

BROADCASTING ACT (CHAPTER 28)

Code of Practice for Television Broadcast Standards

In exercise of the powers conferred by section 6 of the Broadcasting Act (Cap. 28), the Media Development Authority of Singapore hereby issues the Code of Practice for Television Broadcast Standards:

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PRELIMINARY

1.1 Citation and Commencement

This Code is issued pursuant to section 6 of the Broadcasting Act (Cap. 28). It may be cited as the Code of Practice for Television Broadcast Standards and shall come into force on [Date].

1.2 Purpose of this Code

- (a) The Broadcasting Act and the Media Development Authority of Singapore Act (Cap. 172) (“MDA Act”) make it the duty of the Media Development Authority of Singapore (“MDA”) to exercise licensing and regulatory functions in respect of television (“TV”) broadcasting services and to develop codes of practice relating to broadcast and technical standards relating to media and TV broadcasting services.
- (b) The purpose of this Code is to ensure that licensed nationwide TV Licensees in Singapore meet the requirements of high standards of technical quality and reliability of licensable TV broadcasting services.

1.3 Legal Effect of this Code

- (a) In accordance with section 1.4, every nationwide TV Licensee to which MDA grants a broadcasting licence under section 8 of the Broadcasting Act (“Licensee”) must comply with the applicable provisions of this Code.
- (b) The obligations contained in this Code are in addition to those contained in the MDA Act, the Broadcasting Act, as well as other regulations, broadcasting licences or codes of practice issued by MDA. To the extent that any provision of this Code is inconsistent with the terms of MDA Act or the Broadcasting Act or any regulations under the Broadcasting Act, the provisions of the MDA Act or the Broadcasting Act and any regulations under the Broadcasting Act shall prevail. To the extent that this Code is inconsistent with the provisions of any broadcasting licences or codes of practice issued by MDA, the terms of this Code shall prevail. If any provision of this Code is held to be unlawful, all other provisions will remain in full force and effect.

- (c) Where the applicable broadcast standards specified in this Code are not met by any Licensee, MDA will assess each case individually and may, pursuant to section 16 of the Broadcasting Act, issue directions in writing to the Licensee requiring the Licensee to make necessary improvements to achieve the required standards or to take any other action with regard to broadcast standards necessary in order to comply with the provisions of this Code.
- (d) Pursuant to section 12(1) of the Broadcasting Act, the MDA may cancel or suspend a licence for such period as MDA thinks fit and/ or impose financial penalties on a Licensee that contravenes any provision of this Code.

1.4 Application of this Code to Licensees

- (a) Unless otherwise stated, the provisions of this Code shall apply to all nationwide TV Licensees. For avoidance of doubt, this Code shall not apply to niche TV Licensees.

1.5 Definitions

- (a) In this Code, unless the context otherwise requires:-

"Analogue cable TV service" means a licensable TV broadcasting service comprising analogue television signals delivered using coaxial cable transmission technology;

"Analogue terrestrial TV service" means a licensable TV broadcasting service comprising analogue TV signals delivered using over-the-air broadcast transmission technology;

"Cable TV service" means a licensable TV broadcasting service comprising analogue or digital TV signals delivered using coaxial cable transmission technology. It comprises Analogue cable TV service and Digital cable TV service;

"Digital cable TV service" means a licensable TV broadcasting service comprising digital TV signals delivered using coaxial cable transmission technology;

"Digital terrestrial TV service" or "DTV service" means a licensable TV broadcasting service comprising digital TV signals delivered using over-the-air broadcast transmission technology;

"Free-to-air Terrestrial broadcast TV service" means an unencrypted terrestrial licensable TV broadcasting service comprising analogue or digital TV signals delivered using over-the-air broadcast transmission technology that viewers can receive without having to pay a Subscription fee;

"Free-to-air TV service" means an unencrypted terrestrial licensable TV broadcasting service that viewers can receive without having to pay a Subscription fee;

"Indoor reception" means reception of over-the-air broadcast TV signals within a building using a portable antenna;

"Internet Protocol TV Service" or "IPTV service" means a licensable TV broadcasting service comprising digital TV signals delivered using internet protocol ("IP") based broadband technology. The service is delivered over a closed network using infrastructure that is specifically configured to receive an IPTV channel, or channels, from a particular broadband network service provider;

"Licence" means a licence granted under Section 8 of the Broadcasting Act, and "Licensee" shall be construed accordingly;

"Managed transmission TV service" means a licensable TV broadcasting service (comprising (i) Terrestrial broadcast TV service; (ii) Cable TV service; and (iii) IPTV service) delivered using a transmission network which the Licensee has control over the quality of service delivered to the viewer because the network is owned, maintained and/or operated by the Licensee, or by third parties hired and/or contracted by the Licensee;

