



On grounds of the provisions under art.38(1), (3) and (5), under art.44 letter e) and under art.46(1) point 17 of the Government Emergency Ordinance no.79/2002 on the general regulatory framework for communications, approved, with amendments and completions, by Law no.591/2002,

Taking into consideration the provisions under Decision no.131/2002 of the president of the National Regulatory Authority for Communications on the general authorization regime for providing electronic communications networks and services,

THE PRESIDENT OF THE NATIONAL REGULATORY AUTHORITY FOR COMMUNICATIONS

issues the present:

DECISION on imposing minimal requirements for the provision of publicly available electronic communications services

Art.1. – The object of the present decision is the imposing of minimal quality requirements for the provision of certain publicly available electronic communications services, in order to ensure that final users' interests are met.

Art.2. – In order to ensure minimal quality levels for the publicly available electronic communications services, hereby is set out a set of minimal indicators for the quality of services and the minimum values accepted for their parameters, as well as a set of minimal technical features necessary for reaching the imposed quality levels.

Art.3. – (1) The providers of publicly available electronic communications services have the following obligations:

a) to observe the minimal quality requirements herein;
b) to periodically report to the National Regulatory Authority for Communications, hereinafter referred to as *ANRC*, the values of the parameters afferent to the quality indicators for the provision of services, under the conditions set out in the annexes hereto.

(2) In case of quarterly report obligations, reports shall be take place on January 25, April 25, July 25 and on October 25, but only after 6 months since the estimated date indicated in the notification for the provision of the respective electronic communications services.

(3) In case of annual report obligations, reports shall take place on January 25 but only after 6 months since the estimated date indicated in the notification for the respective electronic communications services.

Art.4. – (1) The documents comprising the values of the parameters under art.3 letter b) may be submitted to *ANRC* headquarters or to the territorial office of *ANRC* covering the area where the head office/domicile of the provider is located, but only in one of the following manners, and only in one of the following manners:

a) by registering it, personally or through a representative of the provider, under signature;
b) through registered mail with confirmed receipt;
c) under the form of electronic mail having included, attached or logically associated an extended electronic signature based upon a certificate that has not been invalidated or revoked at the respective moment and generated using a secured device for creating electronic signature.

(2) As the case may be, the notification date is considered to be the date when the notification is registered in the in-coming – out-going correspondence register of ANRC, the confirmation date of the receipt if sent by registered mail with confirmed receipt, or the confirmation date of the receipt if sent in electronic form.

Art.5. – (1) Should the obligation under art.3(1) letter a) be not observed such fact shall constitute contravention, according to the provisions under art.55 (1) letter i) of the Government Emergency Ordinance no.79/2002 on the general regulatory framework for communications, approved, with amendments and completions, by Law no.591/2002.

(2) Should the obligations under art.3(1) letter b) be not observed, ANRC may apply the administrative fines under art.56(1) of Government Emergency Ordinance no.79/2002 on the general regulatory framework for communications, approved, with amendments and completions, by Law no.591/2002.

Art.6. – The minimal quality requirements set aut herein shall be periodically modified in accordance with the results of the periodical reports and the technological evolutions in the field.

Art.7. – Annexes no.1 - 4 are part of this decision.

Art.8. – This decision shall be published in the Romanian Official Bulletin, Part I.

PRESIDENT,

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Annex no.1 Publicly available telephony service

Definition: the publicly available telephony service is the publicly available electronic communications service comprising the direct, real time transport of voice through a switched public electronic communications network, so that any user connected to the network termination point may communicate with any user connected to another network termination point of.

The standard band for voice transmission ranges between 300 and 3400 Hz, with 8,7 dB attenuation at the two ends of the band as compared to the attenuation at the reference frequency of 1020 Hz.

Minimal quality indicators

These minimal quality indicators shall only apply to the publicly available telephony service provided through a public fixed electronic communications network.

1. Supply time for initial connection

Definitions:

The supply time for initial connection represents the interval of time between the moment when the services provider directly receives the request for the provision of the service and the moment when this service becomes available for the user who made the request. Only the requests for which exist technical conditions for the installation shall be taken into consideration.

This parameter shall apply for the installation of a new telephony line as well as for the installation of a supplementary access line, PSTN to ISDN transfer case included.

