



**FRAMEWORK FOR ASESMENT OF QUALITY OF SERVICE FOR  
BROADCASTING SERVICES AND SYSTEMS**

**PUBLIC CONSULTATION PAPER**

**MAY 2020**

## **List of Abbreviations**

AC – Alternating Current  
BER – Bit Error Rate  
BSD – Broadcast Signal Distribution  
C/N – Carrier Power to Noise Ratio  
CBR – Constant Bit rate  
dB – Decibel  
DC – Direct Current  
DVB – Digital Video Broadcasting  
DVB-H – Digital Video Broadcasting – Handheld  
DVB-T2 – Digital Video Broadcasting - Second Generation Terrestrial  
ETSI – European Telecommunications Standards Institute  
FM – Frequency Modulation  
GPS – Global Positioning System  
ICT – Information and Communications Technology  
IP – Internet Protocol  
ITU – International Telecommunications Union  
ITU-R – ITU Radiocommunications Sector  
ITU-T - ITU Telecommunication Standardization Sector  
KPI – Key Performance Indicator  
LBER – BER after LDPC error correction  
LDPC – Low Density Parity Check  
MER – Modulation Error Rates  
MPEG – Moving Picture Expert Group  
MPEG-TS - MPEG Transport Stream  
OMC – Operation Maintenance Centre  
QoS – Quality of Service  
SDTV – Standard Definition TV  
SMS – Short Message Service  
T-DAB – Terrestrial digital Audio Broadcasting  
TV – Television  
UPS – Uninterruptible Power Supply  
VBR – Variable Bit Rate

## Table of Contents

<i>List of Abbreviations</i> .....	<i>i</i>
<i>Table of Contents</i> .....	<i>ii</i>
<b>1. Purpose</b> .....	<b>1</b>
<b>2. Responsibilities of the Authority and Licensees under this Framework</b> .....	<b>1</b>
<b>2.1 Responsibilities of the Authority</b> .....	<b>1</b>
<b>2.2 Responsibilities of the Licensees</b> .....	<b>2</b>
<b>3. QoS Measurements, Reporting and Performance Audits</b> .....	<b>2</b>
<b>4. Technical Context of Quality of Service for Broadcasting Services</b> .....	<b>2</b>
<b>5. QoS Parameters</b> .....	<b>3</b>
<b>5.1 Data Sourcing</b> .....	<b>3</b>
<b>5.2 Signal distribution network performance</b> .....	<b>3</b>
<b>5.2.1 Network Availability</b> .....	<b>3</b>
<b>5.2.2 Service Accessibility</b> .....	<b>5</b>
<b>5.2.3 Service Integrity</b> .....	<b>6</b>
<b>5.3 Service-related QoS Performance for Broadcasting Signal Distributors</b> .....	<b>7</b>
<b>6. Service-related QoS Performance for Subscription Broadcasting Service Providers</b> ...	<b>11</b>
<b>6.1 Service management performance</b> .....	<b>11</b>
<b>6.2 Customer support</b> .....	<b>12</b>
<b>6.3 Billing performance</b> .....	<b>14</b>
<b>7. Quality of Experience</b> .....	<b>14</b>
<b>8. Assessment Framework</b> .....	<b>14</b>
<b>8.1 Scope of services to be covered</b> .....	<b>15</b>
<b>8.2 Aggregation of QoS Components</b> .....	<b>15</b>
<b>8.3 Compliance Declaration &amp; Sanctions</b> .....	<b>16</b>
<b>9. Publication of QoS Reports</b> .....	<b>16</b>
<b>10. Framework Piloting</b> .....	<b>16</b>

## **1. Purpose**

The advent of digital broadcasting has changed the broadcasting value chain by introducing key intermediary players between broadcasters and their consumers. In the digital broadcasting value chain, broadcasting signal distributor is an intermediary player who provides infrastructure for distribution and transmission of the broadcast content to consumers. In addition, the introduction of digital broadcasting saw an increasingly large number of consumers in Kenya access premium multi-channel broadcast content delivered through satellite, terrestrial, internet and cable networks. This model, to a large extent, is based on consumer paying periodic subscription fee to access the content. Thus, broadcasters and broadcasting service consumers, much like those of telecommunications services, increasingly expect broadcasting service providers to provide services and networks that meet a given level of performance to satisfy consumers' explicit and implicit needs.