"Must carry channels" mean the free-to-air nationwide terrestrial TV channels provided on subscription nationwide TV services as directed by the Authority;

"Person" refers to any individual, any company, partnership or association, and any body of persons, corporate or unincorporated;

"Subscriber" mean any person who has requested the Licensee for the reception and/or display of any programme carried on the Service and has agreed to pay the fees and charges which may be levied by the Licensee;

"Subscription fee" means any form of consideration;

"Subscription TV service" means a licensable TV broadcasting service made available to viewers only upon the payment of a Subscription fee, and "subscription nationwide TV service" shall be construed accordingly;

"Terrestrial broadcast TV service" means a licensable TV broadcasting service comprising analogue or digital TV signals delivered using over-the-air broadcast transmission technology. It comprises Analogue terrestrial TV service and DTV service; and

"Viewer" means any person who receives any licensable TV broadcasting service provided by a Licensee.

2 SERVICE COVERAGE REQUIREMENTS

2.1 Introduction

- (a) Section 2 “Service Coverage Requirements” sets out the broadcast standards in relation to service coverage performance that all Licensees must comply with where applicable.

2.2 Terrestrial broadcast TV services

2.2.1 Application

- (a) The provisions set out in this sub-section shall apply to Licensees providing free-to-air Terrestrial broadcast TV services.

2.2.2 Obligations for Licensees to meet specified requirements

- (a) A Licensee providing free-to-air Terrestrial broadcast TV service shall ensure that such service is simultaneously receivable in at least 98% of Singapore’s geographical area (including outlying islands).
- (b) A Licensee providing free-to-air DTV service shall ensure that the indoor reception of such service is enabled for at least 98% of all residential properties in Singapore.
- (c) A Licensee shall make best efforts to provide solutions to any residential or non-residential property that is unable to receive such services.

2.2.3 Compliance with obligations

- (a) A Licensee shall provide MDA with a description of its procedures for ensuring that the required service coverage is achieved. It shall also carry out routine assessments of the coverage of its service(s) and undertake appropriate measures to address any viewer complaints¹ or feedback on coverage issues.

¹ Viewer complaint refers to an expression of dissatisfaction with the service providers’ service in relation to broadcast standards via oral or written communication that requires some action by the service provider beyond the initial contact.

- (b) A Licensee shall submit to MDA quarterly reports, in the format as specified by the Authority, on viewer complaints² relating to the coverage of its service(s) that were received over the past three (3) calendar months, within one (1) month from the end of the quarter. In the event where no complaints were received for the quarter, the Licensee shall still submit the quarterly report and indicate accordingly.³

2.3 Cable TV services

2.3.1 Application

- (a) The provisions set out in this sub-section shall apply to Licensees providing Digital cable TV services.

2.3.2 Obligations for Licensees to meet specified requirements

- (a) A Licensee providing Digital cable TV service shall ensure that such service will be made available to any person in Singapore who makes a request to the Licensee for the connection to the Licensee's telecommunication system for the reception of such services where the Licensee has rolled out its network. For the purposes of this sub-section, "roll out" means the installation of the Licensee's telecommunication system, whether in, on, under or otherwise through any existing or future public road, lane or street.

2.3.3 Compliance with obligations

- (a) A Licensee shall submit to MDA quarterly reports, in the format as specified by the Authority, on viewer complaints⁴ relating to service coverage that were received over the past three (3) calendar months, one (1) month after the end of the quarter. In the event where no complaints were received for the quarter, the Licensee shall still submit the quarterly report and indicate accordingly.⁵

2.4 IPTV services

2.4.1 Application

- (a) The provisions set out in this sub-section shall apply to Licensees providing IPTV services.

2.4.2 Obligations for Licensees to meet specified requirements

² Viewer complaint refers to an expression of dissatisfaction with the service providers' service in relation to broadcast standards via oral or written communication that requires some action by the service provider beyond the initial contact.

³ Complaints which arise from issues related to viewer premise equipment may be excluded from this report.

⁴ Viewer complaint refers to an expression of dissatisfaction with the service providers' service in relation to broadcast standards via oral or written communication that requires some action by the service provider beyond the initial contact.

⁵ Complaints which arise from issues related to viewer premise equipment may be excluded from this report.