Considerations on measuring the parameters of this indicator:

The following parameters values shall be provided:

- the time period during which 95% of the requests are solved;
- the time period during which 99% of the requests are solved;
- the percentage of requests solved within the time interval agreed by the user.

The time period afferent to the first two parameters shall be calculated in actual days and not in working days. Cases when the user asks for the start of services provision to be delayed shall be excluded from this calculation.

2. Fault reports per access line per year

Definitions:

A valid fault report is a report regarding the end or degradation of the service, written by the end user and referring to the network operated by the services provider, or to any other network interconnected with it, through which the calls generated by the respective service are conveyed. The cases when the end or the interruption of the service is due to the damage of a terminal equipment shall be excluded.

The reports on the basic or primary access percentage (BRA/PRA) or on the multi-line analogue access shall be registered as a unique report, irrespective of the number of activated or affected channels. Moreover, the number of considered access lines shall be equal to one for primary or basic access rates, irrespective of the number of activated channels.

In case the service is provided indirectly, the number of access lines shall be replaced by the number of users of the service (CLI or PIN codes registrations).

An access line represents a circuit able to establish a vocal link between the terminal point of the network and the local exchange.

Considerations on measuring the parameters of this indicator:

This parameter shall be calculated by dividing the total number of valid reports on faults added during the data collection period to the average number of access lines or the number of service registrations existing in the respective network during the evaluation time.

An average number of lines (or cases of indirect service use) within the network shall be taken into consideration and this number shall be calculated depending on the variation of the service during the given time interval.

The reports on faults shall be generally presumed as valid.

The parameter shall be separately calculated for direct and indirect services.

3. Faults repair time

Definition:

The faults repair time represents the time interval measured between the moment the fault is reported at the public address indicated by the services provider and the moment when the service element or the service reported as fault is brought to its normal operation parameters.

Considerations on measuring the parameters of this indicator:

The provider of the telephony service shall make publicly available the time interval when notifications regarding faults can be forwarded to the public address indicated by the provider.

The cases when the service provider concludes a contract with the user and commits himself to provide preferential services in order to solve the faults, others than currently offered services, shall not be taken into consideration.

The values of the following parameters shall be reported:

- the time indicated by the services provider period necessary to solve the faults of the access lines, in case of valid reports, for the fastest 80% cases;
- the time period necessary to solve the faults of the access lines, in case of valid reports, for the fastest 95% cases;
- the time period necessary to solve all the other reported faults, in case of valid reports, for the fastest 80% cases;
- the time period necessary to solve all the other reported faults, in case of valid reports, for the fastest 95% cases;
- the percentage of total faults solved within the time period agreed by the user, calculated from the total amount of validly reported faults.

The statistics shall exclude the cases regarding faults whose remedy stands inside other electronic communications networks, interconnected to the first, from which the telephony services provider may not receive information related to the remedy of the problem occurred.

The statistics shall quantify the faults solved during the data collection period, irrespective of the moment when the fault is reported.

4. Unsuccessful calls ratio

Definition:

An unsuccessful call made to a valid identification number, correctly dialed, which does not receive either a busy tone or a calling tone, or an answer signal within at most 30 seconds after information necessary for identifying the called user is received by the network.

Considerations on measuring the parameters of this indicator:

The unsuccessful calls ratio represents the percentage ratio between the number of unsuccessful calls and the total of calls registered during a specified time period.

The values of the following parameters shall be reported:

- percentage of unsuccessful calls at local level;
- percentage of unsuccessful calls at national level;
- percentage of unsuccessful calls at international level.

The values of the national and international parameters shall be provided separately for each used carrier that is located under the Romanian state jurisdiction.

For the international parameter are not imposed restrictive values.

5. Call setup time

Definition:

The call setup time represents the time interval between the moment when the information about the address required for the establishment of the connection is received and the moment when the caller receives a busy tone, a calling tone or an answer signal from the called party.

Considerations on measuring the parameters of this indicator:

The values of the following parameters shall be reported:

- the average value (in seconds) necessary for establishing calls at local level;
- the time period (in seconds) during which 95% of the total telephony local links are established;
- the average value (in seconds) necessary for establishing calls at national level;
- the time period (in seconds) during which 95% of the total telephony national links are established;
- the average value (in seconds) necessary for establishing calls at international level;
- the time period (in seconds) during which 95% of the total telephony international links are established.

The calls considered unsuccessful are not subject to this calculation.

