**Decision No. 1/31 of the Board of the Public Utilities Commission**

Adopted 27 September 2022

**Methodology for the Quality Measurements of Electronic Communications Services**

*Issued pursuant to*

*Section 40, Paragraph one of the Electronic Communications Law*

**I. General Provisions**

1. The methodology determines the procedures by which the Public Utilities Commission (hereinafter – the Regulator) shall carry out quality measurements of the electronic communications services (hereinafter – the measurements) provided by an electronic communications merchant (hereinafter – the merchant).

2. The following terms are used in this methodology:

2.1. **fixed telephone network**– a type of a public fixed electronic communications network designed for the provision of voice communications services to fixed termination points of an electronic communications network;

2.2. **multiple call handling**– an additional voice communication service in a telephone network which enables the end-user to learn about other incoming calls during a call and to choose which call to answer;

2.3. **mobile telephone network**– a type of a public mobile electronic communications network designed for the provision of voice communications services to mobile termination points of an electronic communications network.

3. The Regulator shall carry out scheduled measurements for the voice communications service.

4. The Regulator shall carry out extraordinary measurements for the following electronic communications services:

4.1. the voice communications service;

4.2. the short message service;

4.3. the television programme distribution service.

5. The Regulator shall carry out scheduled measurements according to a publicly available measurement plan for the calendar year (hereinafter – the measurement plan).

6. The Regulator shall ensure extraordinary measurements if a submission of an end-user or merchant regarding the quality of the electronic communications services referred to in Paragraph 4 of this methodology has been submitted to the Regulator and it is necessary to carry out measurements.

**II. Procedures for the Scheduled Measurements of the Voice Communications Service**

7. The Regulator shall carry out measurements of the voice communications service in fixed and mobile telephone networks.

8. The parameters to be measured in voice communications service measurements shall be as follows:

8.1. the number of unsuccessful calls;

8.2. the call set-up time in seconds;

8.3. the speech transmission quality.

9. In addition to the parameters to be measured for the voice communications service specified in Paragraph 8 of these regulations, the Regulator may also carry out measurements of other parameters related to the provision of the voice communications service.

10. The Regulator shall use an electronic communications service quality control system (hereinafter – the telephone network control system) for voice communications service measurements, consisting of a central control unit, measuring devices for voice communications service quality measurements in the fixed telephone network (hereinafter – the fixed network measuring devices), and measuring devices for voice communications service quality measurements in the mobile telephone network (hereinafter – the mobile network measuring devices).

11. The Regulator shall use terminal equipment of the same manufacturer, of the same model, with the same up-to-date software, supporting the technology of the service to be measured, for the quality measurements of the voice communications service in the mobile and fixed telephone networks, according to the type of the electronic communications network.

12. The Regulator shall replace the terminal equipment used for the measurements of voice communication quality at least once every three years.

13. The Regulator shall update annually the need for upgrading the components of the telephone network control system.

14. The Regulator shall include information on the terminal equipment used in the measurements in the electronic communications service quality report for the previous calendar year.

15. The telephone network control system must ensure the measurements of the parameters specified in Paragraph 8 of this methodology.

16. The criteria for determining an unsuccessful call:

16.1. a call attempt with a correctly dialled number granted to the end-user for use, without detecting a call control tone, busy tone or answer within 30 seconds;

16.2. a call attempt with a correctly dialled number granted to the end-user for use, detecting a call control tone in the case of a wrong call;

16.3. a call attempt with a correctly dialled number granted to the end-user for use, detecting a busy tone if this number is not used for other call;

16.4. a call attempt with a correctly dialled number granted to the end-user for use, detecting an answer in the case of a wrong call;

16.5. a call attempt from a fixed electronic communications network with a correctly dialled number granted to the end-user for use, detecting dial tone;

16.6. a call attempt with a correctly dialled number granted to the end-user for use, detecting a notification that the terminal equipment is switched off or is out of the coverage area when the terminal equipment is switched on and is within the coverage area;

16.7. a call attempt from a mobile electronic communications network with a correctly dialled number granted to the end-user for use when the call is failed;

16.8. a call attempt with a correctly dialled number granted to the end-user for use, the call terminating during the calling.

