ICS 17.180.30
CCS N35

NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 43971-2024

Test specification of integrating sphere source for remote sensor calibration

遥感器定标用积分球光源测试规范

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Foreword

This document is in accordance with the provisions of GB/T 1:1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting: Please note that some of the contents of this document may involve patents: The issuing organization of this document does not assume the responsibility for identifying patents: This document was proposed by the Chinese Academy of Sciences: This document is under the jurisdiction of the National Technical Committee on Remote Sensing Technology Standardization (SAC/TC327): This document was drafted by: Hefei Institutes of Physical Science, Chinese Academy of Sciences, China Institute of Metrology, and Space Information Innovation, Chinese Academy of Sciences New Research Institute, National Satellite Meteorological Center: The main drafters of this document are: Ding Lei, Yuan Yinlin, Wu Haoyu, Zheng Xiaobing, Wu Zhifeng, Liu Zhaoyan, Li Yuan and Xu Nan: Integrating sphere light source test specification for remote sensor calibration

1 Scope

GB/T 43971-2024 specifies how the light source used to calibrate remote sensing instruments is itself tested. An integrating sphere produces a large, uniform, known field of light, and it is what an imaging spectrometer or a satellite camera is calibrated against before launch - which makes it the origin of the radiometric scale for everything the instrument will ever measure. That places an unusual burden on the sphere: its own uniformity across the aperture, the stability of its output over the hours a calibration takes, its spectral distribution, and the traceability of its radiance all become part of the uncertainty of the satellite data. A sphere that has drifted or whose coating has aged propagates a systematic error into a dataset used for climate and land-cover records, invisibly and for years. This document specifies the general requirements, the test items and methods, the test inspection and the test result reporting for integrating sphere light sources used in

remote sensor calibration, across the output wavelength range it covers. Under ICS 17.180.30 and CCS N35, it is written for calibration laboratories, remote sensing instrument developers, and metrology institutes.

This document specifies the general requirements, test items and methods, test inspection and test results of integrating sphere light source test for remote sensor calibration: Report: This document is applicable to the output wavelength range from ultraviolet to short-wave infrared (350nm~2500nm) through built-in or external introduction: Integrating spheres with a diameter greater than or equal to 100 mm, used for remote sensor radiation calibration, with continuous spectrum testing, other integrating spheres [Light source] Test is performed as reference:

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document: For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to This document:

GB/T 25915:1-2021 Clean rooms and related controlled environments Part 1: Classification of air cleanliness by particle concentration

GB/T 36299-2018 Basic terminology for optical remote sensing radiation transmission

3 Terms and definitions

The terms and definitions defined in GB/T 36299-2018 and the following apply to this document: 3:1 integrating sphere[source] A surface light source with known spectral radiation characteristics used to calibrate remote sensors:

Note: The integrating sphere [light source] has good plane uniformity, angle uniformity and stability: 3:2 spectral radiance The radiant brightness per unit wavelength:

Note: The unit is watt per square meter steradianmeter [W/(m2·sr·nm)]: [Source: GB/T 36299-2018, 2:9] 3:3 spatialradiancenon-uniformity The degree of difference in radiant brightness of the integrating sphere [light source] radiation output in the normal direction at different positions within the light-emitting plane: 3:4 angular radiance non-uniformity The degree of difference in radiant brightness of the integrating sphere [light source] radiation output in different directions relative to the central normal within the light-emitting plane:

Note: The optical properties of the exit surface of the integrating sphere [light source] are similar to the Lambert surface: Due to limitations such as the manufacturing process, there will be some deviations from the Lambert cosine law: 3:

5 Stability Under specified working conditions, the ability of the integrating sphere [light

source] to maintain the energy output unchanged within a specified time: