

**GENERIC CODE OF PRACTICE ON  
TELEVISION TECHNICAL STANDARDS**

**COMMUNICATIONS AUTHORITY**

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## **Chapter 1            Preamble**

1.1        This Code of Practice is issued by the Communications Authority (CA) pursuant to section 3 of the Broadcasting Ordinance (Cap.562).

1.2        This Code is applicable to television programme services licensed under the Broadcasting Ordinance (Cap.562) except for services provided to hotel rooms.

1.3        Unless otherwise approved by the CA, the signal formats of television programmes delivered on a licensed television programme service should comply with the formats, if any, specified in the statements (including statements of intention) and representations made by, or on behalf, of the licensee in its licence application. In particular, Chapter 2 applies to a television programme service which employs the Digital Terrestrial Television System.

1.4        A licensee shall comply with the technical standards and directions issued from time to time by the CA which are applicable to it.

1.5        The standards set out in this Code should be read in conjunction with relevant legislation and licence conditions currently in force.

## Chapter 2 Digital Terrestrial Television System

### Introduction

2.1 This chapter specifies the details of the National Standard<sup>1</sup> for Digital Terrestrial Television (DTT) System adopted for television programme services in Hong Kong.

### The Television Signal

#### *Modulation and Channel Coding*

2.2 The DTT Systems used in Hong Kong should be based on the National Standard with the use of the following options:

Table 1: Options of the National Standard

Mode	Multi-Carrier Mode with the number of carriers (C) = 3780
Modulation	64QAM, 16QAM and 4QAM
Frame Header	PN 945
Code Rate	0.4 and 0.6
Symbol Interleaving	Mode 2 i.e. B = 52 and M = 720 symbols

2.3 The frequency offset applied to the carriers on individual channels is 0, or +/- 1/6 MHz.

2.4 Where a DTT multiplex is co-sited with and operating on a channel adjacent to other services (e.g. those with lower power), a spectrum mask meeting the specification set out in Figure 19 of the National Standard, the spectrum mask under

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<sup>1</sup> The National Standard refers to “GB20600-2006: Framing Structure, Channel Coding and Modulation for Digital Television Terrestrial Broadcasting System” promulgated by the Standardization Administration of the People’s Republic of China in August 2006. The National Standard has been promulgated by the International Telecommunication Union in its recommendations (e.g. ITU-R Recommendations BT.1306 and BT.1368) since 2011 as one of the DTT broadcasting systems.

stringent conditions, must be used for the multiplex.

*Multiplexing of Signals*

2.5 The multiplexing of baseband signals complied with ISO/IEC 13818-2/3 must conform to ISO/IEC 13818-1. The multiplexing of baseband signals complied with ISO/IEC 14496-10 must conform to ISO/IEC 13818-1. The implementation guidelines stated in ETSI TS 101 154 must be complied.

*Service Information (SI) and Program Specific Information (PSI)*

2.6 Transport streams must provide all applicable tables and descriptors of PSI specified in ISO/IEC 13818-1 and ETSI TS 101 154.

2.7 Transport streams must provide all applicable tables and descriptors of SI required by ETSI EN 300 468 and ETSI TS 101 211 and the special variants in Hong Kong (e.g. character encoding) specified in this chapter.

2.8 The Packet Identifiers of all of the transport stream packets relating to the transmission of television programme services must comply with ISO/IEC 13818-1 or ETSI EN 300 468.

2.9 Each service must be uniquely identified by original\_network\_id/transport\_stream\_id/service\_id.

2.10 SI codes to be used are given in Table 2.

Table 2: SI Codes

SI Code	Status
original_network_id	0x6000 – 0x7FFF
network_id	0x6000 – 0x7FFF
transport_stream_id	For unique identification of a transport stream and to be determined by individual licensee.
service_id	To be assigned by individual licensee.
bouquet_id	0xFFFF0 – 0xFFFF

country_code	0100 1000 0100 1011 0100 0111
private_data_specifier	0xFFFFFFFF

Information on assignments of original\_network\_id and network\_id is available at the website of the Office of the Communications Authority (<http://www.ofca.gov.hk>).

*Logical Channel Number (LCN)*

2.11 The syntax of LCN must comply with IEC 62216. The descriptor\_tag for logical\_channel\_descriptor shall be 0x83.

*Video Signals*

2.12 The video parameters stipulated in Table 3 below must be complied by all standard definition television (SDTV) and high definition television (HDTV) programme services in all multiplexes.

Table 3: Video Parameters

Parameter	SDTV	HDTV
Profile / Level	ISO/IEC 13818-2 Main Profile at Main Level or ISO/IEC 14496-10 (or H.264) Main Profile at Level 3.0	ISO/IEC 13818-2 Main Profile at High Level or ISO/IEC 14496-10 High Profile at Level 4.0
Full-screen luminance resolution (horizontal x vertical)	720 x 576 pixels interlaced	1920 x 1080 pixels interlaced or 1280 x 720 pixels progressive
Frame rate	25 Hz	25 Hz for 1920 x 1080 pixels interlaced or 50 Hz for 1280 x 720 pixels progressive
Aspect ratio	4:3 or 16:9	16:9
Chroma subsampling	4:2:0	4:2:0

2.13 Appropriate Active Format Description (AFD) must be included in the user data of the video elementary stream<sup>2</sup>. The syntax and semantics of AFD defined in ISO/IEC 13818-2 and ETSI TS 101 154 must be complied. The use of values of the active format in the range between 0000<sub>2</sub> and 0111<sub>2</sub> are prohibited.

