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

GB/T 9633-2012

Replacing GB/T 9633-1988

**Measuring methods for properties of gyromagnetic materials
intended for application at microwave frequencies**

微波频率应用的旋磁材料性能测量方法

(English Translation)

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Foreword

This standard was drafted in accordance with GB/T 1.1-2009 given rules.

This standard replaces GB/T 9633-1988 "Test Method gyromagnetic material properties of microwave frequency applications." this standard compared with GB/T 9633-1988, the main changes are as follows.

--- Original standard was more than 10 editorial changes and unify the terminology, such as precision, accuracy unified accuracy.

--- Block diagram, schematic block diagram of a unified, instruments and devices, means

unified device.

--- Magnetic constant μ_0 to magnetic constant μ_0 .

--- "Core" unified "core"; with the multiplication sign "x" instead of the dot "..."

--- Reg number with the original standard to do a larger adjustment.

--- Original standards - Part 2 4.5 penultimate paragraph "Amplifier sensitivity should be more than 2mV" to "spiritual amplifiers Sensitivity should be more than 2mm/mV "; the original standard Figure 21" 9.1MHz "to" 9.1GHz "; the original 9.6 standard measurement procedures last A "measurement should be completed by 25 °C and relative humidity of about 65% of the environment" to "measurement should be done at room temperature."

--- Formula "log" be replaced by "lg".

--- Remove the spin magnetic resonance linewidth (general and GHz) measurement procedure in Method a) (see the 1988 edition of Chapter 5 ~ Chapter 6).

--- Remove the original standard formula (33b) (see 1988 edition 6.3).

This standard is identical with IEC 60556:2006 "gyromagnetic material properties measurements of microwave frequency applications." the editorial changes made the following standard.

--- "This International Standard" by "this standard."

--- References in some standard by adopting international standards to replace national standards or industry standards, and increases appearing in FIG. 18 IEC 60153-2. 1974.

--- Remove the IEC standard preface.

--- To define terms and definitions.

--- The IEC standard reference chapters unified prepared and added at the end of the domestic references.

Correspondence between the consistency of the standards of international documents and normative references of the following documents.

--- GB/T 9637-2001 Electrotechnical terminology Magnetic materials and components [eqv IEC 60050 (221).1990]

--- GB/T 11450.2-1989 hollow metallic waveguides Part 2. Relevant specifications for ordinary rectangular waveguides (eqv IEC 60153-2.

1974)

The standard proposed by the Ministry of Industry and Information Technology of the People's Republic of China.

This standard by the national magnetic components and ferrite materials Standardization Technical Committee (SAC/TC89) centralized.

1 Scope

This standard specifies the measurement method is in accordance with SJ/T 11077-1996 "microwave ferrite specification drafting guidelines" multi-crystal micro stipulated Performance and methodology are generally used in the process of ferrite waves.

This standard applies to the measurement methods used for research applications at microwave frequencies ferrite material.

This standard does not exclude other measurement methods commonly used, but it should be controversial to this standard measuring method for arbitration.

This standard does not include a single crystal and thin film materials.

Note 1: This standard concept of "ferrite" and "microwave" is broad. "ferrite" means not only having a spinel crystal structure of the magnetic - dielectric chemical component, but also refers to a material having a garnet and hexagonal crystal structure.

"Microwave" includes a wavelength range of about 1m ~ 1mm between, and the scope is primarily concerned with 0.3m ~ 10mm.

Note 2: Microwave ferrite material is mainly used for non-reciprocal devices, such as circulators, isolators, non-reciprocal phase shifter. However, these materials may be used reciprocal devices, e.g.

Modulators, and (reciprocal) phase shifter. Other applications include rotating magnetic filter, limiter and more complex devices, such as parametric amplifier.

2 Normative references

The following files for this document is essential. For cited documents with dates, only the dated edition applies to this document.

For undated references, the latest edition (including any amendments) applies to this document.

GB/T 20874-2007 calculation of the magnetic component of the effective parameters (IEC 60205:2001, IDT) SJ/T 11077-1996 microwave ferrite specification drafting guidelines (idt IEC 60392. 1972) IEC 60050 (221).1990 Electrotechnical terminology Magnetic materials and components (Internationalelectrotechnicalvocabulary (IEV) chapter221. magneticmaterialsandcomponents) IEC 60153-2. 1974 Hollow metallic waveguides Part 2. Relevant specifications for ordinary rectangular waveguides (Hollowmetallicwaveguides-Part 2. Relevant specifications for ordinary rectangular waveguides)

3 Terms and Definitions

IEC 60050 (221).1990 definition of terms and definitions apply to this document.

4.1 Introduction

Characteristic parameter is the saturation magnetization of the ferrite material. Widely used in the theoretical calculation, such as calculating tensor permeability of each component (see IEC 60050 (221).1990 in 221-03-02). In various applications of microwave devices, the saturation magnetization determine the low frequency limit of the device, which is the main If the material is not saturated because when there have been so-called low-field loss.

4.2 Objective

Given two similar saturation magnetization measurement method. vibrating coil method (VCM) and vibrating sample method (VSM).

Advantages vibrating coil method (Ref. [20] and [21]) as follows. over the entire measuring temperature range, especially at low temperature measurements, Ann