- (a) A Licensee providing IPTV service shall ensure that such service will be made available to any person in Singapore who makes a request to the Licensee where the Next Generation Nationwide Broadband Network (Next Gen NBN) has been rolled out.⁶

2.4.3 Compliance with obligations

- (a) A Licensee shall submit to MDA quarterly reports, in the format as specified by the Authority, on viewer complaints⁷ relating to service coverage that were received over the past three (3) calendar months, within one (1) month from the end of the quarter. In the event where no complaints were received for the quarter, the Licensee shall still submit the quarterly report and indicate accordingly.⁸

⁶ The Licensee may provide its IPTV service solely on the network owned, maintained, and/or operated by the said Licensee or by the third parties that the said Licensee may hire and/or contract.

⁷ Viewer complaint refers to an expression of dissatisfaction with the service providers' service in relation to broadcast standards via oral or written communication that requires some action by the service provider beyond the initial contact.

⁸ Complaints which arise from issues related to viewer premise equipment may be excluded from this report.

3 TV SIGNAL STRENGTH REQUIREMENTS

3.1 Introduction

- (a) Section 3 “TV Signal Strength Requirements” sets out the broadcast standards in relation to the transmission requirements for TV signal strength that Licensees must comply with where applicable.

3.2 Terrestrial broadcast TV services

3.2.1 Application

- (a) The provisions set out in this sub-section shall apply to Licensees providing free-to-air Terrestrial broadcast TV services.

3.2.2 Obligations for Licensees to meet specified requirements

- (a) A Licensee providing free-to-air Analogue terrestrial broadcast TV service shall ensure that the outdoor TV signal strength within the required coverage area for such services shall not fall below the minimum signal strength of 65 dB μ V/m for Band IV and 70 dB μ V/m for Band V, as specified in Recommendation ITU-R BT.417⁹. These requirements apply to the median field strength at a height of 10m above ground level.
- (b) A Licensee providing free-to-air DTV service shall ensure that the minimum indoor TV signal strength within the required coverage area for such services shall be in accordance with Recommendation ITU-R BT.2254 based on Singapore transmission parameters.¹⁰

3.2.3 Compliance with obligations

- (a) A Licensee shall provide MDA with a written description of its procedures for ensuring that the required standards of TV signal strength is achieved within the required coverage area.
- (b) A Licensee shall also carry out and report annual field measurements at sample locations in the areas between transmitter locations or as directed by MDA and provide such measurement reports to MDA as and when required by MDA.

⁹ ITU-R Recommendation BT.417.

¹⁰ ITU-R Recommendation BT.2254: Frequency and network planning aspects of DVB-T2.

- (c) A Licensee shall submit to MDA quarterly reports, in the format as specified by the Authority, on viewer complaints¹¹ relating to TV signal strength that were received over the past three (3) calendar months, within one (1) month from the end of the quarter. In the event where no complaints were received for the quarter, the Licensee shall still submit the quarterly report and indicate accordingly.¹²

3.3 Cable TV services

3.3.1 Application

- (a) The provisions set out in this sub-section shall apply to all Licensees providing Cable TV services.

3.3.2 Obligations for Licensees to meet specified requirements

- (a) A Licensee providing Digital cable TV service shall ensure that the TV signal strength for such service shall not fall below the minimum of 47 dB μ V, as specified in the European Standard EN 50083-7¹³.
- (b) A Licensee providing Analogue cable TV service shall ensure that where the frequency range and service are 54-824 MHz TV, the signal strength shall not fall below the minimum of 60 dB μ V (as specified in the European Standard EN 50083-7¹⁴).
- (c) For the purpose of this section, the TV signal strength for Cable TV service refers to the minimum voltage level that must be present at each viewer premise's cable outlet.

3.3.3 Compliance with obligations

- (a) A Licensee shall provide MDA with a written description of its procedures for ensuring that the required standards of TV signal strength is achieved.

¹¹ Viewer complaint refers to an expression of dissatisfaction with the service providers' service in relation to broadcast standards via oral or written communication that requires some action by the service provider beyond the initial contact.

¹² Complaints which arise from issues related to viewer premise equipment may be excluded from this report.

¹³ European Standard Series EN 50083-7. Cable networks for television signals, sound signals and interactive services. Part 7: System performance.

¹⁴ European Standard Series EN 50083-7. Cable networks for television signals, sound signals and interactive services. Part 7: System performance.

- (b) A Licensee shall submit to MDA quarterly reports, in the format as specified by the Authority, on viewer complaints¹⁵ relating to TV signal strength that were received over the past three (3) calendar months, within one (1) month from the end of the quarter. In the event where no complaints were received for the quarter, the Licensee shall still submit the quarterly report and indicate accordingly.

