

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 N

客户名称
Client

器具名称
Instrument

型号/规格
Type/Model

出厂编号
Serial No.

生产厂商
Manufacturer

联络信息
Contact Information

校准日期
Date of Calibration

接收日期
Date of Receiving

批准人:

Approved by

发布日期: 2022 年 09 月 14 日
Date of Issue

双锥天线
Biconical Antenna

OBC-022-10W-1

30699001

北京航威大洋微波科技有限公司

2022 年 09 月 13 日

2022 年 09 月 13 日

刘: 董



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中国计量科学研究院



证书编号
Certificate N

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).

2020 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 2020, 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 JJF 1897-2021，GB/T 6113.106:2018。

See page 3 for details of standard names.

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

温度 Temperature: 31 °C 地点 Location: 昌平 Changping 开阔场 OATS

湿度 Humidity: 58 % 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 Name	测量范围 Measurement Range	不确定度/ 准确度等级 Uncertainty/Accuracy	证书编号 Certificate No.	证书有效期至 Due Date (YYYY-MM-DD)
矢量网络 分析仪 Vector Network Analyzer	100kHz~ 8.5GHz	(0.1~0.3)dB (k=2)	XDgp2022- 02161	2023-06-29
地面反射场法 天线测量标准装置	30MHz~1GHz	(0.4~1.0)dB (k=2)	[2014]国量标 计证字第 278 号	2027-07-28



校准结果 Calibration Results

一、校准参考文件详细说明 The Specified Instructions of Calibration Reference Standard Documents

JJF 1897-2021: 30MHz~1GHz 测量天线校准规范

JJF 1897-2021: Calibration Specification for Measurement Antennas from 30MHz to 1GHz

GB/T 6113.106:2018: 无线电骚扰和抗扰度测量设备和测量方法规范 第 1-6 部分: 无线电骚扰和抗扰度测量设备 EMC 天线校准

GB/T 6113.106:2018: Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-6: Radio disturbance and immunity measuring apparatus - EMC antenna calibration

上述校准规范包含了如下文件:

The above Calibration Specification contains the following documents:

SAE ARP 958-2021: Electromagnetic Interference Measurements Antennas;
Standard Calibration Method

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)

NIM-ZY-XD-DJ-093: 《30MHz~1GHz 测量天线校准规范》

NIM-ZY-XD-DJ-093: Calibration Specification for Measurement Antennas from 30MHz to 1GHz

二、校准说明 Calibration Instructions

1. 1m 法天线系数, 是指在以下条件下测量得到的: 1) 收、发天线的参考点的水平投影之间的距离为 1m, 参考点为如图 1 虚线所示; 2) 收、发天线均为垂直极化; 3) 收、发天线离地面高度 3m。

The antenna factor for 1m method is measured in these conditions: 1) the separation between the reference points projected horizontally on the ground is 1m; 2) both the transmit antenna and receive antenna are set up vertically polarized; 3) both the transmit antenna and receive antenna are 3m in height.

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校准结果 Calibration Results

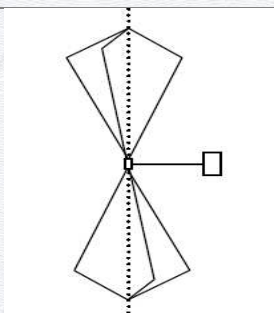


图 1. 参考点位置

2. 在频率范围 200MHz 以下，校准的频率间隔为 1MHz；200MHz 以上，校准的频率间隔为 5MHz。本报告最后一页图形按照该频率间隔绘制。

Below 200MHz in the frequency range, the frequency step for the calibration is 1MHz; above 200MHz, the frequency step for the calibration is 5MHz. The chart in the final page is drawn according to this frequency step.

3. 开阔试验场金属反射面尺寸为 60m×40m，四周铺设底边长 5m 高为 10m 的等腰三角形金属网；98%的点的平整度位于±6mm 以内。

The dimension of the metal ground plane is 60m×40m. An isosceles triangular metal mesh with a base length of 5 m and a height of 10 m is laid all around. The flatness is within±6mm for the 98% sampling points at the metal ground plane.

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校准结果
Calibration Results

三、校准数据 Calibration Results

表 1. 校准数据 Calibration Results

频率 Frequency [MHz]	1m 法天线系数 1m AF [dB(m ⁻¹)]
30	17.8
31	17.6
32	17.5
33	17.5
34	17.4
35	17.2
36	17.1
37	16.8
38	16.6
39	16.4
40	16.2
41	15.9
42	15.5
43	15.4
44	15.1
45	14.9
46	14.6
47	14.3
48	14.0
49	13.7
50	13.2
51	12.6
52	12.2
53	11.9
54	11.5
55	10.9
56	11.0



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校准结果 Calibration Results

57	11.0
58	10.5
59	10.0
60	9.5
61	9.1
62	8.9
63	8.7
64	8.6
65	8.6
66	8.8
67	9.2
68	9.4
69	9.4
70	9.2
71	9.2
72	9.4
73	10.3
74	11.6
75	12.2
76	11.6
77	10.7
78	10.0
79	9.6
80	9.3
81	9.3
82	9.4
83	9.6
84	9.9
85	10.2
86	10.1
87	9.7
88	9.4



