Pursuant to Article 8 paragraph 1 item 1), Article 23 paragraph 1 and Article 109, with regard to Article 131 of the Law on Electronic Communications (Official Gazette of RS Nos. 44/10, 60/13-CC, 62/14 and 95/18 - other law), Article 12 paragraph 1 item 1) and Article 16 paragraph 1 item 4) of the Statute of the Regulatory Agency for Electronic Communications and Postal Services (Official Gazette of RS Nos. 125/14 and 30/16),

the Managing Board of the Regulatory Agency for Electronic Communications and Postal Services, at the 21st session of the fourth convocation held on 31.01.2023, has adopted the following

RULEBOOK

on the quality parameters for publicly available electronic communications services, measurements and testing, and on the assessment of the practices of electronic communication operators

1. Introductory provisions

Scope

Article 1

This Rulebook stipulates in detail the quality parameters for the publicly available voice service, Internet access service and Internet services, media content distribution via appropriate electronic communication networks, the manner of informing subscribers on the quality of service offered and the availability of services, minimum quality of specified services by public communication network operators, quality parameters for electronic communication networks, the assessment of the practices of electronic communication operators, assessment of the fulfilment of special obligations assigned to the operators with a significant market power, control of the use of numeration and other obligations established under the Law on Electronic Communications (Official Gazette of RS Nos. 44/10, 60/13-CC, 62/14 and 95/18 - other law, hereinafter: Law) and the regulations adopted based on it, and the authorities of the Regulatory Agency for Electronic Communications and Postal Services (hereinafter: Agency) whilst carrying out measurements and testing, as well as assessing the practices of electronic communication operators (hereinafter: operator)

Standards and recommendations

Article 2

The basis for setting the quality parameters for publicly available electronic communications services and carrying out measurements and testing are relevant Serbian standards, technical regulations and technical specifications of the European Telecommunications Standards Institute (ETSI), European Committee for Standardisation (CEN), European Committee for Electrotechnical Standardisation (CENELEC), Internet Engineering Task Force – Request for Comments (IETF-RFC), the standards, decisions and recommendations of the International Telecommunication Union

(ITU), International Organisation for Standardisation (ISO), International Electrotechnical Commission (IEC) and the European Conference of Postal and Telecommunications Administrations (CEPT) (hereinafter: international standards) as well as the guidelines of the Body of European Regulators for Electronic Communications (BEREC).

2 Quality parameters for the publicly available electronic communications services and networks

Article 3

The provision of public electronic communications services shall be subject to meeting the basic technical requirements complying with Serbian, European and international standards, this Rulebook and relevant by-laws of the Agency.

Article 4

The limit values of the quality parameters for publicly available electronic communications service prescribed by the Agency are listed in Tables 1, 2, 3, 4 and 5 of Annex 1 and Table 21 of Annex 2, which shall be printed out with this rulebook and constitute its integral part.

The basic set of parameters for monitoring the quality of publicly available voice services is provided in Tables 1, 2 and 3 of Annex 1 printed out with this rulebook and constituting its integral part.

The basic set of quality parameters for publicly available voice services in a fixed network is provided in Table 1 of Annex 1 which is printed out with this Rulebook and constituting its integral part.

The basic set of quality parameters for publicly available voice services in public mobile communication networks at a fixed location is provided in Table 2 of Annex 1 printed out with this rulebook and constituting its integral part.

The basic set of quality parameters for publicly available voice service and data transmission in a public mobile communication network is provided in Table 3 of Annex 1, which has been printed out with this Rulebook constituting its integral part.

The basic set of quality parameters for the Internet access service and Internet services in a public electronic communication network at a fixed location is provided in Table 4 of Annex 1 printed out with this rulebook and constituting its integral part.

The basic set of quality parameters for media content distribution services in a public network at a fixed location (IPTV, cable network, broadcasting network, satellite network - DTH, wireless network in an unlicensed range) is provided in Table 5 of Annex 1, which has been printed out with this Rulebook and constitutes its integral part.

The basic set of parameters for the monitoring of the quality of public mobile communication networks is provided in Table 21 of Annex 2 printed out with this rulebook and constituting its integral part.

Operators shall check the quality of the services they provide at their own expense, in accordance with the Law and this Rulebook.

The number of subscribers to publicly available electronic communications services shall be established annually by the Agency. Operators who have more than 2 % of subscribers to an individual service on the Serbian market, and those required by the Agency, shall submit the reports prescribed in this Rulebook. Said operators shall send the Agency the values of the quality parameters at least once a year, using the forms printed out with this rulebook and constituting its integral part (Report 1, Report 2, Report 3, Report 4 and Report 5 provided in Annex 1).

On its website, the Agency shall annually publish a list of operators who are required to submit reports.

The report referred to in Article 10 hereof shall be sent in the form of electronic document with the electronic signature of the authorised person in the legal entity or in hard copy with the signature of the authorised person.

3 Informing the subscribers on the quality offered and the availability of services

Article 5

The quality of service offered to the consumer must be established in clear, detailed and unambiguous terms, known in advance and made public in an appropriate manner.

The operator’s offer must be publicised at all operator’s retailers and on its website or information channel, depending on the type of service, but the operator may publicise the offer in other ways (via public media, direct mail, etc.).

In the contract signed with the subscriber, i.e. in its general terms and conditions, the operator shall specify the minimum level of the quality of service provided, for the service or services that are the subject matter of the contract, i.e. the operator’s general requirements.

The operator who provides the Internet access service and Internet services via fixed networks shall inform the subscriber in clear and plain terms about the minimum, normally available and maximum throughput stipulated in the contract.