17. In the measurements of the voice communications service in a fixed telephone network, all the parameters to be measured shall apply to subscriber line connections irrespective of the technological means by which they are provided.

18. In the measurements of the voice communications service in a mobile telephone network, all the parameters to be measured shall apply to connections irrespective of the technologies used in the electronic communications networks.

19. Mobile network measuring devices shall ensure measurements of the voice communications service in a mobile telephone network at a fixed location being located inside the coverage area determined by at least one merchant according to the information indicated on the website of the merchant. During measurements, the automatic network search and network selection mode shall be set on the terminal equipment. If only one voice communication transmission technology is available at a given location, the manual network selection mode may be used on the terminal equipment.

20. The additional services of multiple call handling and call forwarding shall not be activated on the terminal equipment used in the measurements of the voice communications service.

21. The Regulator shall carry out scheduled measurements of the voice communications service in the fixed and mobile telephone networks of the merchant according to the scope specified in the measurement plan.

22. The measurement plan shall determine such scope of scheduled measurements of the voice communications service which ensures a 95 per cent confidence level in the measurement results and a relative measurement accuracy of 10 per cent, calculated by taking into account the information submitted by merchants in the voice communications service quality declaration for the previous reporting period.

23. If the subscriber line of the merchant is not ensured for the measurement of the voice communications service in the fixed telephone network at the place of measurement, the Regulator shall, not later than five working days before commencement of the scheduled measurements, request the merchant in writing to ensure the subscriber lines necessary for the measurements, and also to ensure the deployment of the fixed network measuring devices of the Regulator.

24. The Regulator shall use at least two fixed network measuring devices for the scheduled measurements of the voice communications service in the fixed telephone network which are connected to the fixed telephone network termination points selected for measurement by the Regulator at different measurement locations.

25. The Regulator shall use at least two mobile network measuring devices for the scheduled measurements of the voice communications service in the mobile telephone network the terminal equipment of which is connected to the mobile telephone network to be measured in the coverage areas of one or more different base stations at different measurement locations.

26. The Regulator shall ensure that the choice of locations for scheduled measurements of the voice communications service in the fixed and mobile telephone networks cover as evenly as possible the settlements in State cities, municipality towns, and villages of the Republic of Latvia. The scope of scheduled measurements of the voice communications service shall be distributed as evenly as possible among settlements of the same or different types.

27. The Regulator shall ensure that the scheduled measurements of the voice communications service in each settlement are carried out for not less than 100 calls in the network of each merchant, in the direction of each call, by making calls between mobile or fixed network measuring devices.

28. The telephone network control system shall determine the speech transmission quality by using the PESQ (Perceptual Evaluation of Speech Quality) or POLQA (Perceptual Objective Listening Quality Assessment) algorithm. The quality of speech transmission shall be assessed in accordance with Table 1 of Annex to this methodology.

**III. Procedures for Extraordinary Measurements**

29. In extraordinary measurements, the range of parameters to be measured and the scope of measurements may vary and the procedures for the measurements shall depend on the substance of the submission submitted to the Regulator by the end-user or merchant, the electronic communications service provided, and also other factual circumstances.

30. In case of a submission submitted by an end-user, before carrying out extraordinary measurements, the Regulator shall, if necessary for examination of the submission, require the merchant to provide access or the necessary termination point or installation of a subscriber line.

31. In case of a submission submitted by a merchant, before carrying out extraordinary measurements, the Regulator shall, if necessary for examination of the submission, require the merchant which submitted the submission to ensure access to the termination points necessary for the extraordinary measurements and to ensure the deployment of measuring devices.

