

# 中国计量科学研究院



中国认可  
国际互认  
校准  
CALIBRATION  
CNAS L0502

## 校准证书

Calibration Certificate

证书编号  
Certificate No.

客户名称  
Client

器具名称  
Instrument

喇叭天线

型号/规格  
Type/Model

OBH460

出厂编号  
Serial No.

28959001

生产厂商  
Manufacturer

/

联络信息  
Contact Information

校准日期  
Date of Calibration

2021-12-14

接收日期  
Date of Receiving

2021-12-14

批准人：

郭晓涛

Approved by

发布日期： 2022 年 02 月 24 日  
Date of Issue

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# 中国计量科学研究院



证书编号  
Certificate No.

中国计量科学研究院（NIM）是国家最高的计量科学研究中心和国家级法定计量技术机构。1999 年授权签署了国际计量委员会（CIPM）《国家计量基(标)准和国家计量院签发的校准与测量证书互认协议》（CIPM MRA）。The National Institute of Metrology (NIM) is China's national metrology institute (NMI) and a state-level legal metrology institute. NIM is China's signatory to the Mutual Recognition of National Measurement Standards and of Calibration and Measurement Certificates Issued by National Metrology Institutes (CIPM MRA) which is arranged by the International Committee of Weights and Measures (CIPM).

质量管理体系符合 ISO/IEC17025 标准，通过中国合格评定国家认可委员会（CNAS）和亚太计量规划组织（APMP）联合评审的校准和测量能力（CMCs）在国际计量局（BIPM）关键比对数据库中公布。NIM's quality management system meets requirements of the ISO/IEC 17025. Its Calibration and Measurement Capabilities (CMCs) that are peer reviewed both by China National Accreditation Service for Conformity Assessment (CNAS) and the Asia Pacific Metrology Programme (APMP) are published in the International Bureau of Weights and Measures (BIPM) Key Comparison Database (KCDB).

2011 年，NIM 和 CNAS 就认可领域的技术评价活动签署了谅解备忘录，承认 NIM 的计量支撑作用和出具的校准/检测结果的溯源效力。NIM and CNAS signed a Memorandum of Understanding (MOU) for Recognition of Technical Assessment in Laboratory Accreditation Field in 2011, in which CNAS recognizing the technical supporting role of NIM in laboratory accreditation and the traceability of NIM's calibration / test results.

校准结果不确定度的评估和表述均符合 JJF1059 系列标准的要求。The evaluation and expression of uncertainty of the calibration results are in line with the requirements of JJF1059 series standards.

校准所依据/参照的技术文件（代号、名称）Reference documents (Code,Name)

参照 NIM-ZY- XD-DJ-002, CISPR16-1-6 2017, ANSI C63.5-2017  
See page 3 for details of standard names.

校准环境条件及地点 Calibration place and environment

温度 Temperature: 23℃ 地点 昌-18-1005  
湿度 Humidity: 35% RH 其它 Others: /

校准使用的计量基（标）准装置(含标准物质)/主要仪器

Reference Standards (Including the Reference Material) / Instruments used

| 名称<br>Name                            | 测量范围<br>Measurement Range                                 | 不确定度/<br>准确度等级<br>Uncertainty/<br>Accuray | 证书编号<br>Certificate No. | 证书有效期至<br>Due Date<br>(YYYY-MM-DD) |
|---------------------------------------|-----------------------------------------------------------|-------------------------------------------|-------------------------|------------------------------------|
| 矢量网络分析仪<br>Vector Network<br>Analyzer | Frequency:<br>10MHz~50GHz;<br>S21 dynamic range:<br>124dB | S21:<br>0.07 dB~0.20<br>dB (k=2)          | XDgp2021-<br>11309      | 2022-06-05                         |





证书编号  
Certificate No.