Accordingly, the Authority in exercise of its mandate under the Kenya Information and Communications Act, 1998, hereinafter referred to as "the Act", on protection of consumers and improving of quality of communication services, has developed this framework for assessment of quality of service (QoS) for broadcasting services and systems to meet the emerging needs of the broadcasting consumers and to improve service quality. The framework shall be used for measuring and gathering data on quality of services performance by broadcasting service providers to ensure compliance with quality of service (QoS) obligations under the relevant licence terms and conditions.

The proposed framework will provide the mechanism to measure and report performance requirements in customer service management and technical network performance with the aim of enhancing the level of consumers satisfaction with broadcasting services. The details of the proposed framework are set out in the subsequent sections of this document.

## **2. Responsibilities of the Authority and Licensees under this Framework**

As per the provisions of the Kenya Information and Communications (Licensing and Quality of Service) Regulations, 2010, all licensees are obligated to meet the quality of service requirements besides meeting all other licence terms and conditions. To administer the provisions of the Kenya Information and Communications Act, 1998 as amended and Regulations with respect to QoS, the Authority is required to set QoS standards and to monitor licensees' compliance with the set standards.

### **2.1 Responsibilities of the Authority**

Under this framework and in accordance with the Regulations, the Authority has the responsibility to:

1. Set the Quality of Service standards, prescribing the QoS parameters that licensees shall measure and report on. The Authority may amend any aspect of these parameters from time to time to accommodate developments in the sector.
2. Specify the methodology of measuring service performance against each QoS parameter.
3. Apply appropriate sanctions in cases of non-compliance by the licensee.
4. Carry out measurements against some or all the QoS parameters.
5. Audit of the QoS reports submitted by licensees.
6. Where it deems necessary, carry out comparative publishing of QoS performance of the licensees.

## **2.2 Responsibilities of the Licensees**

The licensees, on the other hand, shall have the responsibility to:

1. Have their technical operation in line with the standards set in the National ICT Policy, the Act, Regulations, Guidelines and licences terms and conditions, which documents shall have the order of precedence in which they are listed in this paragraph.
2. Carry out measurements, reporting and record keeping with respect to QoS and critical outages as specified by the Authority.
3. Compile, summarize and submit measurements in the prescribed formats, time intervals and within a specified timeline following the end of each reporting interval.
4. Provide necessary and unrestricted access to facilities and records to the Authority and its authorized agents for inspections, audits and investigations.
5. Take corrective actions within the stipulated timelines in cases where QoS performance falls below the specified levels.
6. Comply with the reporting requirements set by the Authority on the QoS performance of the licensee.

## **3. QoS Measurements, Reporting and Performance Audits**

The Licensee shall:

1. Carry out measurements of all specified QoS parameters using the methodology specified by the Authority or the relevant standardization organization or standards developing organization.
2. Keep all measurement equipment calibrated
3. Keep all supporting and measurement data used for generation of QoS reports for a period not less than twelve (12) months from the end of the Authority's financial year in which that data formed part of their QoS report.
4. Upon request, avail data in (3) to the Authority or its authorized agents.
5. Prepare and submit periodic (quarterly and annual) QoS reports within the timelines specified by the Authority or as may be requested by the Authority.
6. Grant unrestricted access to network installations and/or data as and when required by the Authority or its authorized agents notwithstanding that no prior notice has been given.

Notwithstanding the above, to establish adherence of the licensee to the QoS standard and/or to audit the licensee reports, the Authority may:

1. Conduct inspections, surveys and/or performance audits on quality of service of the licensees from time to time.
2. Use impromptu and routine drive tests, consumer surveys, statistical data and documents submitted by licensees or any other method, as the Authority may deem necessary, to collect QoS performance data of the licensee.
3. Use its own personnel or employ the services of third-party technical specialists or independent third party to conduct any inspections, measurements, surveys or performance audits that may be deemed necessary.

## **4. Technical Context of Quality of Service for Broadcasting Services**

Quality of Service is defined in ITU-T Rec. E.800 as the “the collective effects of service performance which determines the degree of satisfaction of a user of the service.” This definition implies that QoS relates the inherent characteristics of a service that affects the fulfillment of service user requirements. In broadcasting, the eventual QoS experienced by the consumers is the sum of the quality of the various stages in the broadcasting value chain. This includes:

- (1) Broadcast content production, assembly and access
- (2) Signal distribution network performance
- (3) Customer-related service management functions

