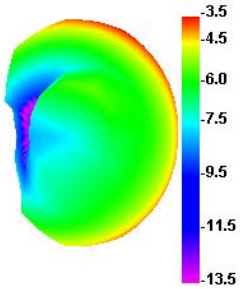
800.000MHz



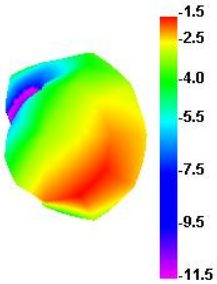

880.000MHz



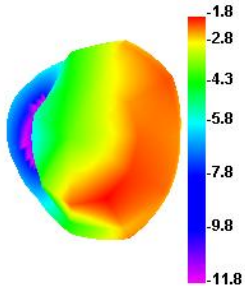

900.000MHz



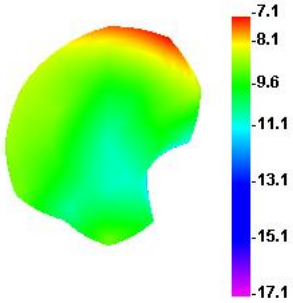

2170.000MHz




2300.000MHz

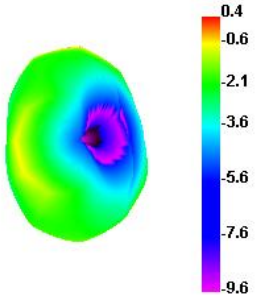



2700.000MHz

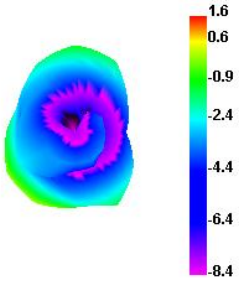



## G/W/B ANT:

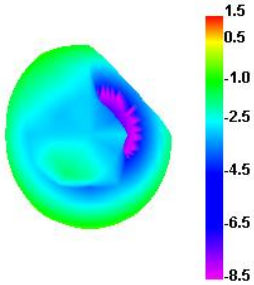
1575.000MHz

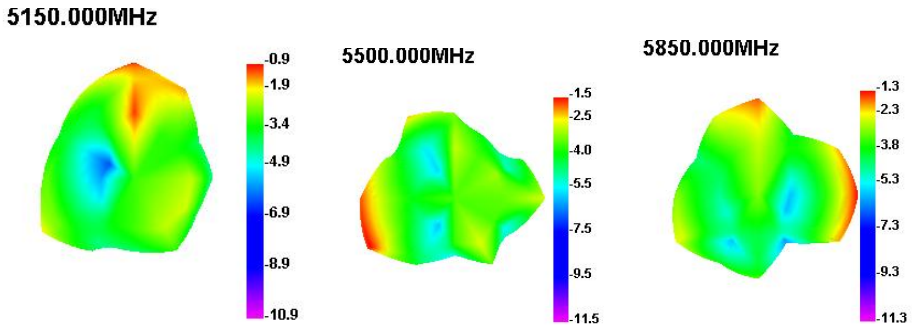



2410.000MHz




2500.000MHz






## ANNEX B: The EUT Appearance and Test Configuration

### B.1 EUT Appearance

## B.2 Test Configuration