

ICS 17.220  
CCS A 56

**JJF**

**INDUSTRY STANDARD OF THE  
PEOPLE'S REPUBLIC OF CHINA**

**JJF 1887-2020**

---

**Calibration Specification for RF and Microwave Power Sensors  
(English Translation)**

**Issued on: November 26, 2020**

**Implemented on: May 26, 2021**

---

**Issued by: State Administration for Market Regulation**

## Table of Contents

|                                                                            |  |
|----------------------------------------------------------------------------|--|
| Introduction (II)                                                          |  |
| 1 Scope (1)                                                                |  |
| 2 Overview (1)                                                             |  |
| 3 Measurement characteristics (1)                                          |  |
| 3.1 Frequency range(1)                                                     |  |
| 3.2 Level range(1)                                                         |  |
| 3.3 Calibration factor (1)                                                 |  |
| 3.4 Voltage standing wave ratio (1)                                        |  |
| 4 Calibration conditions (1)                                               |  |
| 4.1 Environmental conditions (1)                                           |  |
| 4.2 Calibration equipment (1)                                              |  |
| 5 Calibration items and calibration methods (2)                            |  |
| 5.1 Calibration items (2)                                                  |  |
| 5.2 Appearance and working normality inspection (3)                        |  |
| 5.3 Calibration factor (3)                                                 |  |
| 5.4 Reflection coefficient (5)                                             |  |
| 6 Calibration result expression (6)                                        |  |
| 7 Re-calibration interval (6)                                              |  |
| Appendix A Original Record Format (7)                                      |  |
| Appendix B: Internal page format of calibration certificate (10)           |  |
| Appendix C Calibration Uncertainty Evaluation Examples of Major Items (11) |  |
| Appendix D Source reflection coefficient (18)                              |  |
| Appendix E Calibration Principles of Calibration Factors (21)              |  |

### **3 Measurement characteristics (1)**

#### **3.1**

Frequency range(1)

#### **3.2**

Level range(1)

### **3.3**

Calibration factor (1)

### **3.4**

Voltage standing wave ratio (1)

## **4 Calibration conditions (1)**

### **4.1**

Environmental conditions (1)

### **4.2**

Calibration equipment (1)

## **5 Calibration items and calibration methods (2)**

### **5.1**

Calibration items (2)

### **5.2**

Appearance and working normality inspection (3)

### **5.3**

Calibration factor (3)

### **5.4**

Reflection coefficient (5)

## **7 Re-calibration interval (6)**

Appendix A Original Record Format (7)

Appendix B: Internal page format of calibration certificate (10)

Appendix C Calibration Uncertainty Evaluation Examples of Major Items (11)

Appendix D Source reflection coefficient (18)

Appendix E Calibration Principles of Calibration Factors (21)

## **Introduction**

This specification is compiled in accordance with JJF 1071-2010 "Rules for the Compilation of National Metrology and Calibration Specifications": Evaluation of measurement uncertainty According to JJF 1059.1-2012 "Evaluation and Expression of Measurement Uncertainty" and JJF 1059.2-2012 "Using Monte Carlo Lofa Evaluation of Measurement

Uncertainty:" this specification is released for the first time:

## Radio frequency and microwave power sensor calibration specifications

### 1 Scope

This specification applies to radio frequencies with a frequency range of 9kHz~75GHz and a level range of 0dBm~10dBm Calibration with microwave power sensor: The power sensor whose working level is less than 0dBm can refer to this specification for calibration:

### 2 overview

The power meter composed of RF and microwave power sensors (hereinafter referred to as power sensors) and power indicators is connected it is an indispensable power measuring instrument in the technical fields of information, broadcasting, television, radar, aerospace, national defense and military industry: Power transmission the sensor is composed of connectors, power sensitive components, DC or low-frequency circuits: There are many types of power sensors:

The working principle can be divided into thermistor power sensor, thermocouple power sensor and diode power sensor:

The head type can be divided into coaxial and waveguide type power sensors:

### 3 Metrological characteristics

3.1 Frequency range: 9kHz~75GHz:

3.2 Level range: 0dBm~10dBm:

3.3 Calibration factor: greater than 30%, the relative uncertainty of the calibration factor is 0.7%~10%, ( $k=2$ ):

3.4 Voltage standing wave ratio:

### 4 Calibration conditions

4.1 Environmental conditions Ambient temperature:  $(23\pm 5)^{\circ}\text{C}$ , the temperature fluctuation does not exceed  $1^{\circ}\text{C}$  during calibration;

Relative humidity: 20%~80%;

Power supply voltage and frequency:  $(220\pm 11)\text{V}$ ,  $(50\pm 1)\text{Hz}$ ;

Others: There is no mechanical vibration and electromagnetic field interference that affect the normal operation of the calibration system:

### 4.2 Equipment for calibration

4.2.1 Standard power meter (2 units) Frequency range: 9kHz~75GHz;

Power measurement range: -20dBm~ 10dBm;

Relative uncertainty of calibration factor: 0.5%~4.0% (k=2):