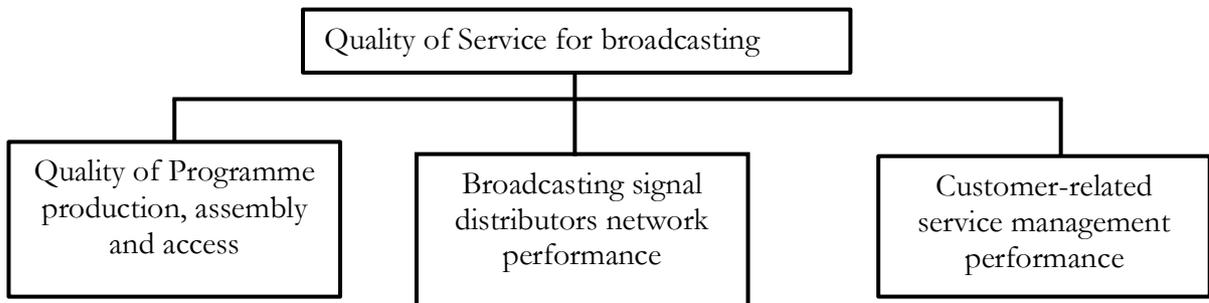


Figure 1: Illustration of components of broadcasting quality of service

At the outset, this framework will focus resources on areas where it will be most impactful. In this regard, this framework covers components (2) and (3) above. The framework is based on the context of television broadcasting and as such shall be applicable to:

- (1) Broadcasting signal distributors
- (2) Subscription broadcasting service providers

## 5. QoS Parameters

In accordance with Regulation 15 of the Kenya Information and Communications (Licensing and Quality of Service) Regulations, 2010, this section defines the applicable parameters, measurement methodologies and the applicable target for each parameter.

### 5.1 Data Sourcing

To cater for varying reporting and performance verification methods for each parameter, the data source point and relevant provisions for auditing such data are specified under each parameter.

### 5.2 Signal distribution network performance

Performance of the broadcasting signal distribution network significantly affects the QoS experienced by the users. Network performance relates to both the distribution and transmission sub-systems of a broadcasting signal distribution network. The following are the key characteristics that define the performance of a DVB-T2 network performance:

- I. Network Availability
- II. Service Accessibility
- III. Service Integrity

#### 5.2.1 Network Availability

Network availability is the degree to which the entire signal distribution network is in a properly functional state that guarantees reception of broadcasting services. Network availability shall be

considered the primary network performance characteristic since all other network performance criteria can only be assessed if the network is available.

Network availability can be assessed in terms of the group of parameters shown in Table 1 below.

**Table 1:** Parameters and KPIs for assessing DVB network availability

<b>KPI</b>	<b>Description</b>	<b>Target</b>
System availability (ETSI TR 101 290, ITU-R SM 1875)	<p><b>Definition:</b> the long-term proportion of time for which the entire digital transmission system guarantees quality reception of DVB services within the service area.</p> <p><b>Formula:</b> shall be computed using the formula below:</p> $= \frac{1}{D} \sum_{d=1}^D \frac{\text{service uptime}}{24 \text{ hours}} \times 100\%$ <p>Where, <math>D</math> is the number of days in the reporting period while <math>d = 1, 2, \dots, D</math></p> <p><b>Note:</b> service unavailability due to schedule maintenance and force majeure shall not be considered as long as the licensee complies with conditions on service interruption stipulated in the licence.</p> <p><b>Data Sourcing:</b> licensees shall provide performance analysis reports of OMC analytics in agreed format on quarterly basis. The Authority shall review the licensees' quarterly report on this QoS parameter.</p>	$\geq 99\%$
Signal Strength (ITU-R SM 1875)	<p><b>Definition:</b> Is a measure of the median value of field strength that is required to permit for a desired reception quality, under specified condition, in the presence of noise and interference for an area to be considered as 'coverage area'.</p> <p><b>Note:</b> The reference point shall be located in the transmitting antenna's far field. Further, fixed reception antenna shall be assumed to be located 10m above the ground.</p> <p><b>Data sourcing:</b> Licensees shall conduct measurements and report on this QoS parameter on quarterly basis. The Authority shall also conduct drive test.</p>	$>32 \text{ dBm}/\mu\text{V}$

### 5.2.2 Service Accessibility

Once a broadcasting service is available, the second layer characteristic that makes a broadcasting service usable is its accessibility. Broadcasting service accessibility embodies the technical characteristics of a broadcast signal that makes it possible to be decodable by a standard receiving device. Table 2 below describes the parameters and KPIs that can be used to assess accessibility of a broadcasting service. Despite network availability, DVB-T2 service would not be accessible if the following parameters fall below the required threshold values.