¹⁵ Viewer complaint refers to an expression of dissatisfaction with the service providers' service in relation to broadcast standards via oral or written communication that requires some action by the service provider beyond the initial contact.

4 PICTURE AND AUDIO QUALITY REQUIREMENTS

4.1 Introduction

- (a) Section 4 “Picture and Audio Quality Requirements” sets out the broadcast standards in relation to picture and audio quality that Licensees must comply with where applicable.

4.2 Terrestrial broadcast TV, Cable TV, IPTV services

4.2.1 Application

- (a) The provisions set out in this sub-section shall apply to Licensees providing Terrestrial broadcast TV services, Cable TV services and/ or IPTV services.

4.2.2 Obligations for Licensees to meet specified requirements

- (a) A Licensee providing Terrestrial broadcast TV service, Cable TV service or IPTV service shall ensure that
 - (i) “live” programmes on such service shall achieve a picture and audio grade of 5 on the ITU-R 5-Point Quality Grading Scale as described in ITU–R BT.500¹⁶ ; and
 - (ii) recorded programmes on such service shall achieve a picture and audio grade of 4 on the ITU-R 5-Point Quality Grading Scale as described in ITU–R BT.500¹⁷.

- (b) A Licensee shall ensure that the picture and audio of the transmitted programmes are accurately synchronised.

4.2.3 Compliance with obligations

- (a) A Licensee shall provide MDA with a written description of its procedures for ensuring that the programmes on its service achieve the required standards of picture and audio quality.
- (b) A Licensee shall also carry out routine assessments of the technical quality of its TV service.
- (c) A Licensee shall, without any undue delay, attend to and handle, as well as provide proper avenues for the speedy resolution of viewer complaints or feedback relating to picture and audio quality.

¹⁶ ITU-R Recommendation BT.500: Methodology for the subjective assessment of the quality of television pictures.

¹⁷ ITU-R Recommendation BT.500: Methodology for the subjective assessment of the quality of television pictures.

- (d) A Licensee shall submit to MDA quarterly reports, in the format as specified by the Authority, on viewer complaints¹⁸ relating to picture and audio quality that were received over the past three (3) calendar months, within one (1) month from the end of the quarter. In the event where no complaints were received for the quarter, the Licensee shall still submit the quarterly report and indicate accordingly.¹⁹
- (e) The Licensee shall retain a continuous recording of the broadcast version of all programmes transmitted on its service for a period of four (4) weeks from the date on which the programmes was broadcast.
- (f) In the event of a pattern or trend of viewer complaints related to picture and audio quality, MDA may, in its discretion, launch an investigation into the service provided by the Licensee. Where an investigation is undertaken in this regard, the Licensee shall provide at MDA's request and without charge, recordings of the programme(s) or channel(s) in question. Such recordings are to be made of the transport stream after all encoding and multiplexing have taken place.²⁰

4.2.4 Guidance notes

- (a) A lower picture and audio quality grade may be justified for news inserts, actuality or historical material where it is not practicable to improve further the technical quality, or where low quality clearly forms part of the editorial intent of the programme.

¹⁸ Viewer complaint refers to an expression of dissatisfaction with the service providers' service in relation to broadcast standards via oral or written communication that requires some action by the service provider beyond the initial contact.

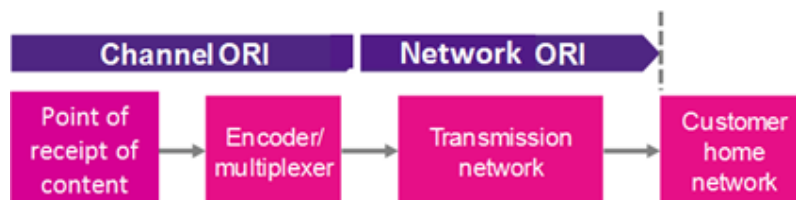
¹⁹ Complaints which arise from issues related to viewer premise equipment may be excluded from this report.

²⁰ The purpose of this requirement is to address cases where Licensees persistently fail to meet the picture and audio quality standards, rather than short term failures due to outages. In general, short term impairment or degradation of picture and audio quality will be considered an outage rather than a breach of the picture and audio quality standards.

5 RELIABILITY REQUIREMENTS

5.1 Introduction

- (a) Section 5 “Reliability Requirements” sets out the broadcast standards in relation to the reliability of services (measured in terms of channel and service availability to viewers) that Licensees shall comply with where applicable.
- (b) For the purposes of Outage Reliability Index (“ORI”) reporting, a distinction is made between Channel Availability and Network Availability:
- (i) “Channel Availability” refers to the time during which an individual programme channel is available as measured at the point of delivery into the transmission network.
 - (ii) “Network Availability” refers to the time during which the transmission network is operable and not in a state of failure or outage.
- (c) An outage is considered to have occurred when:
- (i) there is an absence of channel or service;
 - (ii) there is an intermittent or persistent loss of audio or video for one or more channels, or
 - (iii) there is degradation of service to below a normal or acceptable level of quality.
- (d) In relation to free-to-air DTV services, an outage is also considered to have occurred when:
- (i) there is a breakdown of the main transmitter;
 - (ii) there is a breakdown of a repeater; or
 - (iii) there is a breakdown of a transposer/ gap filler.
- (e) Channel and Network availabilities for managed transmission TV services are measured by separate Channel ORI and Network ORI as shown in the diagram below:



- (f) In this Code, "Channel ORI" means the measure of the reliability of a Licensee's playout system from the point of receipt of content or headend to the point at which the content is encoded and multiplexed into a transport stream for delivery over the transmission network.
- (g) In this Code, "Network ORI" means the measure of the reliability of the transmission network deployed by the Licensee to deliver its service. The computation of Network ORI depends on transmission technology and network architecture deployed by the Licensee (See Guidance Notes in sub-section 5.2.4 / 5.3.4 / 5.4.4).

5.2 Terrestrial broadcast TV services

5.2.1 Application

- (a) The provisions set out in this sub-section shall apply to Licensees providing Terrestrial broadcast TV services, unless otherwise stated.

5.2.2 Obligations for Licensees to meet specified requirements

- (a) A Licensee providing Terrestrial broadcast TV service (other than free-to-air Terrestrial broadcast TV service) shall maintain a minimum monthly Channel ORI of 99.80% for each individual channel on such service.
- (b) A Licensee providing free-to-air Terrestrial broadcast TV service shall maintain a minimum monthly Channel ORI of 99.90% for each individual channel on such service.
- (c) A Licensee providing Terrestrial broadcast TV service (other than free-to-air DTV service) shall ensure that the minimum monthly Network ORI for the transmitter is maintained at 99.80%.
- (d) A Licensee providing free-to-air DTV service shall ensure that:
 - (i) the minimum monthly Network ORI for the DTV network is maintained at 99.80%;
 - (ii) the minimum monthly Network ORI for the main transmitter is maintained at 99.80%; and
 - (iii) the minimum Network ORI for each repeater in its DTV network is maintained at 99.50%, averaged over the preceding six (6) months.

5.2.3 Compliance with obligations

- (a) A Licensee shall monitor and submit to MDA monthly ORI reports on the Channel ORI and Network ORI results.

- (b) The formula for computing Channel ORI and Network ORI for Terrestrial broadcast TV services is:

$$\text{Outage Reliability Index (ORI)} = (1 - R) \times 100\% ,$$

$$\text{where } R = \frac{\text{Total lost time for all outages in a calendar month}}{\text{Total number of broadcast hours in a calendar month}} .$$

- (c) The formula for computing Network ORI for each repeater stipulated in 5.2.2(d)(iii) of this Code is:

$$\text{Outage Reliability Index (ORI)} = (1 - R) \times 100\% ,$$

$$\text{where } R = \frac{\text{Total lost time for all outages in the past 6 months}}{\text{Total number of broadcast hours in the past 6 months}} .$$

- (d) In computing the Network ORI for the DTV network stipulated in clause 5.2.2(d)(i) of this Code, for outages that affect a localised area or a subset of viewers, the effective lost time shall be calculated using a normalisation factor (N) based on the Effective Radiated Power of affected transmitter(s) as a proportion of the total Effective Radiated Power of all transmitters in the DTV network. The formula is:

$$\text{Effective lost time for outage} = \text{Normalisation factor (N)} * \text{Time lost due to outage} ,$$

$$\text{where } N = \frac{\text{Effective Radiated Power of affected transmitter(s)}}{\text{Total Effective Radiated Power of all transmitters}} , \text{ and}$$

Total Effective Radiated Power refers to the total Effective Radiated Power of all transmitters in the DTV network used for delivery of the free-to-air DTV service.

For outages that result in complete loss of service, $N = 1$. If an outage affects only certain transmitter(s) in the DTV network, then $N < 1$. For cases where $N < 1$, broadcasters shall provide description of how the normalisation factor is determined in the monthly ORI reports.

- (e) A Licensee shall also record and report all outage incidents in the monthly ORI reports. The basic details required are date and time of outage incidents; description of incidents in terms of the network elements affected, the number of viewers or subscribers affected, the affected programmes or services and time taken to restore the service. The report on outage incidents shall be in the format as specified by the Authority.
- (f) The Channel ORI and Network ORI results should take into account loss of video or sound or control data essential to view the services due to any cause under the control, either directly or through contract arrangements, of the Licensee. Outages that occur due to factors not under the control of the Licensee may be exempted from the computation of ORI results, although they should be recorded in the monthly ORI reports as stipulated in clause 5.2.3(d).²¹
- (g) The loss of ancillary data and services such as subtitles is exempted from the computation of ORI results. For such cases, Licensees shall display an apology message on the affected programme(s) as soon as possible when the fault occurs.
- (h) A Licensee shall submit to MDA quarterly reports, in the format as specified by the Authority, on viewer complaints²² relating to outages and poor reception quality that were received over the past three (3) calendar months, within one (1) month from the end of the quarter. In the event where no complaints were received for the quarter, the Licensee shall still submit the quarterly report and indicate accordingly.²³

²¹ Exemptions may include impairment due to external content source, equipment managed by viewers, planned maintenance, unscheduled interruptions to power supply, and extreme or unforeseen weather conditions.

²² Viewer complaint refers to an expression of dissatisfaction with the service providers' service in relation to broadcast standards via oral or written communication that requires some action by the service provider beyond the initial contact.

²³ Complaints which arise from issues related to viewer premise equipment may be excluded from this report.

5.2.4 Guidance notes

- (a) Licensees shall submit to MDA monthly Channel ORI results for each free-to-air TV channel.
- (b) The Network ORI shall be measured at the transmitter.

5.3 **Cable TV services**

5.3.1 Application

- (a) The provisions set out in this sub-section shall apply to Licensees providing Cable TV services.

5.3.2 Obligations for Licensees to meet specified requirements

- (a) A Licensee providing Cable TV service shall maintain a minimum monthly Channel ORI of 99.80% for each individual channel on such service.
- (b) A Licensee providing Cable TV service shall maintain a minimum monthly Channel ORI of 99.90% for each individual “must carry” channel²⁴ on such service.
- (c) A Licensee providing Digital cable TV service shall ensure that the minimum monthly Network ORI for such service is maintained at 99.80%.²⁵
- (d) A Licensee providing Analogue cable TV service shall ensure that the minimum monthly Network ORI for such service is maintained at 99.80%.²⁶

5.3.3 Compliance with obligations

- (a) A Licensee shall monitor and submit to MDA monthly ORI reports on the Channel ORI and Network ORI results.
- (b) The formula for computing Channel ORI and Network ORI for Cable TV service is:

$$\text{Outage Reliability Index (ORI)} = (1 - R) \times 100\% ,$$

$$\text{where } R = \frac{\text{Total lost time for all outages in a calendar month}}{\text{Total number of broadcast hours in a calendar month}} .$$

²⁴ The “must-carry” channels are Channel 5, Channel 8, Suria, Vasantham, okto, Channel U and Channel NewsAsia.

²⁵ For the purposes of normalisation, “total connected homes” refers to the total number of subscribers to the Licensee’s digital cable TV services.

²⁶ For the purposes of normalisation, “total connected homes” refers to the total number of homes connected to the Licensee’s cable TV network which do not subscribe to the Licensee’s digital cable TV services.

- (c) In computing the Network ORI, for outages that affect a localised area or a subset of viewers, the effective lost time shall be calculated using a normalisation factor (N) based on the proportion of homes or viewers affected by the outage. The formula is:

*Effective lost time for outage = Normalisation factor (N) * Time lost due to outage ,*

where $N = \frac{\text{Homes affected by outage}}{\text{Total connected homes}}$, and

Total connected homes refer to number of homes receiving the TV service.

For outages which affect the entire service, $N = 1$. If an outage affects only certain homes or viewers, then $N < 1$. For cases where $N < 1$, broadcasters shall provide description of how the number of homes affected is determined in the monthly ORI reports.

- (d) A Licensee shall also record and report all outage incidents in the monthly ORI reports. The basic details required are date and time of outage incidents; description of incidents in terms of the network elements affected, the number of viewers or subscribers affected, the affected programmes or services and time taken to restore the service. The report on outage incidents shall be in the format as specified by the Authority.
- (e) The Channel ORI and Network ORI results should take into account loss of video or sound or control data essential to view the services due to any cause under the control, either directly or through contract arrangements, of the Licensee. Outages that occur due to factors not under the control of the Licensee may be exempted from the computation of ORI results, although they should be recorded in the monthly ORI reports as stipulated in clause 5.3.3(d).²⁷
- (f) The loss of ancillary data and services such as subtitles is exempted from the computation of ORI results. For such cases, Licensees shall display an apology message on the affected programme(s) as soon as possible when the fault occurs.
- (g) A Licensee shall submit to MDA quarterly reports, in the format as specified by the Authority, on viewer complaints²⁸ relating to outages and poor reception quality that were received over the past three (3) calendar months, within (1) month from the end of the quarter. In the event where no complaints were received for the quarter, the Licensee shall still submit the quarterly report and indicate accordingly.²⁹

²⁷ Exemptions may include impairment due to external content source, equipment managed by viewers, planned maintenance, unscheduled interruptions to power supply, and extreme or unforeseen weather conditions.

²⁸ Viewer complaint refers to an expression of dissatisfaction with the service providers' service in relation to broadcast standards via oral or written communication that requires some action by the service provider beyond the initial contact.

²⁹ Complaints which arise from issues related to viewer premise equipment may be excluded from this report.

5.3.4 Guidance notes

- (a) Licensees are not required to report the Channel ORI result for an individual channel if no outage is suffered in a calendar month. Outage incidents, if they occur, shall be reported to the MDA on a calendar month basis.
- (b) The Network ORI shall be measured at the network nodes connected to the premises receiving Cable TV services. In the case where a nationwide outage had occurred for the entire service or channel(s) within the service, the total number of connected homes or subscribers of the service or channel(s) within the service shall be deemed to have experienced an outage.

5.4 IPTV services

5.4.1 Application

- (a) The provisions set out in this sub-section shall apply to Licensees providing IPTV services.

5.4.2 Obligations for Licensees to meet specified requirements

- (a) A Licensee providing IPTV service shall maintain a minimum monthly Channel ORI of 99.80% for each individual channel on such service.
- (b) A Licensee providing IPTV service shall maintain a minimum monthly Channel ORI of 99.90% for each individual “must carry” channel³⁰ on such service.
- (c) A Licensee providing IPTV service shall ensure that the minimum monthly Network ORI for such service is maintained at 99.80%.

5.4.3 Compliance with obligations

- (a) A Licensee shall monitor and submit to MDA monthly ORI reports on the Channel ORI and Network ORI results.
- (b) The formula for computing Channel ORI and Network ORI for IPTV service is:

$$\text{Outage Reliability Index (ORI)} = (1 - R) \times 100\%$$

$$\text{where } R = \frac{\text{Total lost time for all outages in a calendar month}}{\text{Total number of broadcast hours in a calendar month}}$$

³⁰ The “must-carry” channels are Channel 5, Channel 8, Suria, Vasantham, okto, Channel U and Channel NewsAsia.

- (c) In computing the Network ORI, for outages that affect a localised area or a subset of viewers, the effective lost time shall be calculated using a normalisation factor (N) based on the proportion of homes or viewers affected by the outage. The formula is:

*Effective lost time for outage = Normalisation factor (N) * Time lost due to outage ,*

where $N = \frac{\text{Homes affected by outage}}{\text{Total connected homes}}$, and

Total connected homes refer to number of homes receiving the TV service.

For outages which affect the entire service, $N = 1$. If an outage affects only certain homes or viewers, then $N < 1$. For cases where $N < 1$, broadcasters shall provide description of how the number of homes affected is determined in the monthly ORI reports.

- (d) A Licensee shall also record and report all outage incidents in the monthly ORI reports. The basic details required are date and time of outage incidents; description of incidents in terms of the network elements affected, the number of viewers or subscribers affected, the affected programmes or services and time taken to restore the service. The report on outage incidents shall be in the format as specified by the Authority.
- (e) The Channel ORI and Network ORI results should take into account loss of video or sound or control data essential to view the services due to any cause under the control, either directly or through contract arrangements, of the Licensee. Outages that occur due to factors not under the control of the Licensee may be exempted from the computation of ORI results, although they should be recorded in the monthly ORI reports as stipulated in clause 5.3.3(d).³¹
- (f) The loss of ancillary data and services such as subtitles is exempted from the computation of ORI results. For such cases, Licensees shall display an apology message on the affected programme(s) as soon as possible when the fault occurs.
- (g) A Licensee shall submit to MDA quarterly reports, in the format as specified by the Authority, on viewer complaints³² relating to outages and poor reception quality that were received over the past three (3) calendar months, within one (1) month from the end of the quarter. In the event where no complaints were received for the quarter, the Licensee shall still submit the quarterly report and indicate accordingly.³³

³¹ Exemptions may include impairment due to external content source, equipment managed by viewers, planned maintenance, unscheduled interruptions to power supply, and extreme or unforeseen weather conditions.

³² Viewer complaint refers to an expression of dissatisfaction with the service providers' service in relation to broadcast standards via oral or written communication that requires some action by the service provider beyond the initial contact.

³³ Complaints which arise from issues related to viewer premise equipment may be excluded from this report.

5.4.4 Guidance notes

- (a) Licensees are not required to report the Channel ORI result for an individual channel if no outage is suffered in a calendar month. Outage incidents, if they occur, shall be reported to the MDA on a calendar month basis.

- (b) The Network ORI shall be measured at the access network level. For purposes of normalisation, Licensees should provide details on how the number of homes affected is determined in the monthly ORI reports. In cases where the number of homes affected by an outage cannot be accurately determined, Licensees should provide an explanatory note in the monthly ORI reports with details on the nature of the outage and the difficulties in determining affected homes. MDA will consider these outages on a case-by-case basis. In the case where a nationwide outage had occurred for the entire service or channel(s) within the service, the total number of subscribers of the service or channel(s) within the service shall be deemed to have experienced an outage.

6 LOUDNESS REQUIREMENTS

6.1 Introduction

- (a) Section 6 “Loudness Requirements” sets out the broadcast standards relating to loudness and must be complied with by Licensees where applicable. The loudness standards must be maintained at the viewers’ premises. Compliance with the required standards will minimise large variations in loudness during transitions between different types of content and between channels.

6.2 Terrestrial broadcast TV, Cable TV, IPTV services

6.2.1 Application

- (a) The provisions set out in this sub-section shall apply to Licensees providing Terrestrial broadcast TV services, Cable TV services or IPTV services.

6.2.2 Obligations for Licensees to meet specified requirements

- (a) A Licensee shall maintain consistency in the loudness of all audio broadcasts on its Terrestrial broadcast TV services, Cable TV services or IPTV services and shall comply with either the Advanced Television Systems Committee (“ATSC”) or European Broadcasting Union (“EBU”) standards.
- (b) Under the ATSC standards, a Licensee shall ensure that all programmes, including commercials, shall comply with the loudness level specified in ATSC RP A/85.³⁴
- (c) Under the EBU standards, a Licensee shall ensure that all programmes, including commercials, shall comply with the loudness level specified in EBU R128³⁵.

6.2.3 Compliance with obligations

- (a) A Licensee shall provide MDA with a written description of their procedures for ensuring that the required loudness standards are achieved.

³⁴ ATSC Recommended Practice: Techniques for Establishing and Maintaining Audio Loudness for Digital Television. LKFS is defined as loudness, K-weighted and measured relative to full scale. LU is defined as a loudness unit equivalent to a decibel.

³⁵ EBU Recommendation R 128: Loudness normalisation and permitted maximum level of audio signals. LUFS is defined as loudness unit measured relative to full scale and LU is defined as a loudness unit equivalent to a decibel.

- (b) A Licensee shall carry out internal assessment and monitoring using loudness measurement equipment to verify that loudness levels are in line with the required standards. Both the ATSC RP A/85 and EBU R128 standards refer to a standard ITU measurement algorithm for loudness (ITU-R BS.1770).
- (c) A Licensee providing free-to-air Terrestrial TV services shall conduct annual loudness spot checks on programme transmissions at a date and time determined by the Authority. The Licensee shall also prepare and submit to MDA a loudness report for each annual loudness spot check conducted 14 days after the spot check.
- (d) A Licensee providing Cable TV or IPTV services shall conduct annual loudness spot checks on programme transmissions at a date and time determined by the Authority. The Licensee shall also prepare and submit to MDA a loudness report for each annual loudness spot check conducted 14 days after the spot check.
- (e) The first loudness report is to be submitted one (1) year from the issuance of the Code of Practice for TV Broadcast Standards for existing Licensees, or one (1) year from the commencement of service for new Licensees.
- (f) MDA may also direct any Licensee to conduct spot check(s) as and when required by MDA, usually in response to viewer complaints.
- (g) A Licensee shall submit to MDA quarterly reports, in the format specified by the Authority, on viewer complaints³⁶ relating to loudness that were received over the past three (3) calendar months, within one (1) month from the end of the quarter. In the event where no complaints were received for the quarter, the Licensee shall still submit the quarterly report and indicate accordingly.³⁷

³⁶ Viewer complaint refers to an expression of dissatisfaction with the service providers' service in relation to broadcast standards via oral or written communication that requires some action by the service provider beyond the initial contact.

³⁷ Complaints which arise from issues related to viewer premise equipment may be excluded from this report.