#### *Audio Signals*

2.14 Audio coding must conform to either MPEG-1 Layer II defined in ISO/IEC 13818-3 or AC-3 specified in ETSI TS 102 366<sup>3</sup>. The implementation guidelines contained in ETSI TS 101 154 must be complied.

#### *Electronic Programme Guide (EPG)*

2.15 The EPG data stream must comply with ISO/IEC 13818-1, ETSI EN 300 468 and ETSI TS 101 211.

#### *Subtitle*

2.16 Carriage of subtitling data must comply with ETSI EN 300 743. Subtitle objects must be coded in pixel format.

#### *Character Encoding*

2.17 The following character sets: (i) ISO/IEC 10646 : 2003 with CJK full set, Latin subset and encoded control characters and (ii) Hong Kong Supplementary Character Set – 2004 (HKSCS-2004) must be used. Character encoding must conform to UTF-8 and UTF-16 BE (Big-endian, high-byte first).

#### *Over-the-Air Download*

2.18 Receiver software release in any transmitted multiplexes must be carried by transport streams complied with ISO/IEC 13818-1 in accordance with ETSI TS 101 154.

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<sup>2</sup> AFD applies to SDTV only.

<sup>3</sup> ITU-R Recommendation BS.1196 also specifies audio coding systems of MPEG-1 Layer II and AC-3.

*Service Replacement Service*

2.19 The linkage descriptor with the linkage type 0x05 (Service Replacement Service) defined in ETSI EN 300 468 and ETSI TS 101 211 must be used to identify the path to the replacement service.

## Chapter 3            Technical Quality Standards and Reliability

### Introduction

3.1        This chapter specifies the Technical Quality Standards and Reliability required for television programme services in Hong Kong.

### Technical Quality Standards

#### *Description of Standards of Technical Quality*

3.2        Licensees shall submit to the CA on request, a description of their procedures for ensuring high standards of technical quality.

#### *Monitoring of Technical Quality*

3.3        Licensees are required to make their own assessment of the technical quality of their services and to adopt procedures for ensuring high standards of technical quality.

#### *Quality Grading Scale*

3.4        Live studio outputs should normally achieve a sound and vision grade of 5 on the ITU-R 5-Point Quality Grading Scale (5-Excellent, 4-Good, 3-Fair, 2-Poor and 1-Bad) as specified in the latest version of ITU-R Recommendations BS.1284 and BT.500. Recorded programmes based on electronic production should normally achieve a grade of at least 4 and other programmes should normally achieve a grade of at least 3. However, where the materials include historical materials, news inserts, topical or actuality materials, and it is impracticable for licensees to improve the quality without affecting the integrity of the materials, or where low quality clearly forms part of the editorial intent of the programme, a lower score may be permitted.

3.5        Timing differences between the sound and vision of the transmitted programmes should not be, in the opinion of the CA, annoying to the viewer.

## **Reliability**

### *Standards of Reliability*

3.6 Standards of reliability, measured in terms of service availability to viewers, must be maintained to levels that are as high as reasonably practicable. The minimum standard of availability is 99.0% averaged over the preceding six months. This standard shall apply on an individual channel basis. Service availability should be measured at the connecting point at the viewers' end. For video-on-demand service, the reliability standard shall apply when the service is activated and service availability shall count on receipt of the video programme signals at the viewers' end (i.e. television programme signals alone, e.g. on the availability of video programmes, should not be counted as service availability). This availability figure should take account of a loss of video and sound or control data essential to view the services due to any cause under the control, either directly or through contract arrangements, of the licensees.

### *Monitoring of Reliability*

3.7 Licensees shall submit to the CA, within a reasonable time after being required to do so, a return on transmission performance that should include a summary of reliability performance results for distribution and transmission and an analysis of viewer complaints associated with poor reception quality during such period, and in such form, as the CA may direct.

3.8 A domestic free television programme service licensee and a domestic pay television programme service licensee shall, on or before the first of April of each year, submit a return in the specified form on transmission performance during the calendar year immediately preceding the calendar year to which the return relates.

## Chapter 4 Loudness Control

### Introduction

4.1 This chapter specifies the loudness control for digital television programme services in Hong Kong. A programme is an individual, self-contained audio-visual item to be presented in television. An advertisement, promotional material, trailer, interstitial or similar item shall also be considered to be a programme in the context of loudness control.

### Loudness Control Requirements

4.2 The subjective volume should be consistent with the programme material whilst at the same time preventing excessive loudness.

4.3 The programme loudness of a television programme shall be normalised to a level of -23 LUFS<sup>4</sup>, where the programme loudness refers to the integrated loudness over the duration of the programme. The measurement of programme loudness shall be made in accordance with the method as stipulated in the latest version of EBU R 128.