Table 2: Parameters and KPIs for assessing DVB-T2 system accessibility

KPI	Description	Target
Modulation Error Ratio (MER) (DVB-T2 Transmitter) (ETSI TR 101 290, ITU-R SM 1875)	<p><b>Definition:</b> MER represents the ratio between the average power of the DVB signal and the average noise power of the signal constellation.</p> <p><b>Purpose:</b> MER is the measures the performance of digital broadcast transmitter using digital modulation providing a figure of merit analysis of the received signal.</p> <p><b>Data sourcing:</b> licensees shall conduct measurements and report on this QoS parameter on quarterly basis. The Authority shall conduct drive test to confirm the Licensees' claim.</p>	<b>&gt;32 dB</b>
Bit Error rate (BER) for signal from DVB-T2 transmitter (ITU-R SM 1875)	<p><b>Definition:</b> refers to the number of bits in error expressed as a ratio of the total transmitted bits during a given time.</p> <p><b>Purpose:</b> BER measures the quality of a digital transmission link.</p> <p><b>Measurement Principle:</b> BER shall be measured after low density parity check (LDPC) error correction (LBER)</p> <p><b>Data sourcing:</b> licensees shall conduct measurements and report on this QoS parameter on quarterly basis. The Authority shall conduct drive test to confirm licensees' reports.</p>	<b>&lt;10<sup>-8</sup></b>
Carrier Power to Noise Ratio, C/N (ITU-R SM 1875, ITU-R BT 2254)	<p><b>Definition:</b> C/N is the ratio of the received power of the modulated carrier signal (C) and the received noise power (N) and is expressed in decibels (dB).</p> <p><b>Purpose:</b> It characterizes the robustness of the transmission system with regard to noise and interference and is used to determine the signal level required to receive a viable signal in noise and interference (ITU-R BT 2254)</p> <p><b>Measurement Principle:</b> for DVB-T2 fixed reception, static Rayleigh channel shall be used and the target</p>	shall exceed the values specified in ITU-R B'T.2254 for the variant of DVB-T2 deployed.

KPI	Description	Target
	<p>value, will be as per ITU-R BT 2254.</p> <p><i>Data sourcing:</i> licensees shall conduct measurements and report on this QoS parameter on quarterly basis. The Authority shall conduct drive test to confirm the Licensees' claim.</p>	

### 5.2.3 Service Integrity

The integrity of a broadcasting service refers to the extent to which a broadcasting service is provided without excessive impairments. This implies that the integrity of a broadcasting can only be determined once such broadcasting is accessible. This describes QoS during service use and includes elements such as video quality, audio quality and can be assessed using parameters defined in Table 3 below.

**Table 3:** Parameters and KPIs for assessing DVB-T2 service integrity

KPI	Description	Target
Bitrate per program stream (ETSI TR 101 290)	<p><b>Definition:</b> refers to the rate of transfer of information content of a program stream. Each program stream has different elements like video, audio, teletex, conditional access streams, IP information, private user information which are multiplexed together into a transport an MPEG transport stream.</p> <p><b>Purpose:</b> quality of video and audio quality depends on the bitrate used for transmission in the transport stream. Besides video and audio quality, the transmission fee paid by the broadcast content providers to the signal distributors is based on the bitrate used to carry the individual TV program. Thus, it is necessary to monitor program stream bitrate to ensure good video quality and effectively monitor signal distribution tariffs.</p> <p><b>Measurement Principle:</b> packet-based measurement using continuous window function as described in ETSI TR 101 290 shall be used.</p> <p><b>Data sourcing:</b> licensees shall provide bitrate measurement report on quarterly basis which shall also include a detailed description of the analysis method. The Licensees shall also be required to submit raw bitrate measurement data to enable the Authority to verify submitted reports. The Authority may, where necessary, conduct its own measurements.</p> <p><b>Non-compliance &amp; Sanctions:</b> where the payload bit-rates fall below the specified limits, the signal carrier shall properly adjust transmission fee and issue</p>	<p>Average bitrate <math>\geq</math> 95% of the bitrate specified in the contract for constant bitrate (CBR), Or shall not fall below agreed minimum bitrate for variable bitrate (VBR).</p> <p>Nevertheless, the minimum bitrate for SDTV channels shall be no less than 1.5mbps</p>

