

Testing Report

Customer Name: NIE-TECH Co., Ltd

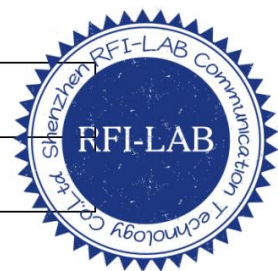
Product Name: WiFi module

Sample Model: CB2S

Reference Standard: *GB/T 9410-2008; ANSI/IEEE Std 149-1979*

Issue Date: 2022.10.21

| | |
|------------------------|------------------|
| Auditor: <i>Eason</i> | Date: 2022.10.21 |
| Approver: <i>Aaron</i> | Date: 2022.10.21 |



Version

| Version No. | Date | Description | Formulate | Approval |
|-------------|------------|-------------------------------|-----------|----------|
| A0 | 2022.10.21 | For the first time, formulate | Eason | Aaron |
| | | | | |
| | | | | |

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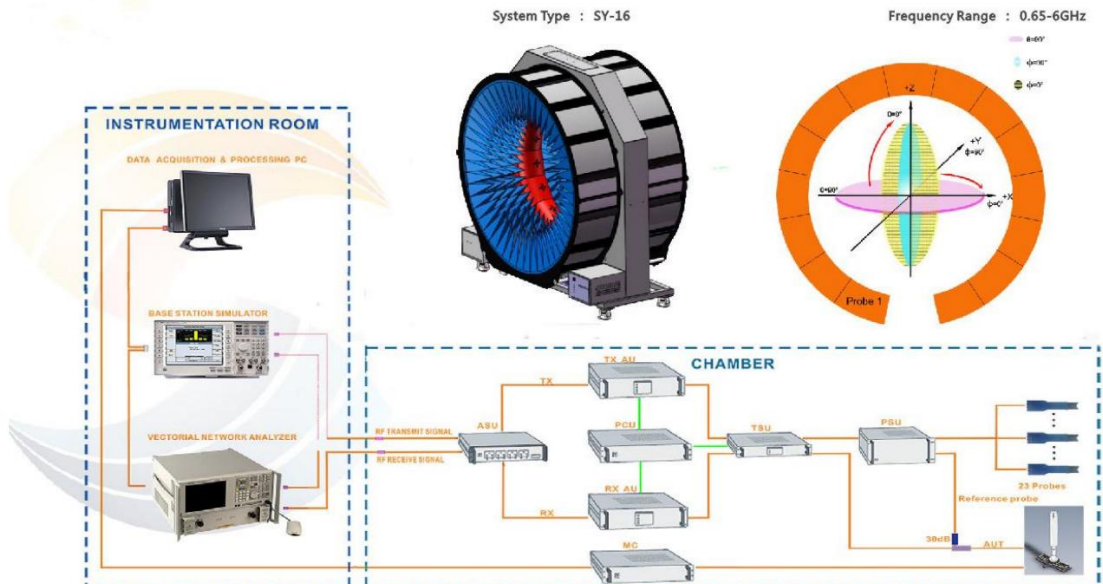
1.General Information

1.1 General information of testing institutions

| | |
|------------------|--|
| Name | Shenzhen RFI-LAB Communication Technology Co., Ltd. |
| Address | 10/F A, Lingyun Bld, Liufang Rd, Baoan District, SZ |
| Tel | 13798473001 |
| E-mail | lait@tech-now.com |
| Equipment | All the equipment used in the report is fixed in 10/F A, Lingyun Bld, Liufang Rd, Baoan District, SZ |

1.2 Testing principle

Multi-Probe OTA Measurement System



1.3 Test equipment

| Equipment | Model No. | Serial No. | Manufacturer | Calibration date | Next calibration date |
|----------------------------|-----------|----------------|--------------|------------------|-----------------------|
| 16 probe microwave chamber | 3*3*2.5 | RFI-LAB-RF-A00 | SUNYIELD | 2021.3.15 | 2023.3.14 |
| Network Analyzer | E5071C | RFI-LAB-RF-A02 | Agilent | 2022.5.13 | 2023.5.12 |

1.4 Test environment

| | |
|-------------|-----------|
| Temperature | 23.9°C |
| Humidity | 59%RH |
| Pressure | 100.12kPa |

1.5 Statement

- (1) The test results in the report are only applicable to the tested samples and the tested samples work under the environment described in the report.
- (2) Only Shenzhen RFI-LAB Communication Technology Co., Ltd. have the right to modify the report, and the modification information shall be annotated in the revision form.
- (3) Any objection to this report shall be raised within 30 days after formal confirmation of the report.
- (4) This report is invalid if there is any evidence that the sample information provided is falsified.
- (5) The report is invalid without the signature of the auditor and approver.