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校准结果 Calibration Results

89	9.4
90	9.4
91	9.7
92	9.8
93	9.9
94	10.1
95	10.4
96	10.7
97	10.9
98	11.1
99	11.3
100	11.5
101	11.8
102	12.0
103	12.2
104	12.4
105	12.8
106	13.1
107	13.5
108	14.1
109	14.8
110	15.8
111	15.5
112	14.7
113	14.7
114	13.3
115	13.2
116	13.5
117	13.8
118	14.1
119	14.5



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校准结果 Calibration Results

120	15.0
121	14.6
122	14.4
123	14.3
124	14.6
125	15.0
126	15.2
127	15.3
128	15.1
129	14.7
130	14.3
131	13.9
132	13.7
133	13.6
134	13.8
135	14.1
136	14.4
137	14.6
138	14.7
139	14.7
140	14.7
141	14.9
142	14.9
143	14.9
144	14.9
145	15.1
146	15.3
147	15.3
148	15.3
149	15.3
150	15.4
151	15.6



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校准结果 Calibration Results

152	15.7
153	15.6
154	15.7
155	15.8
156	16.0
157	16.1
158	16.2
159	16.1
160	16.2
161	16.4
162	16.5
163	16.5
164	16.5
165	16.6
166	16.8
167	16.8
168	16.8
169	16.7
170	16.8
171	17.0
172	17.1
173	17.0
174	17.1
175	17.2
176	17.3
177	17.3
178	17.2
179	17.1
180	17.2
181	17.4
182	17.5
183	17.4



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校准结果 Calibration Results

184	17.4
185	17.6
186	17.7
187	17.8
188	17.8
189	17.8
190	17.9
191	18.0
192	18.1
193	18.0
194	18.0
195	18.1
196	18.2
197	18.3
198	18.2
199	18.2
200	18.3
205	18.6
210	18.8
215	18.9
220	19.1
225	19.5
230	19.6
235	19.8
240	20.5
245	20.1
250	20.2
255	20.3
260	20.5
265	20.6
270	20.9
275	21.1



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校准结果

Calibration Results

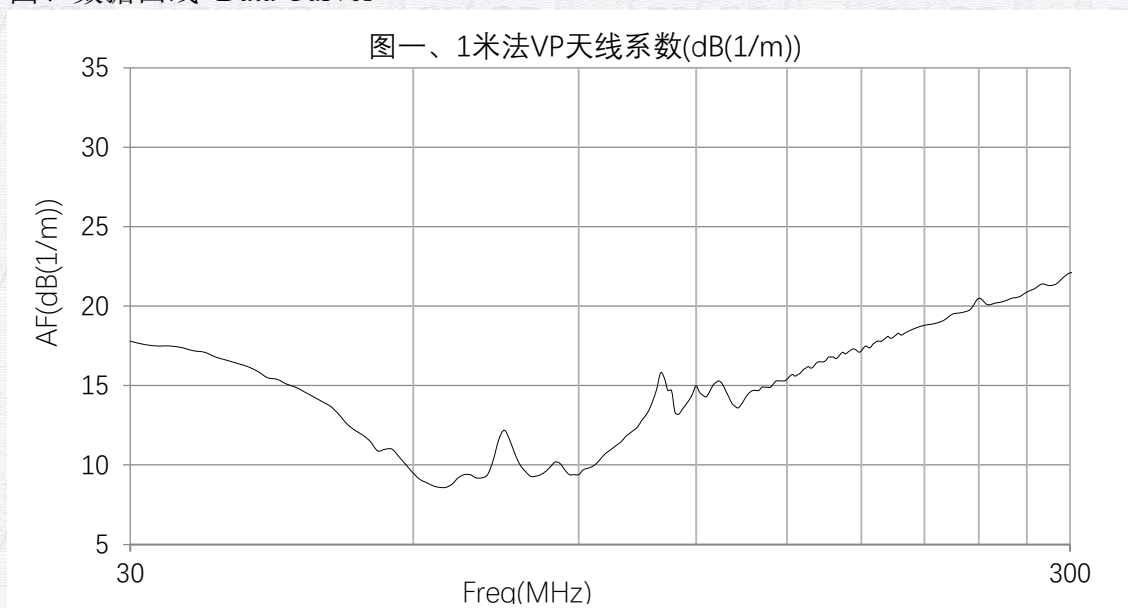
280	21.4
285	21.3
290	21.4
295	21.8
300	22.1

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校准结果
Calibration Results

四、数据曲线 Data Curves



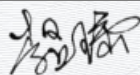
天线系数校准结果的不确定度:
Expanded uncertainty of the measured antenna factor:
 $U=1.2\text{dB}$ ($k=2$) (30MHz~300MHz)

建议 Suggestion: /

声明 Statement:

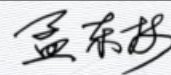
- 我院仅对加盖“中国计量科学研院校准专用章”的完整证书负责。
NIM is ONLY responsible for the complete certificate with the calibration stamp of NIM.
- 本证书的校准结果仅对所校准的计量器具有效。
The certificate is ONLY valid for the calibrated instrument.
- 本证书用中英文两种语言表达, 准确含义以中文为准。
The certificate is reported in both English and Chinese, with the Chinese version as standard.

校准员:



Calibrated by

核验员:



Checked by