The values of the national and international parameters shall be provided separately for each used carrier that is located under the Romanian state jurisdiction.

For the international parameter are not imposed restrictive values.

6. Answer time for „operator” services

Definition:

The answer time for „operator” services represents the time interval between the moment when the information on the address of an „operator” service is correctly received by the network and the moment when the human operator responds to the calling user in order to provide him the requested service.

Considerations on measuring the parameters of this indicator:

The services referred to by this indicator are services called by using special access formats (short 3-digit numbers, except for emergency access numbers services, 112 type). Fully automatically provided services are not subject to this calculation.

The following parameters shall be calculated:

- the average answering time;
- the percentage of calls made to „operator” services that received an answer within less than 30 seconds, calculated from the total of calls made to these services.

7. Availability of public payphones

Definition:

The public payphone means a telephony terminal equipment, available to the general public by a provider of the publicly available telephony service, that can operate as a calling terminal as well as a called terminal.

Considerations on measuring the parameters of this indicator:

The percentage ratio between the number of operational public payphones and the total payphones that belong to the provider shall also be calculated.

8. Bill correctness

Definition:

A complaint regarding the correctness of the bill represents an expression of dissatisfaction of the user regarding the correspondance between his obligation to pay and the effectively provided services. This kind of complaint shall not be considered as a type of request for supplementary information regarding the received bill.

Considerations on measuring the parameters of this indicator:

The percentage ratio between the number of complaints regarding the bill fairness and the total number of bills issued during the reported quarter shall be calculated. All received complaints of this type shall be taken into consideration, irrespective of their validity.

Table 1.1. Minimal quality indicators for the publicly available telephony service

Indicator	Value	Regularity
1. Supply time for initial connection		
1.1. 95% of cases ¹	Max. 60 days	Annually
1.2. 99% of cases ¹	Max. 75 days	Annually
1.3. % of cases solved within the agreed time ¹	Min. 98%	Annually
2. The proportion of faults		
2.1. Faults/access line/year ¹	Max. 0,3	Quarterly
2.2. Faults/access line/year ²	Max. 0,4	Quarterly
3. Faults repair time		
3.1. The time period for solving 80% of faults	Max. 14h	Quarterly
3.2. The time period for solving 95% of faults observed on the access lines ¹	Max.16h	Quarterly
3.3. The time period for solving 80% of faults of any other type ^{1,2}	Max.24h	Quarterly
3.4. The time period for solving 95% of faults of any other type ^{1,2}	Max.48h	Quarterly
3.5.1. % of the faults solved during the period of time agreed with the user for direct services ¹	Min. 98%	Quarterly
3.5.2. % of the faults solved during the period of time agreed with the user for indirect services ²	Min. 99%	Quarterly
4. The unsuccessful calls ratio		

4.1. % of the total local calls ^{1,2}	Max. 8%	Quarterly
4.2. % of the total national calls ^{1,2,3}	Max. 10%	Quarterly
4.3. % of the total international calls ^{1,2,3,4}	-	Quarterly
5. Calls setup time		
5.1. The average period of time necessary to setup local calls ^{1,2}	Max. 4 sec.	Quarterly
5.2. The period of time necessary to setup 95% of the local calls ^{1,2}	Max. 6 sec.	Quarterly
5.3. The average period of time necessary to setup national calls ^{1,2,3}	Max. 6 sec.	Quarterly
5.4. The period of time necessary to setup 95% of the local calls ^{1,2,3}	Max. 7,5 sec.	Quarterly
5.5. The average period of time necessary to setup international calls ^{1,2,3,4}	-	Quarterly
5.6. The period of time necessary to setup 95% of the international calls ^{1,2,3,4}	-	Quarterly
6. The answer time for „operator“ service		
6.1. The average answer period	Max. 30 sec.	Quarterly
6.2. % of the calls made to the „operator“ services that received an answer within less 30 seconds	Min. 90%	Quarterly
7. Availability of public payphones		
7.1. % of public payphones that are operational	Min. 90%	Quarterly
8. Bill correctness		
8.1. % of complaints regarding the correctness of the bill	Max. 2%	Quarterly
¹ “direct service” = service offered by an electronic communications services provider who also provides the access network ² “indirect service” = service offered by an electronic communications services provider, the network for such service being selected by the user through a carrier selection procedure; ³ the numbers will be provided separately for each used carrier that is located under the Romanian state jurisdiction; ⁴ restrictive values are not imposed; the indicator is reported to ANRC and afterwards it is monitored and made public;		

Annex no.2 Leased lines service

Definition:

The leased lines service is the publicly available electronic communications service that offers a transparent and permanent transmission capacity between two points of the networks and does not allow the possibility to switch upon users' request.

