

GY

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

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Replacing NY/T 356-1999; NY/T 951-2006

**Technical Specification for Networking of Terrestrial Digital TV
Broadcast Single Frequency Network Based on IP Transmission
(English Translation)**

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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 of Standardization Documents" Drafting.

1 Scope

This document specifies the technical specifications for single-frequency terrestrial digital TV broadcasting in accordance with GB 20600-2006 based on IP transmission.

This document is applicable to the construction of single-frequency network of terrestrial digital television broadcasting system in accordance with GB 20600-2006 based on IP transmission, as an IP-based transmission Technical basis for the project design and

project acceptance of the transmitted terrestrial digital TV broadcast single frequency network project.

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 reference documents, Only the version corresponding to that date is applicable to this document; for undated references, the latest version (including all amendments) is applicable to this document file.

GB/T 28433-2012 Single frequency network technical requirements for terrestrial digital TV broadcasting GB/T 28434-2012 Technical requirements and measurement methods for single-frequency network adapters for terrestrial digital TV broadcasting GB/T 28435-2012 Technical requirements and measurement methods for terrestrial digital TV broadcast transmitters GB/T 34995-2017 Technical requirements and measurement methods for single frequency network timing receiving equipment GD/J 121-2020 Technical requirements and measurement methods for IP/ASI gateways in program distribution networks

3.1 Terms and definitions

The following terms and definitions apply to this document.

3.1.1

Single frequency network A terrestrial digital television coverage network composed of multiple transmitters located in different locations and in a synchronized state. Each transmitter in the network Transmit the same modulated radio frequency signal at the same frequency and at the same time to achieve reliable coverage of a specific service area.

3.2 Abbreviations

The following abbreviations apply to this document.

ASI asynchronous serial interface (Asynchronous Serial Interface) FEC Forward Error Correction IP Internet Protocol (Internet Protocol) IPDV IP packet delay variation (Internet Protocol packet Delay Variation) IPER IP packet error rate (Internet Protocol packet Error Ratio) IPLR IP packet loss rate (Internet Protocol packet Loss Ratio) IPTD IP packet transfer delay (Internet Protocol packet Transfer Delay) RF (Radio Frequency) RTP Real-time Transport Protocol SIP Second Frame Initialization Packet TS Transport Stream UDP User Datagram Protocol (User Datagram Protocol)

4 System description

According to the technical principle of the single frequency network, a schematic diagram of the networking mode of the terrestrial digital TV broadcasting single frequency network based on IP transmission is shown in Figure 1.

The system mainly includes single frequency network adapter, terrestrial digital TV broadcast transmitter, reference clock signal source, ASI-IP adapter, IP-ASI adaptation and IP transmission network.

5.1 Overall

The synchronization of terrestrial digital TV broadcasting single frequency network, signal distribution network, clock reference, radio wave polarization and station spacing should comply with GB/T 28433-Technical requirements in 2012.

5.2 Single frequency network adapter

Realize the functions of SIP packet insertion and code rate adaptation, and complete the conversion from the input TS stream to the single-frequency network adaptation TS stream, which should comply with GB/T 28434-Technical requirements in 2012.

5.3 Digital terrestrial television broadcasting transmitter

The realization of channel coding, synchronous modulation, up-conversion, power amplification and signal transmission shall meet the technical requirements in GB/T 28435-2012.

5.4 Reference clock signal source

Provide a unified 10MHz reference frequency and 1pps reference time for each node equipment of the single frequency network system, which shall comply with GB/T 34995-Technical requirements in 2017.

5.5 IP/ASI Gateway

Contains ASI-IP adapter and IP-ASI adapter to realize the transmission of TS stream on IP network, which should conform to the technology in GD/J 121-2020 Claim.

5.6 IP transmission network

The IP transmission network realizes the program distribution from the program source to each transmitting station. The technical requirements of the IP transmission network should meet the requirements of Table 1.

Table 1 Technical requirements of IP transmission network

6.1 Single frequency network adapter

It shall comply with the measurement method in GB/T 28434-2012.

6.2 Digital terrestrial television broadcasting transmitter

It shall comply with the measurement method in GB/T 28435-2012.

6.3 Reference clock signal source

It shall comply with the measurement method in GB/T 34995-2017.

6.4 IP/ASI Gateway

It shall comply with the measurement method in GD/J 121-2020.

6.5.1.1 Measurement block diagram

The equipment required for the standard measurement method of IP transmission network performance indicators includes 2 IP transmission testers and 2 reference clock signal sources, respectively Connected to the entrance and exit of the IP transmission network to be tested, the measurement block diagram is shown in Figure 2.

6.5.1.2 Measurement procedure

The standard measurement procedure is as follows.

- a) Accurately connect the measurement system according to Figure 2 to ensure that the equipment is working normally and that the IP transmission network is consistent with the actual service carrying status.
- b) When the reference clock signal source enters the locked state, a stable time reference signal is output to keep the two IP transmission testers synchronized.
- c) Start the IPTD, IPDV, IPLR and IPER test functions of the IP transmission tester respectively. The IP packet length is set to 1500 bytes.

The data rate R_{IP} is set to the actual transmission required rate after considering the TS stream bit rate and network protocol overhead, see the formula in Appendix A (A.1) ~ Formula (A.4). The measurement time of IPTD and IPDV should be guaranteed to be 5min...