# 校准结果

Calibration Results

校准参考文件

Calibration Reference Standard Documents

NIM-ZY- XD-DJ-002

鞭状、双锥、对数周期、复合及微波喇叭天线校准作业指导书

CISPR16-1-6-2017

Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-6: Radio disturbance and immunity measuring apparatus - EMC antenna calibration

ANSI C63.5-2017

American National Standard for Electromagnetic Compatibility-Radiated Emission Measurements in Electromagnetic Interference (EMI) Control-Calibration and Qualification of Antennas (9 kHz to 40 GHz)

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校准结果  
Calibration Results

表 1. 校准数据

Table 1 Calibration Results

| 频率<br>Frequency<br>(GHz) | 天线系数<br>AF<br>dB(1/m) | 增益<br>Gain<br>(dBi) | 驻波比<br>SWR<br>(/) |
|--------------------------|-----------------------|---------------------|-------------------|
| 0.4                      | 17.2                  | 5.0                 | 1.46              |
| 0.45                     | 16.6                  | 6.7                 | 1.45              |
| 0.5                      | 16.5                  | 7.7                 | 1.32              |
| 0.55                     | 17.1                  | 8.0                 | 1.29              |
| 0.6                      | 17.9                  | 7.8                 | 1.26              |
| 0.65                     | 18.5                  | 8.0                 | 1.59              |
| 0.7                      | 18.9                  | 8.2                 | 1.88              |
| 0.75                     | 19.0                  | 8.8                 | 2.17              |
| 0.8                      | 18.9                  | 9.3                 | 1.82              |
| 0.85                     | 18.5                  | 10.3                | 1.59              |
| 0.9                      | 19.1                  | 10.2                | 1.30              |
| 0.95                     | 21.4                  | 8.4                 | 1.86              |
| 1                        | 21.5                  | 8.7                 | 2.02              |
| 1.05                     | 21.5                  | 9.2                 | 2.06              |
| 1.1                      | 21.0                  | 10.1                | 1.82              |
| 1.15                     | 20.8                  | 10.6                | 1.58              |
| 1.2                      | 21.1                  | 10.8                | 1.36              |
| 1.25                     | 21.4                  | 10.8                | 1.62              |
| 1.3                      | 21.6                  | 10.9                | 1.91              |
| 1.35                     | 21.8                  | 11.0                | 1.94              |
| 1.4                      | 22.0                  | 11.2                | 1.65              |
| 1.45                     | 22.1                  | 11.3                | 1.39              |
| 1.5                      | 21.9                  | 11.9                | 1.41              |
| 1.55                     | 22.2                  | 11.8                | 1.63              |



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Certificate No.校准结果  
Calibration Results

| 频率<br>Frequency<br>(GHz) | 天线系数<br>AF<br>dB(1/m) | 增益<br>Gain<br>(dBi) | 驻波比<br>SWR<br>(/) |
|--------------------------|-----------------------|---------------------|-------------------|
| 1.6                      | 22.6                  | 11.7                | 1.77              |
| 1.65                     | 22.6                  | 12.0                | 1.79              |
| 1.7                      | 22.7                  | 12.2                | 1.64              |
| 1.75                     | 22.9                  | 12.2                | 1.46              |
| 1.8                      | 23.0                  | 12.3                | 1.47              |
| 1.85                     | 23.5                  | 12.1                | 1.63              |
| 1.9                      | 24.0                  | 11.8                | 1.72              |
| 1.95                     | 24.8                  | 11.2                | 1.75              |
| 2                        | 25.4                  | 10.8                | 1.62              |
| 2.05                     | 24.9                  | 11.6                | 1.40              |
| 2.1                      | 24.6                  | 12.0                | 1.33              |
| 2.15                     | 24.9                  | 12.0                | 1.44              |
| 2.2                      | 25.4                  | 11.7                | 1.57              |
| 2.25                     | 25.5                  | 11.8                | 1.56              |
| 2.3                      | 25.6                  | 11.9                | 1.43              |
| 2.35                     | 25.5                  | 12.1                | 1.32              |
| 2.4                      | 25.9                  | 11.9                | 1.32              |
| 2.45                     | 26.3                  | 11.7                | 1.41              |
| 2.5                      | 26.2                  | 11.9                | 1.46              |
| 2.55                     | 26.2                  | 12.1                | 1.46              |
| 2.6                      | 26.2                  | 12.3                | 1.37              |
| 2.65                     | 26.2                  | 12.4                | 1.28              |
| 2.7                      | 26.5                  | 12.3                | 1.27              |
| 2.75                     | 26.9                  | 12.1                | 1.33              |
| 2.8                      | 27.0                  | 12.2                | 1.39              |
| 2.85                     | 27.1                  | 12.2                | 1.40              |