2.Sample Information

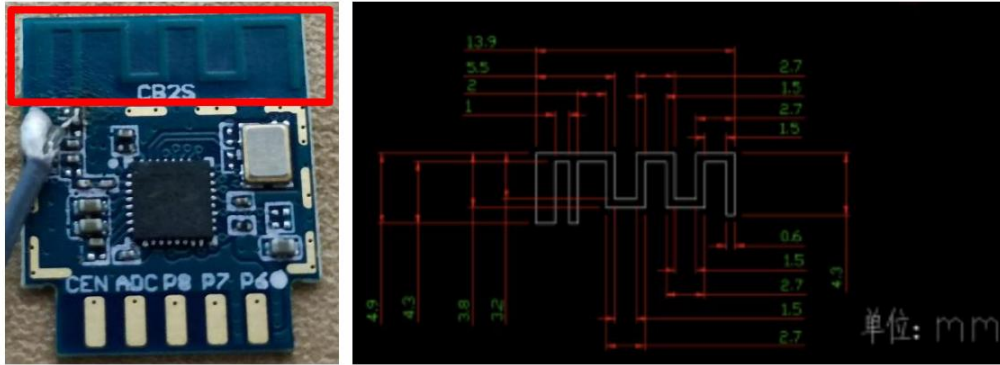
2.1 Client information

| | |
|---------------------|-------------------|
| Name | NIE-TECH Co., Ltd |
| Address | / |
| Contacts | / |
| Tel | / |
| E-mail | / |
| manufacturer | / |

2.2 Description of EUT(S)

| | |
|------------------------|---|
| Product Name | WiFi module |
| Sample Model | CB2S |
| Size | / |
| Serial No. | / |
| Test Item | Antenna Gain; Efficiency; Radiation pattern |
| Frequency Range | 2400-2500MHz |
| Received Date | 2022.10.21 |
| Test Date | 2022.10.21 |
| Remark | / |

2.3 EUT appearance

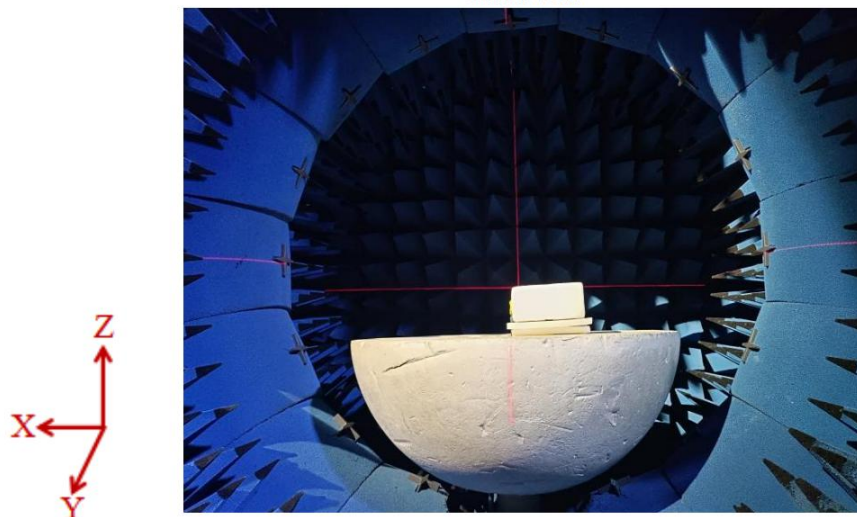


2.4 DUT setup photo of free space OTA testing

Platform



Front view



3. Test Results

3.1 Test standard

| Name | Parameter | Method | Standard no. |
|------------------------------|----------------------|--|------------------------|
| Mobile communication antenna | Antenna gain | Generic specification for antennas used in the mobile communications | GB/T 9410-2008 |
| | Radiation pattern | | |
| Antenna | Radiation efficiency | IEEE Standard Test Procedures for Antennas | ANSI/IEEE Std 149-1979 |
| | Gain and directivity | | |

3.2 Test uncertainty

The uncertainty was calculated on the basis of the GUM published by ISO, using the inclusion factor of K=2 and the 95% confidence level to express the extended uncertainty.

| Item | Uncertainty |
|----------------------|------------------|
| Antenna gain | $\pm 1\text{dB}$ |
| Radiation efficiency | $\pm 10\%$ |