The minimum throughput should be greater than or equal to 70 % of the maximum throughput stipulated in the contract. The measured throughput cannot be below the minimum throughput, except due to the interruption of the electronic communication network or if the reduction of throughput is due to objective causes that are beyond the operator's control or that the operator could not have foreseen, avoided or removed (force majeure). If the throughput is below the minimum throughput due to an interruption of the electronic communication network, the cause must be removed as soon as possible but no longer than 48 hours from the moment of occurrence. If the interruption lasts longer than 48 hours, the operator must reduce the amount charged for the monthly subscription

proportionately to the period during which the service was not provided, for the services for which a fixed monthly subscription is paid.

The normally available throughput should be greater than or equal to 80 % of the maximum throughput stipulated in the contract and available 90 % of the time. If it is established that the normally available throughput is not available for at least 90 % of the time measured as per this Rulebook, the data concerning the deviation from the parameters laid down for said operator will be published on the Agency's website.

The maximum throughput stipulated in the contract is the one that the operator has specified as the maximum throughput in the contract signed by and between the user and the Internet access service provider.

The estimated maximum throughput in public mobile communication networks must be described in the contract, i.e. in the operator's general terms and conditions, in such a way that the subscriber can clearly understand the availability of the maximum throughput in different geographical locations.

The offer must clearly inform the subscriber that the maximum throughput will not be available if the subscriber's device does not meet the necessary technical requirements. The factors that can significantly affect the reduction of the available throughput must be clearly stated in the contract, i.e. the operator's general terms and conditions.

Article 6

Before the contract is signed, the operator providing services via public mobile communication networks must present to the user the maps showing the operator's mobile network coverage on the territory of the Republic of Serbia for each of the current technologies, with the option to grant the user, at the user's request, a trial period for the service offered under the conditions set out in the contract for the tariff package that the user is interested in, so that, given the nature of the mobile communication network, the user can ascertain the availability of the service and the offered quality of service parameters, at a location of interest. The location of interest shall be the location where the customer wants to have the service. The trial service period shall be established in the contract and cannot exceed 30 days, after which period the user is under no obligation to sign a contract with said provider of services through public mobile communication networks.

The user is entitled to a trial service on the selected location of interest at least once a year, or more often if the operator allows it. The trial service shall be provided by the operator, and if the operator finds that the user has misused this option, the operator is under no obligation to sign another contract with the user.

If the user wants to continue using the operator's services after the trial service period, the user shall sign a contract with the operator for the same type of service, with the same quality of service offered and for the period granted by the operator, and cannot change the location of interest for the operator's services from the one used in the trial service period.

The trial service period referred to in paragraph 1 of this Article shall also apply to the Internet access service and Internet services provided via a public mobile communication network at the fixed location stipulated in the contract.

The subscriber shall pay the cost of the service package he/she is interested in corresponding to the number of days of the trial service period, as well as the cost of the SIM card replacement for the services used.

4 Assessing the practices of the operator and carrying out measurements and testing

The obligations of the operator and the powers of the Agency

Article 7

The operator shall provide the electronic communications service in accordance with the prescribed general terms and conditions for the provision of electronic communications services, special obligations of the operators with significant market power, requirements of numeration licences, individual licences for radio frequencies and other obligations stipulated in the Law and regulations based on it.

The Agency is authorised to request from the operator the data and information the Agency needs to assess whether the operator acts in accordance with the obligations set out in paragraph 1 of this Article, and to measure and test the operation of public electronic communication networks and services, associated assets, electronic communication equipment and terminal equipment.

The operator shall make it possible for the Agency to assess the provision of electronic communications services and carry out the measurements and testing referred to in paragraph 2 of this article.

The Agency shall perform the measurement and testing activities via its control and measurement centres, as its organisational units, and persons authorised to carry out measurements and testing.

Assessing the activities of the operator

Article 8

The assessment of the performance of electronic communications activities shall include the collection, processing and analysis of appropriate data and information that the operator must submit or make available to the Agency in another way, pursuant to the Law or regulations adopted on the basis of it, for the purpose of performing electronic communications activities in accordance with the regulations.

Carrying out measurements and testing of the quality parameters of publicly available electronic communications services and public mobile communication networks

Article 9

The Agency shall measure and test the quality parameters of publicly available electronic communications services and public mobile communication networks referred to in Article 4 of this Rulebook pursuant to the regulations specified in Article 2 of this Rulebook.

Subscribers' complaints

Article 10

The assessment of the operator's practices, as well measuring and testing, may be carried out following a subscriber's complaint.

The subscriber referred to in paragraph 1 of this Article may file a written complaint about the operator's work, i.e. the quality of the service provided, under the service contract provisions on the provision of services the quality of which is lower than the one agreed under the contract.

The operator shall respond to the subscriber in writing within 15 days from the date when the complaint was lodged.

The subscriber referred to in paragraph 1 of this Article whose complaint has been rejected may contact the Agency within 15 days from the date when the operator delivered the response to the complaint, or 15 days after the expiration of the deadline for the operator's response to the complaint.

The complaint must include the following basic information:

1) the name and address of the operator;

2) the number of the subscriber contract signed with the operator who provides electronic communications services;
3) the full name and address, or business name and address of the head office, and telephone number of
the complainant;
4) the description of the problem;

5) the description of the attempt to resolve the problem directly with the operator.

With the complaint, the complainant shall submit any evidence relevant to the complaint procedure.

The Agency shall forward the complaint containing the information listed in paragraph 5 of this Article shall be forwarded to the operator, requesting a statement and setting a deadline for it and requesting that the relevant subscriber contract be submitted containing all mandatory elements prescribed in Article 105 of the Law.

Upon receiving the statement, the Agency may carry out additional assessment of the operator's practice or carry out any measurements and testing it deems necessary.

Should the Agency find irregularities in the operator's practices, it will report such operator to the inspectorate of the ministry responsible for the matters pertaining to electronic communications.

Assessing the fulfilment of obligations assigned to the operators with a significant market power

Article 11

The Agency shall assess whether the operators with a significant market power meet the obligations they have been assigned under the Agency's individual administrative acts.

Article 12

The Agency may request other data and information from the operator referred to in Article 8 hereof, and perform additional tests in accordance with the Law, this Rulebook and other acts of the Agency if there is a suspicion that the operator does not comply with the established obligations.

Official note of the assessment of the practices of the operator, measurements and testing

Article 13

The assessment of the practices of the operator, measurements and testing shall be recorded in the official note kept under the provisions of the law regulating general administrative procedure.

Request for statement and reporting to the competent inspectorate

Article 14

Should the assessment procedure find that the operator has not acted in accordance with the prescribed obligations, the Agency will inform the operator about this and request that the operator give a statement and eliminate the identified irregularities. In its request, the Agency shall set the deadline for the operator to submit a statement, eliminate the identified irregularities and inform the Agency about it, which cannot be shorter than eight days, except if the Agency finds that there has been a serious or repeated violation of prescribed obligations.

Should the Agency find that the operator has failed to eliminate the identified irregularities, it will report such operator to the inspectorate of the ministry responsible for the matters pertaining to electronic communications.

5 Final provisions

Article 15

The Rulebook on quality parameters for publicly available electronic communications services and monitoring of electronic communications activity (Official Gazette of RS Nos. 73/11 and 3/14) shall be repealed with effect from the date of entry into force of this Rulebook.

Article 16

This Rulebook shall enter into force on the eighth day following its publication in the Official Gazette of the Republic of Serbia, and is applied upon the expiration of three months following its entry into force.

CHAIRMAN
OF THE MANAGING BOARD

In Belgrade, 31.01.2023

Dragan Kovačević

ANNEX 1

TABLE 1. Quality parameters for publicly available voice service in a fixed network

No.	Parameter	Parameter description	Measurement subject	Measurement method	Limit value
1	Service supply time, if technically feasible	The duration from the instant of a valid service order being received by a direct service provider to the instant a working service is made available for use (ETSI EG 202 057-1)	For 95 % of new connections per year (average time per connection)	Operator's report	≤10 days
			% of services activated within the time frame under the contract		at least 95 %
			Working hours for receipt of complaints		From ___ to ___ working days From ___ to ___ Saturdays From ___ to ___ Sundays
2	Fault report rate per fixed access lines	The fault report rate per fixed access line is the total number of fault reports a year divided by the number of active lines as at 31.12. in the reporting year (ETSI EG 202 057-1)		Operator's report	≤15 %
3	Fault repair time	The total duration of all faults (from the instant a fault report has been made to the instant when the	For 95 % of quickest repairs of access lines a year	Operator's report	≤48 hours

		service element or service has been restored to normal working order) divided by the number of faults (ETSI EG 202 057-1)	% of repairs made within 24 hours since being reported		≥80 %
			Working hours of the fault reporting service		From __ to ___ working days From ___ to ___ Saturdays From __ to ___ Sundays
4	Unsuccessful call ratio	The unsuccessful call ratio refers to the ratio of calls to a valid number which failed. The case where the called party (B - Number) is busy or not responding is not regarded as a failed call The measurement shall be performed on the biggest possible sample.	All calls	Operator's report	≤1 %
			National calls on fixed network within local exchange		
			National calls from fixed network to mobile networks		
			National calls from fixed network to other fixed operators		
			International calls		
5	Call setup time	The call setup time is the period starting when the address information required for setting up a call is received by the network and finishing when the called party busy tone or ringing	Average time for national calls	Operator's report	≤3 s
			Average time for national calls on fixed network		≤3 s

		tone or answer signal is received by the calling party, or the time required to establish a connection from the instant the user has activated the send function. The measurement shall be performed on the biggest possible sample.	Average time for national calls from fixed network to mobile networks		≤5 s
			Average time for international calls		≤5 s
6	Response time for operator services	The duration from the instant when the address information required for setting up a call is received by the network to the instant the human operator answers the calling user to provide the service requested	Average response time per year for 60 % of calls	Operator's report	≤20 s
			% of calls answered within 20 seconds		≥60 %
7	Bill Correctness Complaints	% of complaints followed by bill correction		Operator's report	≤1 %
8	Frequency of customer complaints	Mean value of all complaints per 100 users per year	Number of complaints per user	Operator's report	≤0.5 %
9	Customer complaints resolution time	Resolution time for 80 % of complaints	For 80% of the fastest resolved complaints per year	Operator's report	≤10 days
10	Customer relations	Perceived quality according to questionnaire conducted among users	MOS (based on the survey of 5 % of users, with maximum sample of 1000 users) 1 to 5 scale	Operator's report	-
11	Professionalism of help line	Perceived quality according to questionnaire conducted among users	MOS (based on the survey of 5 % of users, with maximum sample of 1000 users)	Operator's report	-

			1 to 5 scale		
12	Proportion of problems with number portability procedures	The ratio of the number of supply orders with number portability where there is a deviation from the normal porting procedure agreed between the operators to the total number of supply orders that include number portability (ETSI EG 202 057-1)		Operator's report	

MOS (Mean Opinion Score) – Quality of Service

REPORT 1 Report on the quality parameter values of publicly available voice service in a fixed network

Operator name: _____

Data for the period: from _____ to _____

No.	Parameter	Measurement	Value
1	Service supply time, if technically feasible	For 95 % of new connections per year (average time per connection)	(days)
		% of services activated within the time frame under the contract	(%)
		Request receipt time	From ___ to ___ working days From ___ to ___ Saturdays From ___ to ___ Sundays
2	Fault report rate per fixed access lines		(%)
3	Fault repair time	For 95 % of quickest repairs of access lines a year	(hours)
		% of repairs made within 24 hours since being reported	(%)
		Working hours of the fault reporting service	From ___ to ___ working days From ___ to ___ Saturdays From ___ to ___ Sundays

4	Unsuccessful call ratio	All calls	(%)
		National calls on fixed network within local exchange	(%)
		National calls from fixed network to mobile networks	(%)
		National calls from fixed network to other fixed operators	(%)
		International calls	(%)
5	Call setup time	Average time for national calls	(s)
		Average time for national calls on fixed network	(s)
		Average time for national calls from fixed network to mobile networks	(s)
		Average time for international calls	(s)
6	Response time for operator services	Average response time per year for 60 % of calls	(s)
		% of calls answered within 20 seconds	(%)
7	Bill Correctness Complaints	% of complaints followed by bill correction	(%)
8	Frequency of customer complaints	Mean value of all complaints per 100 users per year	%
9	Customer complaints resolution time	For 80% of the fastest resolved complaints per year	(days)
10	Customer relations	MOS (based on the survey of 5 % of users, with maximum sample of 1000 users)	(1 – 5)
11	Professionalism of help line	MOS (based on the survey of 5 % of users, with maximum sample of 1000 users)	(1 – 5)
12	Proportion of problems with number portability procedures	The total number of complaints during the year about the number portability procedure relative to the number of submitted requests for number portability, expressed in %	%

Note:

Place, date	**Officer in Charge**

TABLE 2 Quality parameters for publicly available voice service in a public mobile network at a fixed location

No.	Parameter	Parameter description	Measurement method	Limit value
1	Call Setup Success Rate	$\mathrm{CDR}[\%] = \frac{\boldsymbol{call\ setup\ success\ rate}}{\mathbf{total\ number\ of\ calls}} * 100$ (ETSI TS 102250-2)	Operator's report	>98 % at network level
2	Call Drop Rate	$\mathrm{CDR}[\%] = \frac{number\ of\ irregularly\ terminated\ calls}{\mathrm{number\ successfully\ made\ calls}} * 100$ (ETSI TS 102250-2)	Operator's report	>2 % for each cell where there is a user of publicly available voice service at a fixed location
3	Call setup time	The time required to establish a connection from the instant the user has activated the send function (ETSI TS 102250-2)	Operator's report*	≤5 s
4	Speech signal quality	MOS (ITU-T P.863)	Operator's report*	MOS≥2.3
5	Frequency of customer complaints	Mean value of all complaints per 100 users per year	Operator's report	%
6	Bill Correctness Complaints	% of complaints followed by bill correction	Operator's report	≤1 %
7	Customer relations	5 to 1 scale (excellent, good, fair, poor, bad) The sample size should be at least 100 responses.	Operator's report	-

8	Professionalism of help line	5 to 1 quality scale (excellent, good, fair, poor, bad) The sample size should be at least 100 responses.	Operator's report	
9	Response time for operator services	The duration from the instant when the address information required for setting up a call is received by the network to the instant the human operator answers the calling user to provide the service requested - average response time per year - % of calls answered within 20 seconds	Operator's report	20 s in 60 % of cases
			Operator's report	60 %

Note: Parameter value should be the average value measured for daily peak hour during 5 working days (Average Daily Peak Hour according to ITU-T Recommendation E.600)

MOS (Mean Opinion Score) – Quality of Service

REPORT 2 Report on the quality parameter values of publicly available voice service in a public mobile communication network at a fixed location

Operator name: _____

Data for the period: from _____ to _____

No.	Parameter	Measurement results
1	Call/Packet Session Setup Success Rate	1) GSM network 2) Parameter value for each cell in the network in the form of Excel spreadsheet (*if, for objective reasons, some cells have a significantly poorer performance than others, provide an explanation*)
		1) UMTS network 2) Parameter value for each cell in the network in the form of Excel spreadsheet (*if, for objective reasons, some cells have a significantly poorer performance than others, provide an explanation*)
		1) LTE network 2) Parameter value for each cell in the network in the form of Excel spreadsheet (*if, for objective reasons, some cells have a significantly poorer performance than others, provide an explanation*)
		Network level
2	Call Drop Rate	GSM network (%)
		UMTS network (%)
		LTE network (%)

		Network level (%)
3	Call setup time	Network level (s)
4	Frequency of customer complaints	(%)
5	Bill Correctness Complaints	(%)
6	Customer relations	Average rating
7	Professionalism of help line	Average rating
8	Response time for operator services - average response time per year - % of calls answered within 20 seconds	(s) (%)

Note:

Place, date	**Officer in Charge**

TABLE 3 Quality parameters for publicly available voice service and data services in a public mobile communication network

No.	Parameter	Parameter description	Measurement method	Limit values
1	Call Setup Success Rate Applicable to GSM, UMTS and LTE networks	$\text{CSSR}[\%] = \frac{successfully\ setup\ calls\ attempts}{\text{all call attempts}} * 100$ (ETSI TS 102250-2)	Operator's report*	>98 % at network level
2	Call Drop Rate Applicable to GSM, UMTS and LTE networks	$\text{CDR}[\%] = \frac{\text{unintentionally terminated telephony calls}}{\text{number of successfully setup calls}} * 100$ (ETSI TS 102250-2)	Operator's report*	<2 % at network level
3	Call setup time	The time required to establish a connection from the instant the user has activated the send function (ETSI TS 102250-2)	Operator's report*	According to E.771, indicated in the separate 1/E.771 table
4	Throughput	Advertised maximum throughput, in Mb/s for download and upload	Operator's report*	Mb/s
		Download (DL) throughput mean value, for all applications	Operator's report*	UMTS >2Mb/s LTE > 4 Mb/s
		Upload (UL) throughput mean value, for all applications	Operator's report*	UMTS >256 kb/s LTE >1 Mb/s
5	Frequency of customer complaints	Mean value of all complaints per 100 users per year	Operator's report	%
6	Bill Correctness Complaints	% of complaints followed by bill correction	Operator's report	≤1 %
7	Customer relations	5 to 1 quality scale (excellent, good, fair, poor, bad) The sample size should be at least 100 responses.	Operator's report	-

8	Professionalism of help line	5 to 1 quality scale (excellent, good, fair, poor, bad) The sample size should be at least 100 responses.	Operator's report	
9	Response time for operator services	The duration from the instant when the address information required for setting up a call is received by the network to the instant the human operator answers the calling user to provide the service requested - average response time per year - % of calls answered within 20 seconds	Operator's report	20 s in 60 % of cases

**** Note:*** Parameter value should be the average value measured for daily peak hour during 5 working days (Average Daily Peak Hour according to ITU-T Recommendation E.600)

REPORT 3 Report on the quality parameters of publicly available voice service and data in a public mobile communication network

Operator name: _____

Data for the period: From _____ to _____

No.	Parameter	Measurement results
1	Call Setup Success Rate or availability of publicly available voice service in a mobile network	1) GSM network 2) Parameter value for each cell in the network in the form of Excel spreadsheet (*if, for objective reasons, some cells have a significantly poorer performance than others, provide an explanation*)
		1) UMTS network 2) Parameter value for each cell in the network in the form of Excel spreadsheet (*if, for objective reasons, some cells have a significantly poorer performance than others, provide an explanation*)
		1) LTE network 2) Parameter value for each cell in the network in the form of Excel spreadsheet (*if, for objective reasons, a cell has a significantly lower performance than others, provide an explanation*)
		Network level
2	Call Drop Rate	GSM network (%)
		UMTS network (%)

		LTE network (%)
		Network level (%)
3	Call setup time	For the whole mobile network (s)
4	Advertised maximum throughput	(Mb/s)
	Download (DL) throughput mean value, for all applications	(Mb/s)
	Upload (UL) throughput mean value, for all applications	(Mb/s)
5	Frequency of customer complaints	(%)
6	Bill correctness complaints	(%)
7	Customer relations	Average rating
8	Professionalism of help line	Average rating
9	Response time for operator services - average response time per year - % of calls answered within 20 seconds	(s) (%)

Notes:

	Place, date		**Officer in Charge**

TABLE 4 Quality of service parameters for the Internet access service and Internet services in a public electronic communication network at a fixed location

No.	Parameter	Parameter description	Measurement method	Limit values
	General parameters			
1	Service supply time, if technically feasible	The duration from the instant of a valid service order being received by a direct service provider to the instant a working service is made available for use for 95 % of requests	Operator's report	>95 % for 8 days
2	Frequency of customer complaints	Mean value of all complaints per 100 users per year	Operator's report	(%)
3	Bill correctness complaints	% of complaints followed by bill correction	Operator's report	≤1 %
4	Customer complaints resolution time	Resolution time for 80 % of complaints from the instant of complaint submission	Operator's report	>80 % for 24 days
5	Customer relations	5 to 1 quality scale (excellent, good, fair, poor, bad) The sample size should be at least 100 responses.	Operator's report	-
6	Professionalism of help line	5 to 1 quality scale (excellent, good, fair, poor, bad) The sample size should be at least 100 responses.	Operator's report	-
7	Response time for operator services	The duration from the instant when the address information required for setting up a call is received by the network to the instant the human operator answers the calling user to provide the service requested	Operator's report	20 s for 60 % of calls
		- average response time per year - % of calls answered within 20 seconds		60 %
	Parameters measured			

8a	Throughput	Minimum throughput in Mb/s for download and upload	- Agency: Test instrument (user side) for at least 24 hours - User: Agency -NetTest application - Operator: own measurement methodology	≥70 % of maximum throughput in Mb/s* under contract
8b	Throughput	Normally available throughput in Mb/s for download and upload	- RATEL: Test instrument (user side) for at least 24 hours - User: Agency -NetTest application - Operator: own measurement methodology	≥80 % of maximum throughput in Mb/s under contract for 90 % of measurement duration
9	Latency	Half the time in ms for a Ping to a particular IP address, measured according to RFC 792	- Agency: Test instrument (user side) for at least 24 hours - Operator: own measurement methodology	detailed values according to tables F.2 and F.3 in Annex F of ETSI EG 202 057-4

10	Jitter	The standard deviation of the packet delay on the network	Agency: Test instrument (user side) for at least 24 hours - Operator: own measurement methodology	detailed values according to tables F.2 and F.3 in Annex F of ETSI EG 202 057-4
11	Packet loss	PER or BER	Agency: Test instrument (user side) for at least 24 hours - Operator: own measurement methodology	detailed values according to tables F.2 and F.3 in Annex F of ETSI EG 202 057-4

*Note: The prescribed parameters, as well as the minimum prescribed values, refer to the Internet access and Internet services in a fixed communication network at a fixed location, measured at the Internet port of the modem with the Ethernet cable.

REPORT 4 Report on the values of quality parameters of the Internet access service and Internet services in a fixed electronic communication network at a fixed location

Operator name: _____

Data for the period: from _____ to _____

No.	Parameter	Parameter description	Result
1	Service supply time, if technically feasible	The duration from the instant of a valid service order being received by a direct service provider to the instant a working service is made available for use for 95 % of requests	(days)
2	Frequency of customer complaints	Mean value of all complaints per 100 users per year	(%)
3	Bill correctness complaints	% of complaints followed by bill correction	(%)
4	Customer complaints resolution time	Resolution time for 80 % of complaints from the instant of complaint submission	(days)
5	Customer relations	5 to 1 quality scale (excellent, good, fair, poor, bad) The sample size should be at least 100 responses.	(average rating)
6	Professionalism of help line	5 to 1 quality scale (excellent, good, fair, poor, bad) The sample size should be at least 100 responses.	(average rating)
7	Response time for operator services	- Average response time per year - % of calls answered within 20 seconds	(s) (%)

Note:

Place, date	**Officer in Charge**

TABLE 5 Quality parameters of media content distribution service in a fixed network

No.	Parameter	Parameter description	Measurement method	Limit value
Statistical (general) parameters				
1	Service supply time, if technically feasible	The duration from the instant of a valid service order being received by a direct service provider to the instant a working service is made available for use for 95 % of requests	Operator's report	8 days
2	Number of malfunctions per month	Total number of malfunctions reported during 30 days	Operator's report	(number)
3	Fault repair time	Average time between the moment QoS complaint is received and the moment the fault is repaired		48 hours
		Working hours for receipt of complaints		From __ to ___ - working days From __ to ___ - Saturdays From __ to ___ - Sundays
4	Frequency of customer complaints	Mean value of all complaints per 100 users per year	Operator's report	%
5	Bill correctness complaints	% of complaints followed by bill correction	Operator's report	≤1 %
6	Customer complaints resolution time	Resolution time for 95 % of complaints	Operator's report	5 days
7	Customer relations	5 to 1 quality scale (excellent, good, fair, poor, bad) The sample size should be at least 100 responses.	Operator's report	-
8	Professionalism of help line	5 to 1 quality scale (excellent, good, fair, poor, bad) The sample size should be at least 100 responses.	Operator's report	-
9				20 s for 60 % of calls

	Response time for operator services	The duration from the instant when the address information required for setting up a call is received by the network to the instant the human operator answers the calling user to provide the service requested - average response time per year - % of calls answered within 20 seconds	Operator's report	60 %
10	Mean subjective assessment of audio/video quality	Subjective assessment of audio/video quality degradation Assessed using a 5 to 1 quality scale (1 – unacceptable quality, 5 – imperceptible loss) (ITU-R BS.1770, ITU-R BT.500)	Operator's report	4
Parameters measured by an instrument				
11	Signal level	Signal level is the ratio of signal strength (power) to reference strength (power) expressed in dB; depends on frequency band and modulation applied	Operator's report (measurement done according to standard) EN 60728	According to the indicated standard
12	DVB-T2 field level	Field reception level for fixed receiver, for an aerial height of 10 m	Operator's report	>54 dBμV/m (measuring instrument EBU Tech 3348 r4)
13	C/N(dB) / SD, RF/N (dB)	For digital signal: minimum digital RF signal-to-noise ratio	EN 60728 and ETSI TR 101 290	>19
	C/N (dB)	for DVB-T2		>21
14	BER (Bit Error Rate)	The ratio between the quantity of bits received in error and the total number of bits transmitted within the same time period EN 60728	Operator's report	As per indicated standard $<2x10^{-4}$

		ETSI TR 101 290		
15	MER (Modulation Error Ratio)	Total degradation of the signal when entering the receiver, whose value determines the ability of the receiver to correctly decode the signal The sum of the squares of the magnitudes of the ideal symbol vectors is divided by the sum of the squares of the magnitudes of the symbol error vectors. The result, expressed as a power ratio in dB is defined as the Modulation Error Ratio (MER) EN 60728-1	Operator's report	EN 60728-1, Chapter 5.13.1.3. Table 14
			Operator's report	≥27 (for DVB-T2)
16	MDI (Media Distribution Index)	Video distribution index RFC 4445	Operator's report	RFC 4445
17	*Channel zapping time*	The total duration of time from changing the channel using a remote control to the point that the picture of the desired channel is displayed	Operator's report	-
18	Jitter	The standard deviation of the packet delay on the network G.1081	Operator's report	tendency to 0; no target value
19	Packet loss	Loss of one or more packets in the network G.1081	Operator's report	tendency to 0; no target value
20	Latency	Packet delay G.1081	Operator's report	tendency to 0; no target value

Note: The agency will measure the parameters in accordance with the technology used to provide the service.

REPORT 5 Report on the quality parameter values of media content distribution in a fixed network

Operator name: _____
Data for the period: from _____ to _____

No.	Parameter	Parameter description	Value
1	Service supply time, if technically feasible	The duration from the instant of a valid service order being received by a direct service provider to the instant a working service is made available for use for 95 % of requests	(days)
2	Number of malfunctions per month	Total number of malfunctions reported during 30 days	(number)
3	Fault repair time	Average time between the moment QoS complaint is received and the moment the fault is repaired	Hours/days
		Working hours of the fault reporting service	From __ to ___ working days From __ to ___ Saturdays From __ to ___ Sundays
4	Frequency of customer complaints	Mean value of all complaints per 100 users per year	(%)
5	Bill correctness complaints	% of complaints followed by bill correction	(%)
6	Customer complaints resolution time	Resolution time for 95 % of complaints	(days)
7	Customer relations	5 to 1 quality scale (excellent, good, fair, poor, bad) The sample size should be at least 100 responses.	(average rating)
8	Professionalism of help line	5 to 1 quality scale (excellent, good, fair, poor, bad) The sample size should be at least 100 responses.	(average rating)
9	Response time for operator services	- Average response time per year - % of calls answered within 20 seconds	(s) (%)

Note:

Place, date	**Officer in Charge**

ANNEX 2

TABLE 21 Quality parameters of public mobile communication networks

Network	No.	Parameter	Parameter description	Measurement method	Limit value
GSM	1	GSM coverage	GSM coverage is expressed as a percentage of the total geographical area of a country covered and a percentage of the total population covered. GSM network should be regarded as a whole, and the coverage is measured in all relevant radio frequency bands simultaneously.	Delivered by operator based on prediction model, verification according to ECC REPORT 118	According to licence requirements for signal level >-95 dBm
	2	Received signal level	Received signal level (RxLEV[dBm])	ECC REPORT 103	>-95 dBm, for public publicly available voice service in outdoor** conditions
					For publicly available voice service at a fixed location (CLL): >-85 dBm, in 95 % of the time