A. Minimal quality indicators

1. Leased lines service availability

Definition:

Service availability represents the average time for the real or potential use of the service under specified performance conditions, expressed as a percentage of the observation period.

Considerations on measuring the parameters of this indicator:

$$\text{Availability} = \frac{\text{Perioada de observare} - \sum \text{Perioada de nedisponibilitate}}{\text{Perioada de observare}}$$

$$\text{Frequency of faults} = \frac{\text{Nr. perioadelor de nedisponibilitate}}{\text{Perioada de observare}}$$

Service availability shall be evaluated during a long observation period of time (minimum three months) and cannot be measured using one single test.

The values of the parameters shall be reported quarterly.

The non-availability periods to be assessed in case of leased lines may generally be due to one of the following three causes:

1. faults reported by users (*fault reports*), confirmed by tests and investigations carried out by the service provider;
2. impaired service reported by users (*impaired service reports*) while they continue to use the low performance service;
3. planned service interruptions, for example in order to perform repairs or verification and maintenance activities.

Note

The conditions and procedures regarding the measurement of availability are found in the following standards harmonized at European level: ETSI EN 300 418; EN 300 419; EN 300 448; EN 300 449; EN 300 451; EN 300 452.

The values imposed for the availability parameter, respectively the frequency of falls parameter, are to be found in table 2.1.

Tabelul 2.1. Minimal quality indicators for leased lines service

Indicators	Terrestrial links				Satellite links	
	Service availability		Frequencies of falls (per year)		Service availability	
	Average value	Minimum value	Average value	Minimum value	Average value	Minimum value
Standard	97,3%	94,7%	590	1 590	not	97,0%

indicators					imposed	
Indicators for superior quality	99,5%	98,2%	230	625	not imposed	99,2%

B. The technical features for the minimum set of leased lines

Depending on the nature of the conveyed signal, the leased lines can be classified in:

- analogical leased lines
- digital leased lines.

1. Analogical leased lines

According to ETSI technical standards, the analogical leased lines are divided into the following categories:

- regular quality lines (A2O, A4O) with 2 or 4 wires;
- special quality lines (A2S, A4S) with 2 or 4 wires.

Table 2.2. Types of analogical leased lines

Type of leased line	Reference	
A2O	ETSI EN 300 448	Access and terminal equipments; Analogical leased lines with 2 wires and regular quality vocal band. Connection features and presentation of the network interface.
A2S	ETSI EN 300 449	Access and terminal equipments; Analogical leased lines with 2 wires and special quality vocal band. Connection features and presentation of the network interface.
A4O	ETSI EN 300 451	Access and terminal equipments; Analogical leased lines with 4 wires and regular quality vocal band. Connection features and presentation of the network interface.
A4S	ETSI EN 300 452	Access and terminal equipments; Analogical leased lines with 2 wires and special quality vocal band. Connection features and presentation of the network interface.

According to ETSI standards, the minimal technical features of the connection are to be found in table 2.3.