证书编号  
Certificate No.校准结果  
Calibration Results

| 频率<br>Frequency<br>(GHz) | 天线系数<br>AF<br>dB(1/m) | 增益<br>Gain<br>(dBi) | 驻波比<br>SWR<br>(/) |
|--------------------------|-----------------------|---------------------|-------------------|
| 2.9                      | 27.3                  | 12.2                | 1.33              |
| 2.95                     | 27.4                  | 12.2                | 1.24              |
| 3                        | 27.5                  | 12.2                | 1.25              |
| 3.05                     | 27.8                  | 12.1                | 1.33              |
| 3.1                      | 28.0                  | 12.1                | 1.37              |
| 3.15                     | 28.0                  | 12.2                | 1.36              |
| 3.2                      | 28.1                  | 12.2                | 1.32              |
| 3.25                     | 28.4                  | 12.0                | 1.26              |
| 3.3                      | 28.6                  | 12.0                | 1.24              |
| 3.35                     | 28.7                  | 12.0                | 1.33              |
| 3.4                      | 29.1                  | 11.8                | 1.39              |
| 3.45                     | 29.2                  | 11.8                | 1.36              |
| 3.5                      | 29.4                  | 11.8                | 1.28              |
| 3.55                     | 29.4                  | 11.8                | 1.23              |
| 3.6                      | 29.7                  | 11.7                | 1.22              |
| 3.65                     | 29.7                  | 11.8                | 1.25              |
| 3.7                      | 29.8                  | 11.8                | 1.31              |
| 3.75                     | 30.0                  | 11.7                | 1.28              |
| 3.8                      | 30.5                  | 11.4                | 1.21              |
| 3.85                     | 30.3                  | 11.6                | 1.14              |
| 3.9                      | 30.3                  | 11.7                | 1.15              |
| 3.95                     | 30.4                  | 11.7                | 1.18              |
| 4                        | 30.6                  | 11.6                | 1.18              |
| 4.05                     | 30.6                  | 11.8                | 1.17              |
| 4.1                      | 30.5                  | 12.0                | 1.13              |
| 4.15                     | 30.6                  | 12.0                | 1.07              |



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Certificate No.校准结果  
Calibration Results

| 频率<br>Frequency<br>(GHz) | 天线系数<br>AF<br>dB(1/m) | 增益<br>Gain<br>(dBi) | 驻波比<br>SWR<br>(/) |
|--------------------------|-----------------------|---------------------|-------------------|
| 4.2                      | 30.4                  | 12.3                | 1.07              |
| 4.25                     | 30.4                  | 12.3                | 1.12              |
| 4.3                      | 30.6                  | 12.3                | 1.12              |
| 4.35                     | 30.8                  | 12.2                | 1.08              |
| 4.4                      | 30.9                  | 12.2                | 1.06              |
| 4.45                     | 30.8                  | 12.4                | 1.12              |
| 4.5                      | 30.6                  | 12.6                | 1.15              |
| 4.55                     | 30.6                  | 12.7                | 1.18              |
| 4.6                      | 30.8                  | 12.7                | 1.20              |
| 4.65                     | 31.0                  | 12.6                | 1.22              |
| 4.7                      | 31.0                  | 12.7                | 1.21              |
| 4.75                     | 31.0                  | 12.7                | 1.25              |
| 4.8                      | 31.0                  | 12.8                | 1.32              |
| 4.85                     | 31.0                  | 13.0                | 1.35              |
| 4.9                      | 31.1                  | 13.0                | 1.37              |
| 4.95                     | 31.1                  | 13.0                | 1.38              |
| 5                        | 31.2                  | 13.0                | 1.39              |
| 5.05                     | 31.2                  | 13.1                | 1.44              |
| 5.1                      | 31.2                  | 13.2                | 1.50              |
| 5.15                     | 31.1                  | 13.3                | 1.55              |
| 5.2                      | 31.1                  | 13.4                | 1.57              |
| 5.25                     | 31.1                  | 13.5                | 1.58              |
| 5.3                      | 31.1                  | 13.6                | 1.60              |
| 5.35                     | 31.0                  | 13.8                | 1.64              |
| 5.4                      | 30.9                  | 13.9                | 1.71              |
| 5.45                     | 30.8                  | 14.1                | 1.78              |