<b>KPI</b>	<b>Description</b>	<b>Target</b>												
	credit notes to the content service provider.													
Picture Quality (ITU-R BT 500)	<p><b>Definition:</b> this parameter is used to assess the quality of television images using measurements that more directly anticipated the reactions of those who might view the system being system (ITU-BT 500-14).</p> <p><b>Purpose:</b> the parameter is used to assess the performance of television systems by assessment of picture quality and picture impairment of the output of the signal distribution platform.</p> <p><b>Assessment:</b> Assessment shall be conducted using the methodologies described in Part 2 of ITU-R BT 500 and five-grade impairment scale shall be used:</p> <table border="1"> <thead> <tr> <th>Five-grade picture Quality Impairment scale</th> <th>Impairment</th> </tr> </thead> <tbody> <tr> <td>5 = Excellent</td> <td>Imperceptible</td> </tr> <tr> <td>4 = Good</td> <td>Perceptible, but not annoying</td> </tr> <tr> <td>3 = Fair</td> <td>Slightly annoying</td> </tr> <tr> <td>2 = Poor</td> <td>Annoying</td> </tr> <tr> <td>1 = Bad</td> <td>Very annoying</td> </tr> </tbody> </table> <p>The assessment shall not include news inserts, historical materials or archival footage, footage originated on non-broadcast format or streaming.</p> <p><b>Data sourcing:</b> licensees shall submit quarterly and annual reports on the picture quality. The Authority shall review the submitted reports. Where necessary, the Authority may test licensees' system.</p>	Five-grade picture Quality Impairment scale	Impairment	5 = Excellent	Imperceptible	4 = Good	Perceptible, but not annoying	3 = Fair	Slightly annoying	2 = Poor	Annoying	1 = Bad	Very annoying	Grade 4 and above
Five-grade picture Quality Impairment scale	Impairment													
5 = Excellent	Imperceptible													
4 = Good	Perceptible, but not annoying													
3 = Fair	Slightly annoying													
2 = Poor	Annoying													
1 = Bad	Very annoying													

### 5.3 Service-related QoS Performance for Broadcasting Signal Distributors

This set of QoS performance parameters assess the nature of service delivery by a licensee to its customers. Service-related QoS performance is generally described in terms of the speed, accuracy, reliability, availability, simplicity and flexibility in the manner in which customers access licensed services. Table 4 below describes the group of parameters used to characterize service-related QoS performance of broadcasting signal distributors.

**Table 4:** Parameters and KPIs for assessment of service-related QoS performance of broadcasting signal distributors

<b>KPI</b>	<b>Description</b>	<b>Target</b>
Service Enquiry Response Time	<b>Definition:</b> The duration of time taken by the BSD to respond to a content service provider enquiry on availability of transmission capacity and requirements	<7 days

KPI	Description	Target
	<p>for being hosted on that given BSD network.</p> <p><b>Measurement Principle:</b> the duration shall be considered as the period between date of receipt of the incoming correspondence and the date of the replying correspondence.</p> <p><b>Data Sourcing:</b> The BSD shall submit quarterly and annual reports on the performance of this parameter. The Authority shall review BSD reports and may request access to additional information to enable it audit the submitted reports.</p>	
Service Supply Time	<p><b>Definition:</b> The duration of time taken by the BSD to commence or effect a change in transmission of a TV channel upon full compliance with hosting conditions, provided that the BSD had indicated technical feasibility to carry the said TV channel.</p> <p><b>Measurement Principle:</b> the duration shall be considered as the period between date of full compliance with required hosting conditions to the date of commencement of transmission in all the applicable sites.</p> <p><b>Data Sourcing:</b> The BSD shall submit quarterly and annual reports on the performance of this parameter. The Authority shall review BSD reports and may request access to additional information to enable it audit the submitted reports.</p>	<14 days
Billing Error Rate	<p><b>Definition:</b> The number of bills in error expressed as proportion of all the bills issued during the review period.</p> <p><b>Measurement Principle:</b> the number of bills in errors shall include all bills that the BSD issued and whose value was eventually agreed to be in error, whether as a result of BSDs own realization or arising from content service provider complaints.</p> <p><b>Data Sourcing:</b> The BSD shall provide quarterly and annual reports on this parameter. The Authority shall review BSD reports and may request access to additional information to enable it audit the submitted reports.</p>	<10 <sup>-4</sup>
Information notification time	<p><b>Definition:</b> The minimum period in hours within which planned changes and service adjustments must be notified prior to the outage.</p>	<24hours