32. The Regulator shall use the following for extraordinary measurements of the parameters of service quality, depending on the substance of the submitted submission and the type of electronic communications service provided to the end-user or to the merchant:

32.1. the telephone network control system;

32.2. other means of measurement or terminal equipment owned by the Regulator;

32.3. the equipment of the end-user or merchant;

32.4. other terminal equipment and means of measurement for an objective assessment of the submission and for establishment of the facts relating to the submission.

33. The Regulator shall ensure the extraordinary check of the quality of the voice communications service by carrying out measurements of the parameters specified in Paragraph 8 of this methodology or by recording the factors affecting the provision of the service which are relevant to the substance of the submission of the end-user or merchant.

34. The Regulator shall ensure the extraordinary check of the quality of the short message service by carrying out measurements in accordance with quality requirements for the provision of electronic communications services set by the Regulator or by recording the factors affecting the provision of the service which are relevant to the substance of the submission of the end-user or merchant.

35. The Regulator shall ensure the extraordinary check of the quality of the television programme distribution service by determining a subjective visual assessment of image quality in conformity with the following conditions:

35.1. the room in which the subjective visual assessment is carried out shall have general lighting, avoiding direct sunlight, and the video inspection device used shall be free from any defect likely to affect or interfere with the assessment;

35.2. for subjective visual assessment, a video inspection device shall be used which supports the technology of the service being measured and has a display diagonal dimension of not less than 22 inches for SDTV (Standard-Definition Television) and 50 inches for HDTV (High-Definition Television) and higher image resolutions;

35.3. the subjective visual assessment shall be carried out at a distance from the screen of the video inspection device specified in Table 2 of Annex to this methodology, depending on the screen height (H) in centimetres of the video inspection device used for the measurement;

35.4. the image quality shall be determined for each television programme as a quantitative value in points which is obtained by subjective visual assessment of the image in accordance with Table 3 of Annex to this methodology;

35.5. the image quality shall be assessed by taking into account the most characteristic potential disturbances and distortions in accordance with Table 4 of Annex to this methodology;

35.6. the image quality shall be assessed by two experts of the Regulator by calculating the average of the subjective assessment of the image quality of both experts.

36. During the extraordinary check of the quality of the television programme distribution service, the Regulator shall, where necessary, record the factors affecting the provision of the service which are relevant to the substance of the submission of the end-user or merchant.

37. The Regulator shall include the results of the extraordinary measurements in the inspection statement regarding the activities of the merchant.

**IV. Summarisation of the Results of Scheduled Quality Measurements**

38. The Regulator shall ensure the processing and summarisation of the results of measurements of the voice communications service and the identification of the results of the measurements by using as the selection criterion the time period during which the measurements were carried out and the name of the merchant.

39. The Regulator shall assess the indicators of the quality of the voice communications service over a calendar year period by publishing a summary of the results of the measurements of the voice communications service and the assessment in the electronic communications service quality report for the preceding calendar year.

40. The Regulator shall publish a summary of the average values of the results of the scheduled measurements of the voice communications service on the website of the Regulator at least quarterly.

41. The Regulator shall include the following indicators in the electronic communications service quality report to assess the quality of the voice communications service:

41.1. the average call set-up time in seconds;

41.2. the percentage of calls where the value of the call set-up time exceeds 15 seconds;

41.3. the percentage of calls where the value of the call set-up time exceeds the set-up time value declared by the merchant;

41.4. the percentage of unsuccessful calls;

41.5. the average speech transmission quality in points according to the PESQ or POLQA algorithm;

41.6. the percentage of calls where the speech transmission quality value according to the PESQ or POLQA algorithm is lower than 1.6 points;

41.7. the distribution of the number of calls based on speech transmission quality according to the PESQ or POLQA algorithm.

42. The Regulator shall, if necessary, assess and publish a different level of detail of the results of the measurements or other indicators.

**Closing Provisions**

43. Decision No. 1/30 of the Public Utilities Commission of 23 November 2017, Methodology for Measurements of the Quality of Electronic Communications Services (*Latvijas Vēstnesis*, 2017, No. 236), is repealed.

