

ICS 11.040.50

CCS C43

YY

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

YY/T 1766.4-2024

**Image quality evaluation methods for computed tomography
scanners - Part 4: Evaluation of imaging performance under
automatic exposure control**

X射线计算机体层摄影设备图像质量评价方法 第4部分：自动曝光控制下的成像性能评价

Issued on: February 7, 2024

Implemented on: September 1, 2025

Issued by: National Medical Products Administration

Table of Contents

1 Scope	1
2 Normative references	1
3 Terms and Definitions	1
4 Imaging conditions related to CT automatic exposure control	2
5 Imaging performance evaluation method under X-ray tube current modulation	2
14 Reference	17

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. This document is part 4 of YY/T 1766 "Image quality evaluation method for X-ray computed tomography equipment". The following parts have been published.

1. Evaluation of modulation transfer function;

2. Evaluation of low contrast resolution;

3. Performance evaluation of dual energy imaging and energy spectrum application;

4. Evaluation of imaging performance under automatic exposure control. 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 is proposed by the State Food and Drug Administration. This document is provided by the National Technical Committee for Standardization of Medical Electrical Appliances - Medical X-ray Equipment and Appliances Sub-Technical Committee (SAC/TC10/SC1) Centralized. This document was drafted by: Shanghai Siemens Medical Devices Co., Ltd., Liaoning Medical Device Inspection and Testing Institute, Shanghai United Imaging Medical Technology Co., Ltd., Hangwei General Electric Medical Systems Co., Ltd., Neusoft Medical Systems Co., Ltd., Philips Healthcare (Suzhou) Co., Ltd. Company, Mingfeng Medical Systems Co., Ltd., and Kuanteng (Beijing) Medical Equipment Co., Ltd. The main drafters of this document are: Tian Yi, Sun Zhiyong, Cai Xiaolu, Zhou Pei, Wei Dong, Liang Tiecheng, He Xiujian, Lu Xiaodong, Tong Zhiyuan, Xu Yifei, Xing Zhanfeng, Chen Wei, Xiang Huicai, and Li Xiang.

YY/T 1766 is a method standard system for evaluating the image quality of CT scanning devices, which aims to establish relevant image performance and imaging methods. The

standardized evaluation method for environmental protection is composed of the following four parts.

1.Modulation transfer function evaluation. The purpose is to establish an evaluation method for the spatial imaging resolution of CT scanning devices.

2.Evaluation of low contrast resolution. The purpose is to establish an absolute evaluation method for low contrast imaging of CT scanning devices. The present invention provides an objective method for evaluating the comparability of low-contrast resolution when CT scanning devices are applied with reduced-dose technology.

3.Evaluation of dual energy imaging and energy spectrum application performance. The purpose is to establish the CT scanning device for dual energy imaging, or The present invention relates to an evaluation method for related image performance when energy spectrum is applied based on images or data obtained by corresponding acquisition modes.

4.Evaluation of imaging performance under automatic exposure control. The purpose is to establish the performance of the CT system under automatic exposure control.

Standardized evaluation method for imaging performance. X-ray computed tomography image Quality assessment methods Part

1 Scope

YY/T 1766.4 is Part 4 of the Chinese CT image quality evaluation series and covers imaging performance when automatic exposure control is in use. AEC modulates the tube current according to patient size and anatomy, and it is switched on for essentially every clinical scan, yet classical image quality measurements are made at fixed technique, which means they describe a mode the scanner is rarely used in. This part defines how imaging performance is evaluated with AEC active, so that the measured quality and the delivered dose correspond to real practice. It sits under the general CT standard YY/T 0310. For a manufacturer of CT systems or a medical physics team evaluating one in China, this is the reference method.

This document describes the automatic exposure control technology used in X-ray computed tomography equipment (hereinafter referred to as CT scanner). The corresponding imaging performance evaluation method is proposed. This document applies to whole-body and special-purpose CT scanning devices, including CT scanning devices that provide image data for radiation therapy planning.

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 9706.103-2020 Medical electrical equipment Part 1-

3.General requirements for basic safety and essential performance Collateral standard.
Radiation protection for diagnostic X-ray equipment

GB 9706.244 Medical electrical equipment Part 2-

44.Basic safety and essential performance safety of X-ray computed tomography
equipment Fully dedicated requirements

GB/T 10149 Terminology and symbols for medical X-ray equipment

GB/T 19042.5 Evaluation and routine testing of medical imaging departments Part
3-5.X-ray computed tomography equipment imaging Performance acceptance test and
stability test

YY/T 1821 Calculation method for body-size-specific dose estimation of X-ray computed
tomography equipment

3 Terms and definitions

GB/T 10149, GB 9706.103-2020, GB 9706.244, GB/T 19042.5 and YY/T 1821 and the
following terms The following terms and definitions apply to this document.

3.1 In X-ray equipment, the process of automatically controlling one or more loading factors
to obtain the required radiation dose at a preselected location. model. [Source: GB
9706.103-2020, 3.10]

3.2 In X-ray equipment, an operating mode in which the X-ray tube current is automatically
modulated to obtain the required radiation dose at a preselected position.

3.3 An optimized constant X-ray flux can be determined for exposure control throughout the
scanning sequence.