KPI	Description	Target
	<p><b>Measurement Principle:</b> this shall be applicable only to changes/adjustment service implemented by the BSD. It excludes changes requested by the content service providers.</p> <p><b>Data Sourcing:</b> BSDs shall provide quarterly and annual reports on this parameter. The Authority shall review BSD reports and may request access to additional information to enable it audit the submitted reports.</p>	
Customer service availability	<p><b>Definition:</b> The minimum duration in hours, during a 24-hour period, that a customer service call-center shall be reachable by such means of communication as telephone calls, SMS, email, expressed as a percentage of 24 hours.</p> <p><b>Measurement Principle:</b> this parameter includes all the duration that a customer can obtain help whether by following provided machine prompts or by help of human agent.</p> <p><b>Data Sourcing:</b> The BSD shall provide quarterly and annual reports on this parameter. The Authority shall review BSD reports and may request access to additional information to enable it audit the submitted reports.</p>	>99.99%
Customer service call answer rate	<p><b>Definition:</b> is the proportion of customers' calls that are answered by the customer care center compared to the number of calls received by the customer care center.</p> <p><b>Measurement Principle:</b> in measuring call answer rate, calls dropped midway by the customers or due to network-related problems shall be excluded. Therefore, only calls dropped after full-length ringing (ring-back) tone shall be considered as unanswered.</p> <p><b>Data Sourcing:</b> The BSD shall provide quarterly and annual reports on this parameter. The Authority shall review BSD reports and may request access to additional information to enable it audit the submitted reports.</p>	>95%
Fault report time	<p><b>Definition:</b> the maximum period within which any fault occurrence must be reported to the content service providers after its occurrence.</p> <p><b>Measurement Principle:</b> this parameter shall be</p>	<24 hours

KPI	Description	Target
	<p>measured by the average duration in hours between a fault occurrence and the time the BSD reported the same to all the content service providers whose services were affected by the fault.</p> <p><b>Data Sourcing:</b> The BSD shall provide quarterly and annual reports on this parameter. The Authority shall review BSD reports and may request access to additional information to enable it audit the submitted reports.</p>	
<p>Average complaints resolution time “ACRT” – non-reception of broadcasting services</p>	<p><b>Definition:</b> the duration in hours taken to resolve and restore service reception upon complaint by consumers for non-reception of broadcasting service.</p> <p><b>Measurement Principle:</b> measure the time elapsed between the original log of a complaint by the customer and the closure of the matter and computing the average resolution time as:</p> $ACRT = \frac{1}{N} \sum_{n=1}^N t_n$ <p>Where, N is the number of complaints resolved during the period under review, <math>t_n</math> is the time taken to close the <math>n^{th}</math> complaints.</p> <p><b>Data Sourcing:</b> The BSD shall provide quarterly and annual reports on this parameter. The Authority shall review BSD reports and may request access to additional information to enable it audit the submitted reports.</p>	<p><b>&gt;99% of the complaints shall be resolved within 24 hours.</b></p>
<p>Average complaints resolution time “ACRT” – other complaints</p>	<p><b>Definition:</b> refers to the average time in days it takes to resolve consumer complaints.</p> <p><b>Measurement Principle:</b> measure the time elapsed between the original log of a complaint by the customer and the closure of the matter and computing the average resolution time as:</p> $ACRT = \frac{1}{N} \sum_{n=1}^N t_n$ <p>Where, N is the number of complaints resolved during the period under review, <math>t_n</math> is the time taken to close the <math>n^{th}</math> complaints.</p> <p><b>Data Sourcing:</b> The BSD shall provide quarterly and annual reports on this parameter. The Authority shall</p>	<p><b>&lt; 95% shall be resolved within 7 days</b></p>

KPI	Description	Target
	review BSD reports and may request access to additional information to enable it audit the submitted reports.	

## 6. Service-related QoS Performance for Subscription Broadcasting Service Providers

This set of parameters describe customer service and service management performance between subscription broadcasting service providers and subscribers for their services. This category is further classified into service management, customer service and billing performance according to the functional areas to which they relate. Tables 5, 6 and 7 below describe the group of parameters used to characterize service-related QoS performance of subscription broadcasting service providers.

### 6.1 Service management performance

**Table 5:** Parameters and KPIs for assessing service management performance for subscription broadcasting services

KPI	Description	Target
Service supply time	<p><b>Definition:</b> The duration in days taken to supply and install necessary customer premise equipment as well as activation of service upon receipt of a competent request for the provision of service</p> <p><b>Data Sourcing:</b> Licensee shall provide quarterly and annual reports on this parameter. The Authority shall review licensee reports and may request access to additional information to enable it to audit the submitted reports.</p>	<3 days
Service re-activation	<p><b>Definition:</b> Refers to the duration between consumer's payment to restore service after expiry of subscription and the actual service re-activation.</p> <p><b>Data Sourcing:</b> Licensee shall provide quarterly and annual reports on this parameter. The Authority shall review licensee reports and may request access to additional information to enable it to audit the submitted reports.</p>	<15 minutes
Notification of planned outages	<p><b>Definition:</b> The minimum notice period served on subscribers prior to a scheduled outage.</p> <p><b>Data Sourcing:</b> Licensee shall provide quarterly and annual reports on this parameter. The Authority shall review licensee reports and may request access to additional information to enable it to audit the submitted reports.</p>	>3days
Fault report time	<p><b>Definition:</b> the maximum period within which a</p>	<24 hours

