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

GB/T 12190-2021

Replacing GB/T 12190-2006

**Method for measuring the shielding effectiveness of
electromagnetic shielding enclosures**

电磁屏蔽室屏蔽效能的测量方法

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Table of Contents

1	Scope
2	Normative references
3	Terms and definitions
4	Initial test procedure
4.1	Preparation
4.2	Test plan
4.3	Equipment calibration
4.4	Reference level and dynamic range
4.5	Pre-check procedure for shielding effectiveness
4.6	Note
5	Detailed measurement procedures
5.1	Overview
5.2	Typical measurement frequency
5.3	Judgment Criteria
5.4	Measurement uncertainty
5.5	Preparation process
5.6	Low frequency band measurement (9kHz~20MHz)
5.7	Resonance frequency measurement (20MHz~300MHz)
5.8	High-frequency band measurement (300MHz~18GHz)
5.8.6	Measurement method
6	Test report
	Appendix A
	Appendix B

1 Scope

GB/T 12190-2021 is the Chinese national standard on method for measuring the shielding effectiveness of electromagnetic shielding enclosures, in the field of telecommunications and audio-video engineering. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 21 May 2021 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 December 2021. Classification: ICS

33.100, CCS L06. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This document describes the measurement method of the shielding effectiveness (SE) of electromagnetic shielding rooms, and the measurement frequency range is 9kHz~18GHz. As needed If necessary, the frequency can be extended to 50Hz and 100GHz to both ends. This document is applicable to electromagnetic shielding rooms with dimensions not less than 2.0m on each side.

2 Normative references

The contents of the following documents constitute the indispensable clauses of this document through normative references in the text. Among them, dated quotations Only the version corresponding to the date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to This document.

GB/T 4365-2003 Electrotechnical terminology electromagnetic compatibility (IEC 60050-161.1990, IDT)

3 Terms and definitions

The following terms and definitions defined in GB/T 4365-2003 apply to this document.

3.1 Accessible test location No need to modify the mother body structure, the test antenna can reach the position.

3.2 Dynamic range; DR The receiving system works in the amplitude range of the linear region (see C.6 of Appendix C). Note

1.For SE measurement, DR is the difference between the reference level (see 4.4) and the minimum discernible signal above the noise floor. Note

2.The minimum discernible signal is defined as the amplitude greater than the noise floor of the test system by at least 3dB.

3.3 Localsource An emission source that is very close to the shielded room and whose electromagnetic energy only irradiates a local area on the surface of the shielded room.

3.4 Parent structure A permanent enclosure or external room containing a shielded room.

3.5 Shielding effectiveness; SE The ratio of the signal value received when there is no shield to the signal value received in the shield, that is, between the transmitting antenna and the receiving antenna There is the insertion loss caused by the shield in the future.

3.6 Shielding enclosure A structure that protects the inside from external electric and

magnetic fields or protects the outside from the internal electric and magnetic fields.

Note. It is usually built of metal materials, and certain measures are taken at the seams of metal plates and doors to ensure continuous electrical connection. High-performance shielded room The same frequency can suppress the electric field and magnetic field by one to seven orders of magnitude.

3.7 Shielding enclosure owner Individuals, companies, or organizations that put forward final shielding requirements and will use shielded rooms.

3.8 Testing agency The organization that completed the measurement and issued a report.

4 Initial test procedure

4.1 Preparation Before the formal measurement, the reference level and dynamic range (DR) need to be measured.

4.2 Test plan Before the measurement, the owner of the shielded room and/or related parties should develop a test plan. When measuring, it should be carried out in accordance with the test plan. The test plan should include measurement frequency, measurement location, judgment criteria (ie SE limit) and a list of equipment used. For a shielded room used in a full anechoic chamber (FAR) or a semi-anechoic chamber (SAC), the SE measurement should be carried out before the installation of the absorbing material OK; if not, perform SE measurement on FAR or SAC, and the measurement location shall be specified in the test plan. See Appendix A for the selection guide for measurement techniques.

4.3 Equipment calibration Any measuring equipment that can affect the measured value of SE should be calibrated. The latest calibration date traceable to the national standard shall be provided.

4.4 Reference level and dynamic range The reference level should be determined in accordance with the description in the measurement clauses for the low-frequency band (magnetic field), resonance band, and high-frequency band (plane wave) (see 5.6.4, 5.7.4, 5.8.5). The reference level should be re-determined when the measurement arrangement is changed. The reference level should be re-measured after the end of each frequency measurement. If the re-measured reference level value has a change of more than $\pm 3\text{dB}$ from the previous reference level value, the measurement should be performed again. It should be ensured that each measurement arrangement has a suitable DR. This can be determined by the following method. Excite the receiving device with the relevant transmitting device, and prove The receiving equipment maintains the linear calibration state for all the various emission and reception levels that may be encountered during the measurement. In the receiving system, use the school The calibrated attenuator changes the input of the receiver. If the decibels of the two changes are the same, it means that the system is working in a linear calibration state. This kind of The verification should be

performed at least once at each measurement frequency point. The DR should be at least 6dB greater than the SE of the shielded room under test. It is best to determine the DR when measuring the reference level. The surrounding environment should be minimized (Such as walls, buildings).

4.5 Pre-check procedures for shielding effectiveness See Appendix B for the pre-check procedure of SE.

4.6 Matters needing attention The emission source should be operated by experienced surveying personnel. During the measurement process in accordance with this document, the personnel concerned shall be protected from radio frequency radiation, and the attachment of the measurement site shall be avoided. Near other electronic devices cause interference.

5.8.6 Measurement method

5.8.6.1 Overview After determining the relative position of the transmitting antenna and the receiving antenna from the shielding wall, measure the amplitude of the maximum signal. Whether it is measured with a dipole antenna Still use horn antenna to measure, the method is the same.

5.8.6.2 Transmitting antenna position According to Figure 7 and Figure 8, select some measurement points according to the test plan, and the selected transmitting antenna position and polarization should be able to cover the shielding room respectively The walls. The measurement was carried out under the horizontal polarization and vertical polarization of the antenna. The horizontal distance between adjacent measuring points should not be greater than 2.6m. but if When measuring the reference level, the distance between the transmitting antenna and the receiving antenna is less than 2m, and the horizontal distance between adjacent measurement points should not be greater than 1.3m. Such as If the height of the shielding wall is not more than 3m, place the center of the antenna at half the height of the shielding wall. If the height of the shielding wall exceeds 3m, the measuring point should be added in the vertical direction. The distance between the measuring points in the vertical direction should not be greater than 2m, and the antenna should be located in each vertical segment. center. However, if the distance between the transmitting antenna and the receiving antenna is less than 2m when measuring the reference level, the vertical distance between adjacent measurement points should not be large At 1m. The distance between the transmitting antenna and the measuring wall is at least 1.7m (excluding the thickness of the shielding wall); and the distance from the ground is at least 0.3m. If because of Due to the limitation of physical size, the distance between the two antennas is less than 2m, then the distance between the transmitting antenna and the shielding wall is the reference distance and 0.3m. Difference. When measuring, the power applied to the transmitting antenna should be equal to the power used when measuring the reference level in 5.8.5.