4.4 The maximum true peak level of a television programme shall be -1 dBTP<sup>5</sup>, where the maximum true peak level refers to the maximum value of the audio signal waveform of the programme in the continuous time domain. The measurement of maximum true peak level shall be made in accordance with the method as stipulated in the latest version of EBU R 128.

4.5 The maximum short-term loudness level of a television programme (integrated over intervals of 3 seconds) shall comply with the limits as specified below. The measurement of maximum short-term loudness level shall be made in accordance

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<sup>4</sup> LUFS stands for loudness unit relative to full scale, as specified in EBU R 128. The permitted deviation from the level shall not exceed +/- 1.0 LU, where LU stands for loudness unit and 1 LU is equivalent to 1 dB.

<sup>5</sup> dBTP signifies decibels relative to full scale in true-peak measurement, as specified in the latest version of ITU-R Recommendation BS.1770.

with the method as stipulated in the latest version of EBU Tech 3341.

- (a) -18 LUFS for a programme of duration up to 2 minutes such as advertisements, promotion materials and trailers; and
- (b) -13 LUFS for programme longer than 2 minutes.

4.6 An alignment level which is 18 dB below the maximum possible coding level of a digital audio system used in broadcasting (i.e. -18 dBFS<sup>6</sup>), as recommended in EBU R 68, should be adopted.

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<sup>6</sup> dBFS stands for decibel relative to full scale. As specified in the latest version of ITU-R Recommendation BS.1726, 0 dBFS is the maximum signal level that a digital audio system is capable of representing. Above this level, abrupt signal clipping occurs with the consequent distortion.

## Annex

### List of References

1	<b>National Standard or GB 20600-2006</b> “Framing Structure, Channel Coding and Modulation for Digital Television Terrestrial Broadcasting System” published by the Standardization Administration of China
2	<b>EBU R 68</b> “Alignment level in digital audio production equipment and in digital audio recorders” published by the European Broadcasting union (EBU)
3	<b>EBU R 128</b> “Loudness normalization and permitted maximum level of audio signals” published by EBU
4	<b>EBU Tech 3341</b> “Loudness Metering: ‘EBU Mode’ metering to supplement EBU R 128 loudness normalization” published by EBU
5	<b>ETSI EN 300 468</b> “Digital Video Broadcasting (DVB); Specification for Service Information (SI) in DVB systems” published by the European Telecommunications Standards Institute (ETSI)
6	<b>ETSI EN 300 743</b> “Digital Video Broadcasting (DVB); Subtitling systems” published by ETSI
7	<b>ETSI TS 101 211</b> “Digital Video Broadcasting (DVB); Implementation and usage of Service Information (SI)” published by ETSI
8	<b>ETSI TS 101 154</b> “Digital Video Broadcasting (DVB); Specification for the use of Video and Audio Coding in Broadcast and Broadband Applications” published by ETSI
9	<b>ETSI TS 102 366</b> “Digital Audio Compression (AC-3, Enhanced AC-3) Standard” published by ETSI
10	<b>HKSCS-2004</b> “Hong Kong Supplementary Character Set - 2004 (HKSCS-2004)” published by HKSAR - Hong Kong Special Administrative Region
11	<b>IEC 62216</b> “Digital terrestrial television receivers for the DVB-T system” published by the International Electrotechnical Commission (IEC)
12	<b>ISO/IEC 13818-1</b> “Information technology – Generic coding of moving pictures and associated audio information – Part 1: Systems” published by the International Organization for Standardization (ISO)
13	<b>ISO/IEC 13818-2</b> “Information technology – Generic coding of moving pictures and associated audio information – Part 2: Video” published by ISO

14	<b>ISO/IEC 13818-3</b> “Information technology – Generic coding of moving pictures and associated audio information – Part 3: Audio” published by ISO
15	<b>ISO/IEC 14496-10</b> “Information technology – Coding of audio-visual objects – Part 10: Advanced video coding” published by ISO
16	<b>ISO/IEC 10646 : 2003</b> “Information technology – Universal Multiple-Octet Coded Character Set (UCS)” published by ISO
17	<b>ITU-R Recommendation BS.1196</b> “Audio coding for digital broadcasting” published by International Telecommunication Union (ITU)
18	<b>ITU-R Recommendation BS.1726</b> “Signal level of digital audio accompanying television in international programme exchange” published by ITU
19	<b>ITU-R Recommendation BS.1770</b> “Algorithms to measure audio programme loudness and true-peak audio level” published by ITU
20	<b>ITU-R Recommendation BT.500</b> “Methodologies for the subjective assessment of the quality of television images” published by ITU
21	<b>ITU-R Recommendation BS.1284</b> “General methods for the subjective assessment of sound quality” published by ITU
22	<b>ITU-R Recommendation BT.1306</b> “Error-correction, data framing, modulation and emission methods for digital terrestrial television broadcasting” published by ITU
23	<b>ITU-R Recommendation BT.1368</b> “Planning criteria, including protection ratios, for digital terrestrial television services in the VHF/UHF bands” published by ITU