Table 2.3. Analogical leased lines. Minimal technical conditions

CONNECTION	MINIMAL VALUES
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FEATURES	A20	A2S	A40	A4S
Transfer features				
Information transfer capability	Signals in vocal band without any restriction imposed on the use of frequencies	Signals in vocal band without any restriction imposed on the use of frequencies	Signals in vocal band without any restriction imposed on the use of frequencies	Signals in vocal band without any restriction imposed on the use of frequencies
Transmission structure	Bidirectional	Bidirectional	Bidirectional	Bidirectional
Setting up/ releasing the connection	Does not require the use of any protocol or other intervention of the user in NTP	Does not require the use of any protocol or other intervention of the user in NTP	Does not require the use of any protocol or other intervention of the user in NTP	Does not require the use of any protocol or other intervention of the user in NTP
Symmetry	Symmetrical in both directions	Symmetrical in both directions	Symmetrical in both directions	Symmetrical in both directions
Communication configuration	Point by point	Point by point	Point by point	Point by point
Network performances				
Total attenuation	$0 \text{ dB} \leq a_T \leq 25 \text{ dB}$	$0 \text{ dB} \leq a_T \leq 17 \text{ dB}$	$0 \text{ dB} \leq a_T \leq 21 \text{ dB}$	$0 \text{ dB} \leq a_T \leq 13 \text{ dB}$
Attenuation distortion	EN 300 448 (table2, fig.1)	EN 300 449 (table2, fig.1)	EN 300 451 (table2, fig.1)	EN 300 452 (table2, fig.1)
Level of conveyed signals				
1. Maximum level of the average entry power	-9 dBm	-9 dBm	-13 dBm	-13 dBm
2. Maximum level of the instantaneous power	+4 dBm	+4 dBm	0 dBm	0 dBm
3. Maximum power level within a 10Hz band	No restrictive values are imposed	No restrictive values are imposed	No restrictive values are imposed	No restrictive values are imposed
4. Maximum value of the entry power outside the vocal band	No restrictive values are imposed	No restrictive values are imposed	No restrictive values are imposed	No restrictive values are imposed
Transmission delay				
1. Terrestrial transmission	$\leq (15+0,01G)\text{ms}$ (G=geographical distance in km)	$\leq (15+0,01G)\text{ms}$ (G= geographical distance in km)	$\leq (15+0,01G)\text{ms}$ (G= geographical distance in km)	$\leq (15+0,01G)\text{ms}$ (G= geographical distance in km)
2. Satellite transmission	$\leq 350 \text{ ms}$	$\leq 350 \text{ ms}$	$\leq 350 \text{ ms}$	$\leq 350 \text{ ms}$
Group delay disturbance	No restrictive values are imposed	EN 300 449 (table3, fig.3)	No restrictive values are imposed	EN 300 452 (table3, fig.3)
Time variation of total attenuation				
1. Sudden amplitude variations	No restrictive values are imposed	≤ 10 during a 15 min period	No restrictive values are imposed	≤ 10 during a 15 min period
2. Other variations	$\pm 4\text{dB}$ as compared to the corresponding value at $f=1020\text{Hz}$	$\pm 4\text{dB}$ as compared to the corresponding value at $f=1020\text{Hz}$	$\pm 4\text{dB}$ as compared to the corresponding value at $f=1020\text{Hz}$	$\pm 4\text{dB}$ as compared to the corresponding value at $f=1020\text{Hz}$
Level of the psophometric	$< -41 \text{ dBm0p}$	$< -41 \text{ dBm0p}$	$< -41 \text{ dBm0p}$	$< -41 \text{ dBm0p}$

noise power at the output of the leased line				
Impulse noise	No restrictive values are imposed	≤ 18 impulses ≥ -21 dBm0 during the 15 min period	No restrictive values are imposed	≤ 18 impulses ≥ -21 dBm0 during the 15 min period
Phase jitter	No restrictive values are imposed	$\leq 10^0$ peak to peak	No restrictive values are imposed	$\leq 10^0$ peak to peak
Total disturbances				
1. Quantization disturbances	$\leq 7,5$ qdu; ≤ 1 ADPCM system	≤ 3 qdu; without ADPCM system	$\leq 7,5$ qdu; ≤ 1 ADPCM system	≤ 3 qdu; without ADPCM system
2. Total disturbances	No restrictive values are imposed	> 28 dB	No restrictive values are imposed	> 28 dB
Single tone interference	No restrictive values are imposed	≤ -44 dBm0	No restrictive values are imposed	≤ -44 dBm0
Frequency error	No restrictive values are imposed	$\leq \pm 5$ Hz	No restrictive values are imposed	$\leq \pm 5$ Hz
Harmonique disturbances	No restrictive values are imposed	≥ 25 dB under the fundamental's level	No restrictive values are imposed	≥ 25 dB under the fundamental's level
Echo and stability				
Echo control device	Not used	Not used	-	-
Echo at emmission	> 10 dB	> 10 dB	-	-
Echo at reception	> 20 dB	> 20 dB	-	-
Stability	0÷4 kHz	0÷4 kHz	-	-

2. Digital leased lines

The minimum set of leased lines for which minimal technical features are imposed refer to one of the following categories of leased lines:

- digital leased line without restrictions, with 64 Kbit/s binary flow (D64U);
- digital leased line with multiple 64 kbit/s binary flow (D64M);
- digital leased line for 2.048 kbit/s circuits, unstructured (D2048U);
- digital leased line for 2.048 kbit/s circuits, structured (D2048S).

