ICS 17.240
CCS F74

NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 44645-2024

Measurement method for shielding effectiveness of electromagnetic shielding materials under the excitation of high power microwave

电磁屏蔽材料高功率微波屏蔽效能测量方法

Issued on: September 29, 2024 **Implemented on: October 1, 2026**

Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC

Table of Contents

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 China Electrical Equipment Industry Association. This document is under the jurisdiction of the National Technical Committee for Standardization of Electromagnetic Shielding Materials (SAC/TC323). This document was drafted by: Institute of Applied Electronics, China Academy of Engineering Physics, Shanghai Institute of Metrology and Testing Technology, Maxim New Materials Materials Co., Ltd., Jiangsu Quality and

Standardization Research Institute, Northern Engineering Design and Research Institute Co., Ltd., China Electronics Cosine Technology Co., Ltd. Ltd., Beijing Huayu Xinao Technology Co., Ltd., Institute of Metal Research, Chinese Academy of Sciences, Chengdu Moore Huanyu Testing Technology Co., Ltd., Beijing Beijing Radio Measurement and Testing Institute, Huawei Terminal Co., Ltd., University of Electronic Science and Technology of China, China Institute of Metrology, Harbin Institute of Technology, Anhui Normal University, Jiangsu Institute of Metrology (Jiangsu Energy Metrology Data Center), Jiangsu Zhongdi New Materials Technology Co., Ltd., Tianjin Nuo Optoelectronic Materials Co., Ltd., Anfang High-tech Electromagnetic Safety Technology (Beijing) Co., Ltd., Tianjin University, Shenzhen Feirongda Technology Co., Ltd. Ltd. The main drafters of this document are. Ma Hongge, Qin Feng, Xiao Tian, Chen Chaochan, Yan Zhiyang, Chen Weibin, Zhu Jiangang, Yu Xiaolei, Zhao Zhanliang, Guo Rongbin, Gao Cheng, Ma Song, Chen Nan, Han Yufeng, Yu Zhigang, Li En, Gao Yuan, Huang Pan, Lu Zhengang, Liu Xiaoming, Zhao Pinzhang, Liu Weide, Zhu Yanyan, Cai Jinliang, Yang Hong, Wang Zhen, Lai Lei, Wu Fan, Shi Weiwei, Gao Yong, Zhao Rui, Zhang Hong, Wu Zhuang. Electromagnetic shielding materials High power microwave shielding effectiveness Measurement method

1 Scope

GB/T 44645-2024 gives the method for measuring the shielding effectiveness of electromagnetic shielding materials under high power microwave excitation. Shielding effectiveness measured at milliwatt levels does not predict behaviour at gigawatt levels: at high field strength the material can break down, the apertures arc, absorptive layers heat and change properties, and the response becomes non-linear, so a shield qualified by the ordinary methods may not shield at all against the thing it was bought for. The standard sets the general requirements, the measurement conditions and the requirements on the materials tested, then the measurement of narrowband high power microwave shielding effectiveness and separately of wideband and ultra-wideband shielding effectiveness, each with its measurement system and equipment, its measurement layout and its measurement steps, together with the data processing and the safety provisions, including radiation protection for the personnel. It takes effect on 1 October 2026.

This document describes the measurement method, safety and performance of high power microwave shielding effectiveness of electromagnetic shielding materials in the frequency range of 100MHz~40GHz. Protection and test report contents. This document is applicable to the measurement of high-power microwave shielding effectiveness of planar electromagnetic shielding materials.

2 Normative references

The contents of the following documents constitute 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 8702 Electromagnetic environment control limits

GB 18871 Basic Standard for Ionizing Radiation Protection and Radiation Source Safety

GB/T 26667-2021 Terminology of electromagnetic shielding materials

GB/T 30142 Measurement method for shielding effectiveness of planar electromagnetic shielding materials

GB 50826 Technical Specification for Electromagnetic Anechoic Chamber Engineering

3 Terms and definitions

The terms and definitions defined in GB/T 26667-2021 and GB/T 30142 and the following apply to this document.

3.1 High power microwave high power microwave; HPM Strong electromagnetic radiation with a frequency of 100MHz~300GHz, a peak power greater than 100MW or an average power greater than 1MW.

Note. The high power microwave frequency range described in this document is 100MHz~40GHz, including narrowband high power microwave, broadband high power microwave, ultra-wideband high power microwave, Rate microwave.

3.2 relative bandwidth The ratio of the signal bandwidth to its center frequency is calculated according to formula (1). FRB= fH-fL fH fL()/2 x100% (1) Where. FRB

---relative bandwidth; fH

---The highest frequency corresponding to the microwave pulse power spectrum density decreasing by 3dB relative to the peak power spectrum density, in gigahertz Hertz (GHz); fL

---The lowest frequency corresponding to the microwave pulse power spectrum density decreasing by 3dB relative to the peak power spectrum density, in gigahertz Hertz (GHz).