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Certificate No.校准结果  
Calibration Results

| 频率<br>Frequency<br>(GHz) | 天线系数<br>AF<br>dB(1/m) | 增益<br>Gain<br>(dBi) | 驻波比<br>SWR<br>(/) |
|--------------------------|-----------------------|---------------------|-------------------|
| 5.5                      | 30.8                  | 14.2                | 1.80              |
| 5.55                     | 30.8                  | 14.3                | 1.79              |
| 5.6                      | 30.9                  | 14.3                | 1.81              |
| 5.65                     | 31.0                  | 14.3                | 1.89              |
| 5.7                      | 31.0                  | 14.3                | 1.93              |
| 5.75                     | 31.0                  | 14.4                | 1.97              |
| 5.8                      | 31.1                  | 14.4                | 2.01              |
| 5.85                     | 31.2                  | 14.3                | 2.02              |
| 5.9                      | 31.2                  | 14.4                | 2.01              |
| 5.95                     | 31.4                  | 14.3                | 2.09              |
| 6                        | 31.6                  | 14.2                | 2.23              |

校准结果的不确定度

Uncertainty of calibration results

AF/Gain  $U=0.7\text{dB}$  ( $k=2$ )SWR(<2)  $U=0.10$  ( $k=2$ )

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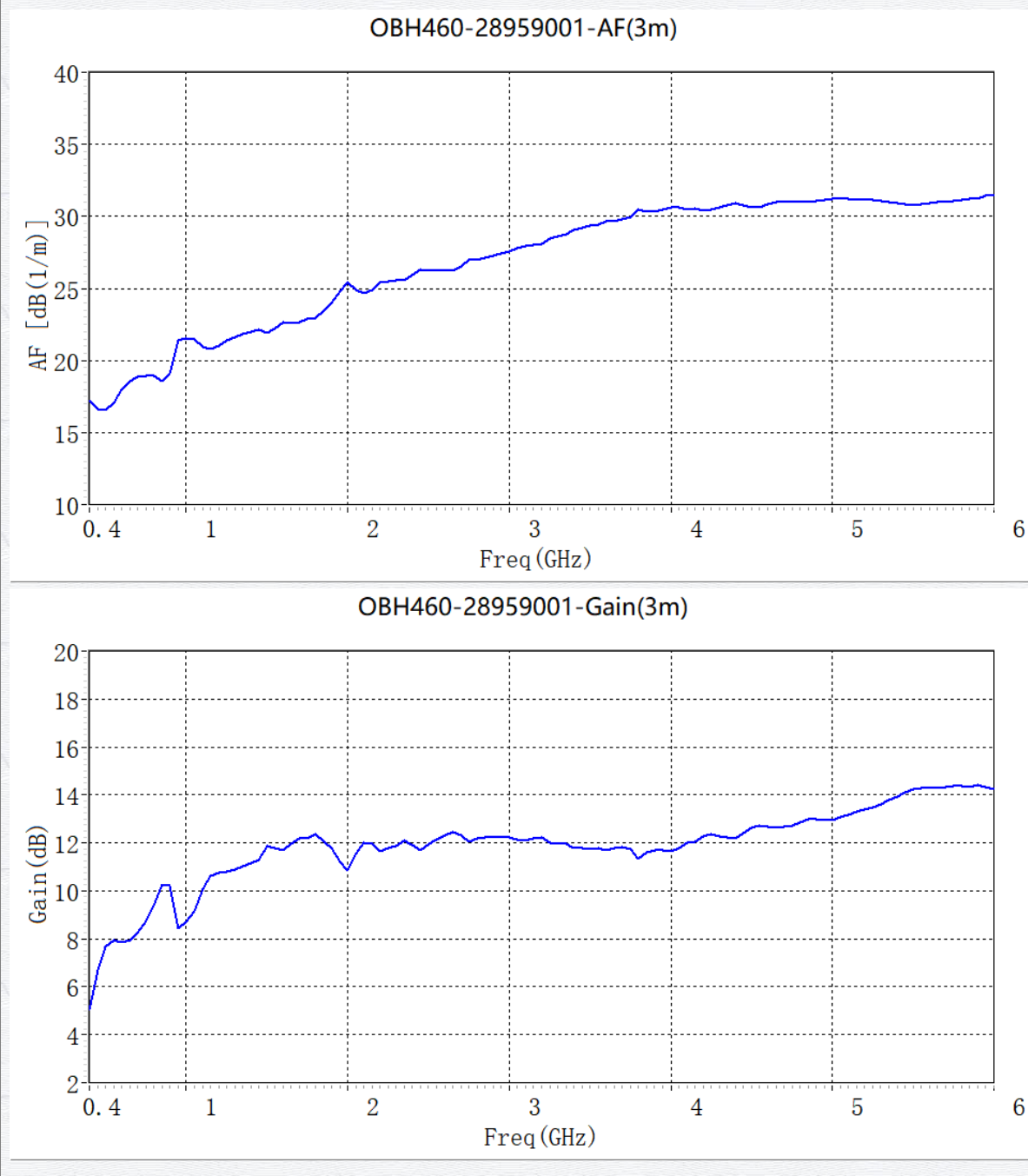
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Certificate No.

## 校准结果 Calibration Results

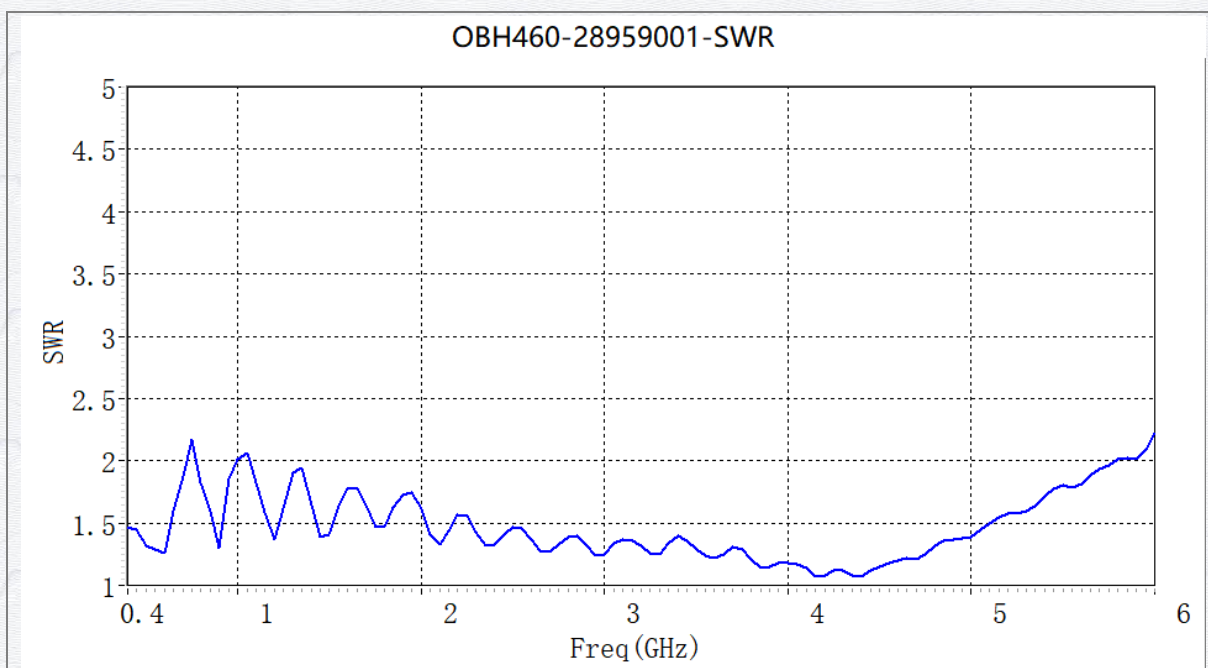
校准曲线  
Calibration Curve





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Certificate No.

## 校准结果 Calibration Results



建议 Suggestion:

/

声明 Statement:

1. 我院仅对加盖“中国计量科学研究院校准专用章”的完整证书负责。

NIM is ONLY responsible for the complete certificate with the calibration stamp of NIM.

2. 本证书的校准结果仅对所校准的计量器具有效。

The certificate is ONLY valid for the calibrated instrument.

3. 本证书用中英文两种语言表达，准确含义以中文为准。

The certificate is reported in both English and Chinese, with the Chinese version as standard.

校准员:

王雅龙

Calibrated by

核验员:

刘科

Checked by