Table 2.4. Types of digital leased lines

The type of leased line	Reference	
64 kbit/s D64U	ETSI EN 300 289	Access and terminal equipments; Digital leased lines without 64 Kbps restrictions, with octet integrity; Connection features.
2048 kbit/s - E1 (unstructured) D2048U	ETSI EN 300 247	Access and terminal equipments; Digital leased lines for 2048 Kbps circuits, unstructured; Connection features.
2048 kbit/s - E1 (structured) D2048S	ETSI EN 300 419	Access and terminal equipments; Digital leased lines for 2048 Kbps circuits, structured; Connection features.

According to the ETSI standards, minimal technical connection features are to be found in table 2.5.

Table 2.5. Digital leased lines. Minimal technical conditions

CONNECTION FEATURES	MINIMAL CONDITIONS			
	D64U	D64M	D2048U	D2048S
Transfer features				
Information transfer rate	64kbit/s	n x 64kbit/s	2048±50ppm kbit/s	Synchronised leased lines 2048±50ppm kbit/s 1984kbit/s
Information transfer capability	Digital information without restrictions	Digital information without restrictions	Digital information without restrictions	Digital information without restrictions
Transmission structure	Maintaining the bye integrity	Separate bytes	Unstructured	Maintaining the frame integrity
Setting up/ releasing the connection	Does not require the use of any protocol or other intervention of the user in NTP*	Does not require the use of any protocol or other intervention of the user in NTP*	Does not require the use of any protocol or other intervention of the user in NTP*	Does not require the use of any protocol or other intervention of the user in NTP*
Symmetry	Symmetrical in both directions	Symmetrical in both directions	Symmetrical in both directions	Symmetrical in both directions
Communication configuration	Point by point	Point by point	Point by point	Point by point
Network performance				
Transmission delay				
1. Terrestrial transmission	≤(10+0,01G)ms (G=geographical distance in km)	≤(10+0,01G)ms (G= geographical distance in km)	≤(10+0,01G)ms (G= geographical distance in km)	≤(10+0,01G)ms (G= geographical distance in km)
2. Satellite transmission	≤ 350 ms	≤ 350 ms	≤ 350 ms	≤ 350 ms
Jitter (1 UI=15,6µs)				
1. Jitter at line input port	0,25UI (20Hz±600Hz) 0,05UI (3kHz±20kHz)	1,1UI (4Hz±100kHz) 0,11UI (40Hz±100kHz)	1,1UI (4Hz±100kHz) 0,11UI (40Hz±100kHz)	1,1UI (4Hz±100kHz) 0,11UI (40Hz±100kHz)
2. Jitter at line output port	0,25UI (20Hz±20kHz) 0,05UI (3kHz±20kHz)	1,5UI (20Hz±100kHz) 0,2UI (18kHz±100kHz)	1,5UI (20Hz±100kHz) 0,2UI (18kHz±100kHz)	1,5UI (20Hz±100kHz) 0,2UI (18kHz±100kHz)
Byte slip	≤ 5 in 24h	≤ 5 in 24h	≤ 5 in 24h	≤ 5 in 24h
Error parameters				
1. Errored seconds (ES)	≤ 5 324 in 24h	≤ 5 324 in 24h	≤ 2889 in 24h	EN 300 419 (table 1)
2. Severly errored seconds (SES)	≤ 105 in 24h	≤ 105 in 24h	≤ 117 in 24h	
3. BBE**	-	-	22 395 in 24h	
*Network Termination Point				
**Background Block Errors				

Annex no.3 Electronic communications services provided on the ISDN network

Minimal quality indicators of the services provided on an ISDN network

Definition:

The ISDN network is that network through which an electronic communications services package is conveyed, providing a digital connection between the interfaces user/network.

1. Fault reports over ISDN access line per year

Definition:

A valid complaint report represents a report over a service interruption or degradation affecting one or more ISDN channels, refers to the network and includes the request for repairs. Damages of any terminal equipment are excluded.

Considerations on measuring the parameters of this indicator:

The calculation of the indicator shall be made by dividing the number of valid reports registered during a year to the average value of the number of ISDN access lines in the same period of time.