<b>KPI</b>	<b>Description</b>	<b>Target</b>
	<p>subscription broadcasting service provider must notify its affected subscribers of any fault occurrence after its occurrence.</p> <p><b>Measurement Principle:</b> this parameter shall be measured by the average duration in hours between a fault occurrence and the time the subscription service provider notified the affected subscriber of the fault.</p> <p><b>Data Sourcing:</b> Licensees shall provide quarterly and annual reports on this parameter. The Authority shall review licensees' reports and may request access to additional information to enable it audit the submitted reports.</p>	
Notification of changes in bouquet	<p><b>Definition:</b> The minimum notice period served on subscribers prior to change in a bouquet which they subscribe to and for which all the necessary regulatory and contractual approvals have been obtained.</p> <p><b>Data Sourcing:</b> Licensee shall provide quarterly and annual reports on this parameter. The Authority shall review licensee reports and may request access to additional information to enable it to audit the submitted reports.</p>	>15 days
Service Cessation Notification Time	<p><b>Definition:</b> The minimum contract termination notice period in days that a subscriber is required to furnish to a subscription broadcasting service provider to deactivate a subscription service upon receipt of competent request for service termination.</p> <p><b>Data Sourcing:</b> Licensee shall provide quarterly and annual reports on this parameter. The Authority shall review licensee reports and may request access to additional information to enable it to audit the submitted reports.</p>	<7 days

## 6.2 Customer support

**Table 6:** Parameters and KPIs for assessing customer support performance for subscription broadcasting services

<b>KPI</b>	<b>Description</b>	<b>Target</b>
Customer complaints submission rate	<p><b>Definition:</b> refers to the measure of the probability of a customer submitting a complaint on the service provided by the licensee.</p> <p><b>Measurement Principle:</b> It is measured as the total</p>	<5%

KPI	Description	Target
	<p>number of complaints submitted in a given period expressed as the ratio of the total subscribers.</p> <p><b>Data Sourcing:</b> Licensees shall provide quarterly and annual reports on this parameter. The Authority shall review licensee reports and may request access to additional information to enable it to audit the submitted reports.</p>	
<p>Customer complaints resolution time ‘ARCT’ – non-reception of broadcasting service</p>	<p><b>Definition:</b> the duration in hours taken to resolve and restore service reception upon complaint by consumers for non-reception of broadcasting service.</p> <p><b>Measurement Principle:</b> measure the time elapsed between the original log of a complaint by the customer and the closure of the matter and computing the average resolution time as:</p> $ACRT = \frac{1}{N} \sum_{n=1}^N t_n$ <p>Where, N is the number of complaints resolved during the period under review, <math>t_n</math> is the time taken to close the <math>n^{th}</math> complaints.</p> <p><b>Data Sourcing:</b> licensee shall provide quarterly and annual reports on this parameter. The Authority shall review licensee reports and may request access to additional information to enable it to audit the submitted reports.</p>	<p>&gt;99% of the complaints shall be resolved within 24 hours.</p>
<p>Customer complaints resolution time ‘ARCT’ – other complaints</p>	<p><b>Definition:</b> refers to the duration taken to satisfactorily resolve complaints from customers other than for non-reception of broadcasting services.</p> <p><b>Measurement Principle:</b> measure the time elapsed between the original log of a complaint by the customer and the closure of the matter and computing the average resolution time as:</p> $ACRT = \frac{1}{N} \sum_{n=1}^N t_n$ <p>Where, N is the number of complaints resolved during the period under review, <math>t_n</math> is the time taken to close the <math>n^{th}</math> complaints.</p> <p><b>Data Sourcing:</b> licensee shall provide quarterly and annual reports on this parameter. The Authority shall</p>	<p>95% of complaints to be resolved within 7 days</p>

KPI	Description	Target
	review licensee reports and may request access to additional information to enable it audit the submitted reports.	
Online resolution of customer complaints	The proportion of customer calls that are answered lead to satisfactory resolution of the complaints either by automated voice prompt or by human call agents	>80%