	3	RxQUAL	Quality on the receiver side (RxQUAL), measured in indoor** conditions for CLL.	ECC REPORT 103	RxQUAL <5 for publicly available voice service at a fixed location (CLL)
UMTS	4	UMTS coverage	UMTS coverage is expressed as a percentage of the total geographical area of a country covered and a percentage of the total population covered. UMTS network should be regarded as a whole, and the coverage is measured in all relevant radio frequency bands simultaneously.	Delivered by operator based on prediction model, verification according to ECC REPORT 103	According to licence requirements for CPICH RSCP > -105 dBm
	5	CPICH Received Signal Code Power (CPICH RSCP)	CPICH RSCP	ECC REPORT 103	>-105 dBm, for publicly available voice service in outdoor** conditions
					For publicly available voice service at a fixed location (CLL): >-90 dBm, in 95 % of the time
	6	CPICH Ec/Io	CPICH Ec/Io, measured in indoor* conditions	ECC REPORT 103	>-10 dB, in 95 % of the time for publicly available voice service at a fixed location (CLL)

LTE	7	LTE coverage	LTE coverage is expressed as a percentage of the total geographical area of a country covered and a percentage of the total population covered. The coverage is measured in all relevant radio frequency bands simultaneously.	-	Under the conditions of the Rulebook on the minimum requirements for issuing individual licences for the use of radio frequencies following the public bidding procedure for the radio frequency range 1710-1785/1805-1880 MHz (Official Gazette of the RS No. 136/14) and the Rulebook on the minimum requirements for issuing individual licences for the use of radio frequencies following the public bidding procedure for the radio frequency bands 791–821/832–862 MHz (Official Gazette of the RS No. 70/15)* for RSRP >-110 dBm
	8		RSRP		RSRP >-110 dBm in outdoor** conditions

		Reference Signal Received Power (RSRP)			For publicly available voice service at a fixed location (CLL): >-100 dBm, in 95 % of the time
	9	Reference Signal Received Quality (RSRQ)	RSRQ, measured in indoor* conditions		>-15 dB, in 95 % of the time for a publicly available voice service at a fixed location (CLL)

If the LTE network is realised in frequency bands of 1710-1785/1805-1880 MHz and 791–821/832–862 MHz

****Outdoor conditions means measurements carried out outdoors, i.e. outside buildings.***

*****Indoor conditions means measurements carried out indoors, i.e. inside buildings.***

R a t i o n a l e

I. Legal basis

The legal basis for the adoption of the Rulebook on the quality parameters for publicly available electronic communications services, measurements and testing, and on the assessment of the practices of electronic communication operators (hereinafter: Rulebook) is provided under Article 8 paragraph 1 item 1), Article 23 paragraph 1 and Article 109, with regard to Article 131 of the Law on Electronic Communications (Official Gazette of RS 44/10, 60/13-CC, 62/14 and 95/18 - other law, hereinafter: Law).

According to the provisions of Article 109, the Law stipulates that the Regulatory Agency for Electronic Communications and Postal Services (hereinafter: Agency) is authorised to prescribe detailed quality parameters for specific publicly available services and the manner of informing the consumers about the offered quality of services, and set the minimum quality requirements for the operator of the public communication network providing such services.

II. Reasons for the adoption of the Rulebook

After the analysis of the Rulebook on quality parameters for publicly available electronic communications services and monitoring of electronic communication activity (Official Gazette of RS Nos. 73/11 and 3/14, hereinafter: Rulebook on quality parameters), it was concluded that some provisions needed to be worded more clearly to avoid any dilemmas when interpreting them. After the last amendments to the Rulebook on quality parameters in 2014, new technologies for service provision in the field of public electronic communication networks were introduced on the market, and they had to be regulated through appropriate quality parameters. The Rulebook on quality parameters did not prescribe quality parameters for the 4G mobile communication network, so they had to be regulated in the amended rulebook. The Agency has made it possible for operators to use the CLL (Cellular Local Loop) technology for fixed access, rendering it necessary to set the minimum quality of service parameters to match the quality of a fixed access network. In addition, by participating in and observing the work of the BEREC (The Body of European Regulators for Electronic Communications) working groups, the Agency tries to implement the latest requirements adopted by this European Union body, to the extent allowed by the Law, to keep pace with the current development of electronic communications in Europe. The amendment procedure for the Rulebook was initiated to create the conditions for harmonising the regulation with market requirements and with changes that

had happened in this field since the adoption of the Rulebook on quality parameters. The Rulebook far surpasses the amendments to the current Rulebook in changes, rendering it necessary to adopt a new by-law with a different title.

III. Specific provisions explained

When drafting specific provisions in the Rulebook, the starting point was the operator's obligation under Articles 105, 109, 113 and 131 of the Law, i.e. to perform the electronic communications activities in accordance with the Law, the general act regulating general requirements for the performance of electronic communications activities under the general authorisation regime, the special obligations of operators with significant market power and other obligations set out in the Law and the Agency's general acts.

The performance of electronic communications activities is based on particular standards and technical specifications, whilst the quality of the business activity is determined on the basis of measurable parameters listed in the attachments to this Rulebook and printed out with this rulebook and constituting its integral part.

The Rulebook on quality parameters has been in force since 8.10.2011, whilst the Rulebook on the amendments to the Rulebook on quality parameters for publicly available electronic communications services and monitoring of electronic communications activity (Official Gazette of RS No 3/14), which entered into force on 23.1.2014, has made changes to some quality parameters. Significant amendments to the Rulebook on quality parameters are needed, i.e. adopting a new Rulebook. Over the past period, some irregularities were observed in the procedures concerning the assessment of the operators' work and the quality control of services, which had to be eliminated. The names of the services have to be aligned with the Rulebook on general requirements for performing electronic communications activities under the general authorisation regime (Official Gazette of RS Nos. 58/18 and 78/21, hereinafter: Rulebook on general requirements), the term *control* has been separated from the term *assessment of the practices* of the electronic communications operators, laid down in Article 131 of the Law, whilst parameters have to be defined for the newly introduced services and electronic communication networks, respectively. Throughputs have been defined more precisely, in accordance with the Agency's Guidelines for the Open Internet from February 2019, and the user protection procedure has been made clearer.

The title of the Rulebook has been changed and the wording "monitoring of the performance of electronic communications activities" were replaced with "measurements and testing, and assessing of the practices of electronic communications operators" to harmonise the terminology with Article 131 of the Law. The term control has been removed because Article 98 of the Law prescribes only the control of the radio frequency spectrum, which is regulated under another general act.