3.3 Test data

3.3.1 Typical free space efficiency and gain

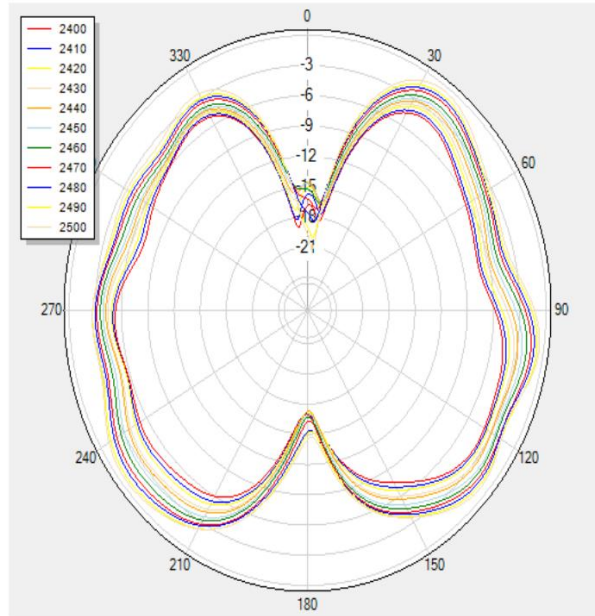
| Frequency/MHz | 2400 | 2410 | 2420 | 2430 | 2440 | 2450 | 2460 | 2470 | 2480 | 2490 | 2500 |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Peak Gain/dBi | -3.56 | -3.32 | -3.13 | -2.65 | -2.51 | -1.97 | -1.67 | -1.15 | -0.82 | -0.51 | -0.24 |
| Efficiency/% | 20.67 | 22.19 | 23.65 | 26.10 | 27.79 | 30.55 | 33.35 | 37.15 | 39.79 | 42.67 | 45.25 |

3.3.2 Typical free space radiation pattern

(1) 2400-2500MHz X-Z Plane:

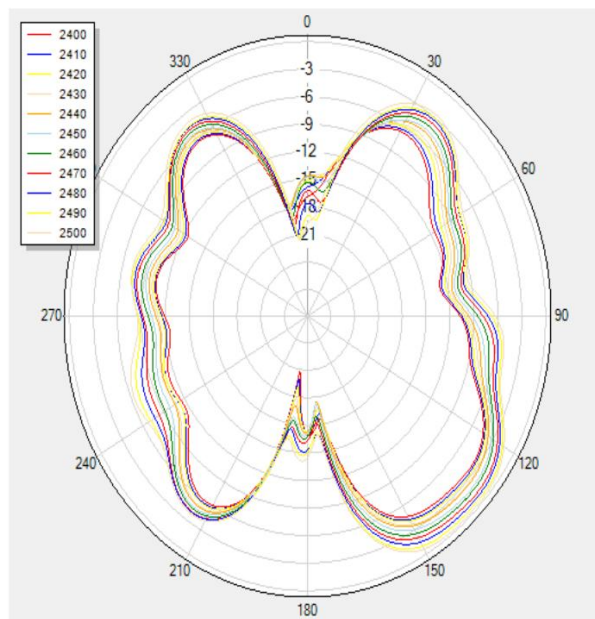
unit: dBi

V Phi=0



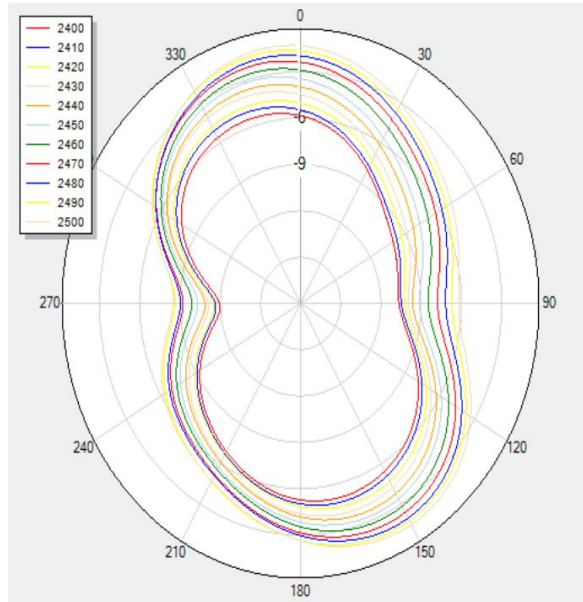
(2) 2400-2500MHz Y-Z Plane:

V Phi=90

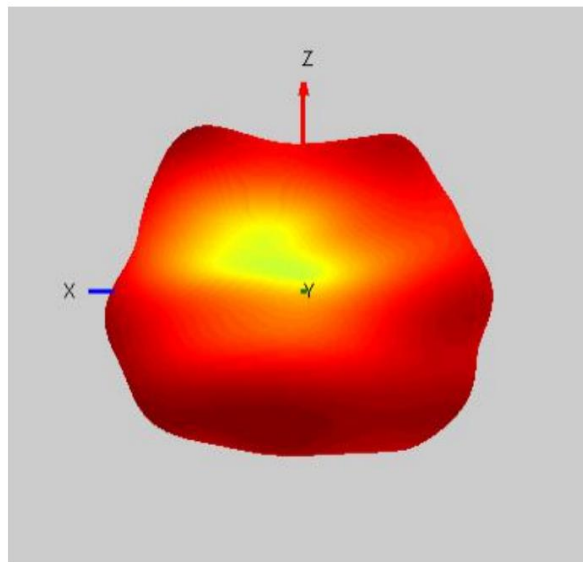


(3) 2400-2500MHz X-Y Plane:

H Theta=90



(4) Typical Free Space 3D Radiation Pattern at 2.45GHz:



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