44. Methodology shall come into force on 1 October 2022.

Chair of the Board of the Public Utilities Commission A. Ozola

**Annex**

Decision No. 1/31 of the Public Utilities Commission

27 September 2022

Table 1

**Speech transmission quality assessment**

|  |  |  |  |
| --- | --- | --- | --- |
| **No.** | **Assessment** | **Explanation of the assessment** | **Value in points** |
| 1. | Excellent quality | Speech is clearly understandable. | **≥ 4** |
| 2. | Good quality | During speech transmission, there is slight background noise. | **≥ 3 to < 4** |
| 3. | Fair quality | Speech is difficult to understand. Insufficient audibility or temporary speech interruptions may occur. | **≥ 2 to < 3** |
| 4. | Poor quality | Speech is very difficult to understand. Noticeable background noise or speech interruptions. | **≥ 1 to < 2** |
| 5. | Bad quality | Communication is not possible. | **< 1** |

Table 2

**Optimum distance for assessment of the image of the television programme distribution service**

|  |  |  |  |
| --- | --- | --- | --- |
| **No.** | **Image resolution in pixels** | **Image aspect ratio** | **Image assessment distance in centimetres** |
| 1. | 720 x 483 | 4 : 3 | 7 H |
| 2. | 640 x 480 | 4 : 3 | 7 H |
| 3. | 720 x 576 | 4 : 3 | 6 H |
| 4. | 1,024 x 768 | 4 : 3 | 4.5 H |
| 5. | 1,280 x 720 | 16 : 9 | 4.8 H |
| 6. | 1,400 x 1,050 | 4 : 3 | 3.3 H |
| 7. | 1,920 x 1,080 | 16 : 9 | 3.2 H |
| 8. | 840 x 2,160 | 16 : 9 | 1.6 H |
| 9. | 7,680 x 4,320 | 16 : 9 | 0.8 H |

Note. When assessing the image quality at a resolution of 3840 x 2160, the image assessment distance may be selected in the range 1.6 H–3.2 H. When assessing the image quality at a resolution of 7680 x 4320, the image assessment distance may be selected in the range 0.8 H–3.2 H.

Table 3

**Image quality assessment of the television programme distribution service**

|  |  |  |  |
| --- | --- | --- | --- |
| **No.** | **Assessment** | **Explanation of the assessment** | **Value in points** |
| 1. | Excellent quality | The image is clearly visible and does not contain disturbances or distortions. | **5** |
| 2. | Good quality | The image is clearly visible but contains temporary disturbances and distortions which do not interfere with the perceptibility of the image. | **4** |
| 3. | Fair quality | The image contains disturbances and distortions which slightly interfere with the perceptibility of the image. | **3** |
| 4. | Poor quality | The image has substantial disturbances and distortions which interfere with the perceptibility of the image. | **2** |
| 5. | Bad quality | The image has long-lasting substantial disturbances and distortions which significantly interfere with the perceptibility of the image. | **1** |

Table 4

**Most characteristic image disturbances and distortions of the television programme distribution service**

|  |  |
| --- | --- |
| **No.** | **Description of the most characteristic potential image disturbances and distortions** |
| 1. | Moving or unmoving bandlike, grainy layering or layering of other type on the image; |
| 2. | Irregularity of the brightness and colours of the image; |
| 3. | Multiplication of the image; |
| 4. | Temporary or complete freezing of the image; |
| 5. | Individual missing fragments of the image; |
| 6. | Side effects of the picture near moving details of the image which are not related to the design of the programme image to be transmitted (image artefacts); |
| 7. | Distortions of vertical lines on the right side of the image; |
| 8. | Shifting of image and sound in time or side noises unrelated to the acoustic presentation of the programme being broadcast (sound artefacts); |
| 9. | Other disturbances which significantly affect the perception of the image. |