Only valid reports shall be taken into consideration.

This indicator shall be reported quarterly.

2. Severely Errored Seconds

Definition:

A Severely Errored Second (SES) represents an interval of a second that has a bit error rate (BER) superior to the value of 10^{-3} .

Considerations on measuring the parameters of this indicator:

The indicator shall be expressed as a percentage ratio between the number of severely errored seconds during the specified interval and the total of seconds during that interval for ISDN 64kbps connections.

3. Unsuccessfull calls ratio

Definitions:

A failed call is a call addressing a valid identification number, properly dialed, for which the signaling system of the called user does not receive the message "ALERT" or "CONNECT", nor any other indication of "busy user", nor other distance rejection indication, in less than 30 seconds after the moment when the "INITIAL ADDRESS MESSAGE" or the "SUBSEQUENT ADDRESS MESSAGE" messages are received by the network.

A virtual unsuccessfull call is a virtual call made to a valid identification number, which does not determine the reception of a connecting package or of an availability confirmation from the called party during a 200 seconds period from the moment when a call request package is transferred from the caller party to the access channel.

Considerations on measuring the parameters of this indicator:

The rate of unsuccessfull calls represents the percentage ratio between the number of unsuccessfull calls and the total calls/virtual calls within a specified period of time.

Measurements shall be made by generating test signals.

The parameter values for unsuccessful calls and for unsuccessful virtual calls shall be reported separately.

This indicator shall be reported quarterly.

4. Call setup time

Definition:

The call setup time represents the period that starts when the message "INITIAL ADDRESS MESSAGE" or "SUBSEQUENT ADDRESS MESSAGE", required for circuit selection, is received by the network and ends when a message "ALERT" or "CONNECT", or an indication "busy user", or any indications of calls rejection from the called user, is received by the signaling system of the caller.

Considerations on measuring the parameters of this indicator:

The unsuccessful calls and the calls receiving the "NO USER RESPONDING" message shall be excluded from the calculation.

Measurements shall be made by generating test signals.

This indicator shall be reported quarterly.

5. Transfer rate

Definition:

The transfer rate for a virtual connection is the number of data bits successfully transferred in one direction from one termination point to another per time unit.

Considerations on measuring the parameters of this indicator:

The indicator shall be calculated as the percentage ratio between the real value of the obtained transfer rate and the nominal value of the connection.

Measurements shall be made by generating test signals. The indicator shall be calculated for 10 seconds time intervals of active connection.

This indicator shall be reported quarterly.

6. Loop delay

Definition:

The loop delay represents the time interval since the first bit of the package reaches the access line of the transmitting terminal equipment until the last bit of the same package is received by the terminal receiving equipment.

Considerations on measuring the parameters of this indicator:

Measurements shall be made by generating test signals and using data packages of 128 bits fixed length.

This indicator shall be reported quarterly.

7. Call setup delay

Definition:

The call setup delay represents the interval between the moment when the first bit of the call request package is transferred from the terminal equipment transmitting in line and the moment when the last bit of the connection package is received by the terminal receiving equipment.

Considerations on measuring the parameters of this indicator:

The unsuccessful calls shall be excluded. Measurements shall be made by generating test signals.

This indicator shall be reported quarterly.

8. The availability of the support service

Definition:

An unavailability status starts with the first occurrence of a 10 consecutive seconds interval during which, for each second, either the service is interrupted due to a fault in the network, or the residual error rate exceeds 10^{-3} . These 10 seconds are considered part of the unavailability time.

The unavailability status ends with the first 10 seconds interval during which the service is not interrupted or the residual error rate does not exceed 10^{-3} . These 10 seconds are considered part of the availability time.

The availability of the support service is defined as the percentage ratio between the average number of hours during which the service is available for the user (for all the permanent package mode connections) and the total numbers of hours.

Considerations on measuring the parameters of this indicator:

The unavailability moments due to the equipments/devices belonging to users or third parties shall be excluded from the calculation

This indicator shall be reported quarterly.