### 6.3 Billing performance

**Table 7:** Parameters and KPIs for assessing Billing performance for subscription broadcasting services

KPI	Description	Target
Billing Error Rates	<p><b>Definition:</b> The number of bills in error expressed as proportion of all the bills issued during the review period.</p> <p><b>Measurement Principle:</b> the number of bills in errors shall include all bills that the licensee issued and whose values were eventually determined to be erroneous, whether because of licensee’s own realization or arising from content service provider complaints.</p> <p><b>Data Sourcing:</b> Licensee shall provide quarterly and annual reports on this parameter. The Authority shall review licensee reports and may request access to additional information to enable it to audit the submitted reports.</p>	<10 <sup>-4</sup>

## 7. Quality of Experience

Quality of Experience (QoE) is defined in ITU-T Rec. P.10/G100 as the degree of delight or annoyance of the user of an application or service. QoE shall be determined using customer satisfaction surveys. As per ITU-T Rec P.10/G.100 QoE assessed from such surveys is influenced by factors including the type and characteristics of the application or service, context of use, the user's expectations with respect to the application or service and their fulfilment, the user's cultural background, socio-economic issues, psychological profiles, emotional state of the user among others. Thus, since QoE is largely subjective, its assessment shall include a description of influencing factors that are included.

During the first three (3) years of the implementing the framework, the Authority shall pilot QoE assessment for broadcasting services as one of the components of this framework.

## 8. Assessment Framework

## 8.1 Scope of services to be covered

This QoS assessment framework shall be applicable to terrestrial broadcasting signal distributors and subscription broadcasting services providers.

## 8.2 Aggregation of QoS Components

Both broadcasting signal distribution network performance and service-related QoS components specified in Sub-section 5.3 shall be applicable to the broadcasting signal distributors. Service-related performance specified in Section 6 shall be applicable to the subscription broadcasting service providers delivered using terrestrial, satellite, cable or internet transmission. QoE performance that shall be assessed as per Section 7 shall be applicable to all categories of broadcasting services. However, the QoE score shall not contribute to the assessment framework during the first three (3) years during which the Authority shall pilot the assessment of the QoE component of the framework.

The assessment structure of the QoS components for the various categories shall be as set out in Table 8 below during the first three (3) years of the implementation of the framework.

**Table 8:** QoS Assessment Structure for year the first three (3) years

QoS Component	Broadcasting signal distributors	Subscription broadcasting service provider – with self-provisioning BSD licence	Subscription broadcasting service providers – on a licensed common-carrier signal distribution platform <sup>1</sup>
Signal distribution network performance (terrestrial)	70%	70%	-
Service related performance – BSD (terrestrial)	30%	-	-
Service-related performance – Subscription broadcasting services (terrestrial, satellite, cable, internet)	-	30%	100%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

After the third year or when the Authority commences QoE assessment, the assessment structure of QoS and QoE components for the various categories of broadcasting services shall be as set out in Table 9 below.

**Table 9:** QoS Assessment Structure for beyond year 3

<sup>1</sup> This shall include common carrier BSD on terrestrial platform, satellite service providers licensed in countries with comparable network performance requirement.

QoS Component	Broadcasting signal distributors	Subscription broadcasting service provider – with self-provisioning BSD licence	Subscription broadcasting service providers – on a licensed common-carrier signal distribution platform <sup>2</sup>
Signal distribution network performance (terrestrial)	60%	60%	-
Service related performance – BSD (terrestrial)	30%	-	-
Service-related performance – Subscription broadcasting services (terrestrial, satellite, cable, internet)	-	30%	90%
Quality of Experience (QoE)	10%	10%	10%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

### 8.3 Compliance Declaration & Sanctions

A licensee shall be deemed to be compliant if they attain an aggregate of at least 80%. Penalties and/or other sanctions will be applied to licensees who fail to meet the required threshold as provided under the Act.

### 9. Publication of QoS Reports

In accordance with Regulation 18 of the Kenya Information and Communications (Licensing and Quality of Service) Regulations, 2010, the Authority shall have the right to publish the results of the overall QoS assessment as well as all its various components on the Authority’s website and/or in local dailies.

### 10. Framework Piloting

The Authority shall pilot all components of this framework in the first two (2) years of its implementation. This will enable the Authority, together with the licensees, to address all the formative problems and develop a consensus on the framework and responsibilities of each party. Upon completion of the piloting phase, the Authority shall commence full implementation of the framework.

<sup>2</sup> This shall include common carrier BSD on terrestrial platform, satellite service providers licensed in countries with comparable network performance requirement.

