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

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**The full scale digital level of the digital audio equipments
(English Translation)**

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Foreword

In the broadcasting and television audio system (including the production, broadcasting and transmission of programs), when digital and analog equipment are used in combination, Improper selection of the full-scale level of the word audio equipment will cause the system working level to fluctuate, and even cause increased distortion and reduced signal-to-noise ratio.

The performance of the system is deteriorated, and the program exchange between different broadcast and television systems is also affected. In order to avoid the above situation, it is specially formulated this standard.

In the development of this standard, GB/T 14919-1994 "Technical Specifications for Digital Sound Signal Source Coding", SMPTE RP 155-1997 Recommendation `` Audio Levels for Digital Audio Records on Digital Television Tape Recorders) and EBU R 68-2000, Calibration in Digital Audio Production Equipment and Digital Audio Recorders Level "(Alignment level in digital audio production equipment and in digital audio recorders), and combined with the survey results of domestic digital audio equipment and years of work experience.

Appendix A and Appendix B of this standard are informative appendices.

This standard is under the jurisdiction of the National Radio and Television Standardization Technical Committee.

This standard was drafted. Central People's Broadcasting Station.

1 Scope

This standard specifies the full-scale level values of digital equipment in program production, broadcast and transmission systems in digital audio systems for broadcasting and television.

This standard applies to digital audio systems for broadcasting and television. Other digital

audio systems can be implemented by reference.

2 Normative references

The clauses in the following documents have become the clauses of this standard after being referenced. For dated references, all subsequent Neither amendments (excluding errata) or revised versions are applicable to this standard, however, parties who have reached an agreement under this standard are encouraged to study is the latest version of these files available? For undated references, the latest version applies to this standard.

GB/T 14919-1994 Technical Specification for Digital Audio Signal Source Coding SMPTE
RP 155-1997 Digital Audio Levels in Digital Television Tape Recordings EBU R 68-2000
Calibration levels in digital audio production equipment and digital audio recorders

3 Terms and definitions

The following terms and definitions apply to this standard.

dBu

Unit of voltage level with 0.775V (effective value) as the reference voltage. Expressed as.
 $\text{dBu} = 20\lg (v/0.775)$.

The calculation of dBu only considers the voltage level itself, not the relationship with the corresponding electric power level, and does not consider whether the impedance is 600ohm.

dBu is usually used to describe the input and output levels of professional audio equipment.

Full scale digital level the maximum unclipped analog signal level that can be converted by an A/D or D/A converter in a digital audio device.

dB FS dB full scale

A unit of digital audio signal level.

0dB FS is equal to "full-scale" digital audio reference level. It is a reference for digital audio equipment with A/D and D/A converters.

Mark. "Full scale" refers to the maximum codeable analog signal level before the converter may reach "digital overload".

A/D converter and D/A converter analog to digital convertor and digital to analog convertor
the A/D converter is an analog/digital signal converter.

The D/A converter is a digital/analog signal converter.

Digital overload

Describe the case where the input signal of the A/D converter exceeds the full scale (0dB

FS) range.

Since 0dB FS is the absolute highest voltage level that can be converted by the A/D converter, no digital level can exceed 0dB FS, so A voltage level of 0dB FS and all voltage levels greater than it produce the same output symbol.

4 Full-scale level value

The encoding method used by digital audio equipment should comply with the provisions of GB/T 14919-1994, that is, the encoding method used is at least equivalent to PCM 16bit uniform accuracy.

The full-scale level value of a digital audio device, that is, the maximum codeable level value, is represented by a corresponding 1KHz sine wave signal voltage level.

In the broadcasting and television audio system, the full-scale level value of digital equipment is 0dB and the analog signal voltage level corresponding to FS is 24dBu.

Record A. Taking into account the actual situation of China's radio stations, at this stage, the full-scale level value of 0dB FS corresponds to the analog signal voltage level of 22dBu.

Digital devices continue to be used, see Appendix B.

Appendix A

(Informative appendix) SMPTE RP 155-1997 related expressions of full-scale level of digital audio equipment SMPTE RP 155-1997 describes the full level of digital audio equipment as follows.

- a) The calibration signal is a 1KHz sine wave that is 20dB below the maximum level of the system. Considering the 16-bit significant bit encoding, this maximum level is positive the peak value is 7FFF (hexadecimal), and the negative peak value is 8000 (hexadecimal);
- b) The level detection meter should be calibrated to a steady-state reference signal (-20dB FS) equivalent to the normal working level of the audio program signal.

Note: Since 4dBu is used as the calibration level of the audio system in China's radio and television systems, the digital full-scale level should be 24dBu.

Appendix B

(Informative appendix) EBU R 68-2000 related expressions of full-scale level of digital audio equipment EBU R 68-2000 describes the full-scale level of digital audio equipment as follows.

- a) The calibration signal is a 1KHz sine wave;
- b) that the maximum allowable level of the audio program should be 9 dB higher than the calibration level;

- c) Considering the effects of operating errors and instantaneous peaks in audio programs, a level reserve of 6dB should be reserved;
- d) considering the characteristics of the quasi-peak meter for broadcasting, the actual peak value is 3 dB higher than the indication of the quasi-peak meter;
- e) In digital equipment, the calibration level of the digital audio signal coding level should be 18dB lower than the maximum codeable level of the system.

Note: Since 4dBu is used as the calibration level of the audio system in our broadcasting system, the digital full-scale level should be 22dBu.