Law, Article 1 of the Rulebook has been amended, defining the scope of the Rulebook in accordance with the new title of the Rulebook and defining the terms *service* and *network* in line with the Rulebook on general requirements, whilst the Rulebook prescribes quality parameters, i.e. the minimum values of quality parameters.

In Article 2 of the Rulebook, the guidelines of the Body of European Regulators for Electronic Communications (BEREC) and relevant national standards have been incorporated in the basis for establishing quality parameters for the publicly available electronic communications services and measurements and testing and assessments.

Article 3 of the Rulebook prescribes that, to provide publicly available electronic communications services, the operator must meet the basic technical requirements in line with the relevant Serbian, international and European standards.

In Article 4, the service name has been updated in line with various technologies for voice transmission in fixed and mobile communication networks, as per the Rulebook on general requirements, by replacing the term "public voice service in a public telephone network" with the term "publicly available voice service in a fixed network". Quality parameters for publicly voice services in public mobile communication networks at a fixed location have been introduced. The term "media content transmission" has been replaced with the term "media content distribution". The Article also prescribes that the number of subscribers to publicly available electronic communications services will be established annually by the Agency and that operators with more than 2 % of subscribers to a service on the Serbian market must submit reports stipulated in the Rulebook.

Article 5 of the Rulebook specifies the manner in which subscribers must be informed about the quality of service offered, providing the minimum, normally available and maximum throughput.

Article 6 of the Rulebook stipulates that the users of services in public mobile communication networks may use a trial period of no longer than 30 days for the service offered, so that the user can ascertain the availability of the service and the offered quality of service parameters at a location of interest, which should reduce the number of complaints on the quality of service in mobile communication networks for which it is not possible to set minimum parameters for each point of the network due to the nature of the service and factors affecting it.

Section 4, *Assessing the practices of the operator and carrying out measurements and testing*, prescribes in detail how measurements and testing, as well as the assessment of the operator's practices, should be carried out.

How to file a complaint about the quality of the service to the operator is described in detail in Article 10 of the Rulebook whilst Articles 13 and 14 prescribe how to keep the minutes on the assessment of operators' practices, measurements and testing in accordance with the Law on General Administrative Procedure (Official Gazette of RS Nos. 18/16 and 95/18 - authentic interpretation, hereinafter: LGAP), and how the Agency may request a statement from the operator and reports irregularities to the competent inspectorate in accordance with its powers.

Articles 18 and 19 of the Rulebook prescribing the control of requirements under the numeration licence and individual licence for the use of radio frequencies have been deleted because this matter is regulated under Article 8 of the Rulebook and the Rulebook on the method of controlling the use of the radio frequency spectrum, performing technical inspections and protection against harmful interference (Official Gazette of RS Nos. 60/11, 35/13 and 16/15).

Also, the form and content of Annex 1 and Annex 2 have been changed, terminological adjustments have been made, publicly available voice service in public mobile communication networks at a fixed location has been added, and the name of the Agency has been changed, in accordance with the Law. Table 5 of Annex 1 of the Rulebook introduces quality parameters for the Internet access service and Internet service in the mobile electronic communication network at a fixed location, which has appeared on the electronic communications market as a competition to the Internet access and Internet service in a fixed electronic communication network, rendering it necessary to regulate its quality parameters.

Table 5 of Annex 1 of the Rulebook also introduces some parameters for media content distribution services for broadcasting network, satellite network - DTH and wireless network in the unlicensed radio frequency range. Quality parameters for analogue transmission in the distribution of media content have been deleted, due to the fact that it has been surpassed.

The forms in said Annexes have been changed for terminological alignment with the names of services and networks in the Rulebook on general requirements, as stated in the Rulebook. Because they have become technologically obsolete, some parameters have been deleted, whilst some new ones have been added because of the introduction of a new transmission technology in mobile networks (Long Termination Equipment - LTE) and access networks (publicly available voice services at a fixed location), and measurement methods have been explained more precisely.

In Table 21 of Annex 2, the parameter for the CDMA network coverage has been deleted because the licence for this type of service provision technology expired in 2019 and will not be renewed.

The forms in Annex 3 and Annex 4 have been deleted. The report on the assessment of operator’s practices, i.e. the report form is regulated under LGAP, which the Agency duly applies in its work. Operators must report to the Agency on their quality parameter values by sending the required reports once a year.

The reporting procedure has been simplified and changed allowing for the reports to be sent as electronic documents with the electronic signature of the natural person or the authorised person in the legal entity or in hard copy with the signature of the authorised person.

IV. Proposed follow-up activities

The Managing Board of the Agency has considered and adopted the Draft Rulebook, which, in accordance with the provisions of Articles 34-36 of the Law, was then sent for a 30-day public consultation, from 4.11.2022 to 4.12.2022.

During the public consultation procedure, A1 Srbija d.o.o, Yettel d.o.o, SBB DOO and Telekom Srbija a.d. sent their opinions. The Agency considered all the opinions given in the public consultation, analysed them and after evaluating the merits of their arguments made a proposal for a new rulebook and sent it to the Managing Board for further action.

It is proposed that the proposal for the new rulebook should be considered and adopted by the Managing Board of the Agency and, in accordance with Article 23 paragraph 2 of the Law and Article 57 paragraph 1 of the Law on State Administration (Official Gazette of RS 79/05, 101/07, 95/10, 99/14, 30/18 - other law and 47/18), then sent to the competent line ministry for further action and opinion on the constitutionality and legality of the Rulebook. Upon receipt of the ministry's opinion, the Rulebook will be published in the Official Gazette of the Republic of Serbia.

V. Funds for the implementation of the Rulebook

For the implementation of this rulebook, special funds will be earmarked in the Agency’s financial plan to secure instruments to measure the quality parameters of the Internet access in the users’ access network.