Table 3.1. Minimal quality indicators for publicly available electronic communications services provided through ISDN networks

Indicator	Value	Observations
Faults reported per ISDN access line per year	max. 0.2	For all the types of ISDN support services (for all bearer services)
Severely errorated seconds	max. 1%	
Unsuccessful calls rate	max. 2%	For the support services with circuits/package switching
Call setup time	max. 5sec.	For the support services with circuits switching
The transfer rate	min. 95%	For support services with package switching
Loop delay	max. 150msec.	
Call setup delay	max. 5sec.	For support services with package switching
Availability of the support service	min. 99%	For permanent support services with package switching

Annex no.4 Electronic communications services provided through networks using IP protocol

In order to reach minimal quality levels for the services provided through networks that use IP protocol the following performance parameters shall be used:

1. IP-IPTD transfer delay

For one transmission direction, this parameter represents the necessary time for a package to be entirely transmitted and received at its destination and is the sum of two parts, namely:

- the time needed for the first bit of the packet to pass from the source to the destination, depending on the physical distance, on the number of active and passive equipments passed through along the connection and of the sudden network loading;
- the time needed to transmit all the bits in the package, depending on the line transmission speed.

2. IP-IPDV delay variation

For a given pair of IP packages, this parameter represents the difference between the delay on one direction, measured for two consecutive packets.

3. IP-IPLR loss rate

The parameter is defined as the ratio between the number of sent packages that are not received at the destination or are received corrupted and the total number of sent packages.

4. IP-IPER error rate

This indicator represents the ratio between the number of corrupted packages and the total number of sent packages.

The four performance parameters considered for the networks using IP protocol shall fit within the restrictive values defined in table 4.1, thus identifying the quality classes of the provided services.

Table 4.1. Correlating the performance objectives of IP networks with the service quality classes

Network performance parameter	Nature of the performance objective	Service quality class					
		Class 0	Class 1	Class 2	Class 3	Class 4	Class 5
IPTD	Maximum value ⁽¹⁾	100ms	400ms	100ms	400ms	1s	N
IPDV	Maximum value ⁽²⁾	50ms ⁽³⁾	50ms ⁽³⁾	N	N	N	N
IPLR	Maximum value	10 ⁻³ ⁽⁴⁾	10 ⁻³ ⁽⁴⁾	10 ⁻³	10 ⁻³	10 ⁻³	N
IPER	Maximum value	10 ⁻⁴ ⁽⁵⁾					N

These objectives apply to public networks using IP protocols. For the IPTD, IPDV and IPLR parameters a standard 1 minute period is recommended. „N“ corresponds to „is not imposed“.

(1) The long propagation periods may prevent from reaching those performance objectives. Therefore, the provider of services may alternatively choose between different values, depending on the performance level that can be offered.

(2) For supplementary technical data regarding this parameter, one shall address to ITU-T Y.1541 Recommendation, Appendix II.

(3) This value is proportional with the capacity of the points of connection between the networks.

(4) Value obtained following ITU studies on the quality of the applications that integrate human voice.

(5) This value changes the loss of packages into the sole dominant source of the faults in the transmission towards superior levels.

In order for the imposed conditions to be met, as well as in order to clarify the technical aspects regarding the definition, implementation, measurement of performance parameters, one shall address the ITU-T Y.1540 and Y.1541 Recommendations.

Table 4.2. suggests an orientation for the providers of electronic communications services conveyed through the networks using IP protocol, for the purpose of provided applications classification.

Table 4.2. Classifying electronic communications services provided through networks using IP protocol into quality classes

Service quality class	Applications (examples)	Node mechanisms	Network technics
0	Real time, highly interactive applications sensitive to jitter variations (VoIP, video teleconferences)	Separate waiting queues, with preferential services and traffic management	Switching and distance constraints
1	Real time, interactive applications sensitive to jitter variations (VoIP, video teleconferences)		Lower switching and distance constraints
2	Highly interactive information on transactions (signals)	Separate waiting queues, low priority	Switching and distance constraints
3	Interactive information on transactions		Lower switching and distance constraints
4	Interactive informations on transactions (short transactions, video flux, data transmissions)	Long waiting ques, low priority	Any route/way
5	Traditional applications of regular IP networks	Separate waiting ques, minimum priority	Any route/ way

The providers of publicly available telephony services, using VoIP technology for the provision of local calls, are bound to communicate to all interested persons the quality class of

the provided service, before providing the service, and to practice tariffs correlated to this class when providing the service.

The providers of publicly available telephony service, using VoIP technology for the provision of long-distance and international calls, are bound to observe the performance objectives corresponding to class 0 service quality.