

**Attachment 2.**  
**State Telephone Call (Loop)**  
**Service Quality Standards**

## **State Telephone Call (Loop) Service Quality Standards**

*[all of the following are copies of the full text of regulations, except for notes italicized in brackets]*

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### **Arkansas, 126 03 Code of Ark. Regs. 014 (Telecommunications Providers Rules)**

#### **Rule 11.07. Transmission Standards**

##### **A. General Information**

(1) Both the objectives and the limits for transmission values are presented in these Rules. However, values which are between an objective and the respective maximum or minimum limit are not violations, though surveillance and possibly corrections are indicated.

(2) These Rules do not address transmission quality standards of all circuit parameters; for example, return loss, crosstalk, impulse noise, etc. However, BOC Notes on the LEC Network - 1990 Special Report SR-TSV-002275, Issue 1, March 1991, published by Bellcore, is adopted as the minimum transmission standard for circuits which originate and terminate in Arkansas.

(3) The following transmission loss and noise value requirements do not include the attenuation from devices such as impedance matching transformers or 2dB test pads.

##### **B. Quality of Service Requirements**

(1) Values above the maximum or below the minimum limits in Subsections C., D., and E. of this Rule require immediate attention and correction.

(2) For purposes of evaluating the quality of service, each type of circuit shall be evaluated separately and at least 95% must comply with the respective maximum or minimum limits.

##### **C. Subscriber Loop Standards**

(1) Loop current (terminated in a 200 ohms resistance or an equivalent test instrument):

- a. objective 23.0 milliamperes
- b. minimum 20.0 milliamperes

(2) Transmission loss at 1004 Hertz, excluding central office loss:

- a. objective 8.0 decibels
- b. maximum 10.5 decibels

(3) Metallic (message circuit) noise:

- a. objective 20.0 dBrnC
- b. maximum 30.0 dBrnC

##### **D. Inter-office or Extended Area Service (EAS) Trunk Standards**

(1) Transmission loss at 1004 Hertz:

- a. objective 4.0 decibels
- b. maximum/minimum +/- 4.0 decibels

(2) Message circuit noise for electronically derived (carrier) circuits:

- a. objective 21.0 dBrnC
- b. maximum 28.0 dBrnC

- (3) Message circuit noise for metallic (copper) circuits:
  - a. objective 25.0 dBrnC
  - b. maximum 36.0 dBrnC

E. Toll Connecting Trunk Standards

- (1) Transmission loss at 1004 Hertz:
  - a. objective 3.0 decibels
  - b. maximum/minimum +/- 3.0 decibels
- (2) Message circuit noise:
  - a. objective 23.0 dBrnC
  - b. maximum 32.0 dBrnC

\* dBrnC = decibels above reference noise with C-message weighting.

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**Illinois, 83 Ill. Adm. Code § 730.525 (Standards of Service for Local Exchange Telecommunications Carriers, Standards of Quality of Service)**

§ 730.525 Transmission Requirements

Local exchange carriers shall furnish and maintain plant, equipment and facilities to meet the following minimum transmission standards. The transmission standards set forth in this Section are based upon measurements from the network interface at the customer premises through the local loop to a nominal 48-volt central office and measured at a frequency of 1004 hertz.

a) Local line analog loops shall have a loop resistance not exceeding the operating design of the associated central office equipment. Longer loops may be used by deployment of loop range ex-tenders.

b) All analog loops are to be maintained to a minimum of 40,000 ohms insulation resistance.

c) Transmission loss of analog local loop shall be engineered not to exceed 10.0 dB when measured in accordance with subsection (a). The local loop transmission loss shall be adjusted to 10.0 dB or less if it exceeds 10.0 dB.

d) Transmission loss in analog interoffice trunks shall be engineered not to exceed 7 dB. If the loss exceeds expected design loss by + or - 3.5 dB, it shall be corrected to within 1 dB of the design loss.

e) Transmission loss on analog toll terminating trunks shall be engineered not to exceed 4 dB. If the loss exceeds expected design loss by + or - 3.5 dB, it shall be corrected to within 1 dB of the design loss.

f) Transmission loss on all digital interoffice trunks shall be engineered and maintained not to exceed 6 dB.

g) Loop current shall be maintained at 20 milliamperes or greater.

h) Power influence (Noise to Ground) shall not exceed 90 dBrnC.

i) Circuit noise (Noise Metallic) shall not exceed 30 dBrnC.

*[Note: Similar standards for non-LEC carriers at 83 Ill. Adm. Code 737.630]*

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**Kentucky, 807 Ky. Admin. Regs. 5:061 (Telephone)**

Section 18. Minimum Transmission Objectives.

- (1) Transmission objectives set forth in this administrative regulation are based upon use of standard Federal Communications Commission registered telephone sets connected to a minimum forty-eight (48) volt dial central office and measured at a frequency of 1,000 cycles.
- (2) Access lines shall have a loop resistance not exceeding the operating design of associated central office equipment.
- (3) Telephone utilities shall, as nearly as possible, design access line loops having a transmission loss of no more than eight and five-tenths (8.5) decibels measured to the network interface.
- (4) Overall transmission loss, including terminating equipment, on local interoffice trunks shall be no more than seven (7) decibels.
- (5) Whenever feasible, overall transmission loss, including terminating equipment, on intertoll trunks and terminating links shall be no more than five (5) decibels.

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**Maryland, Code of Md. Regs. 20.45.05.07 (Service Supplied By Telephone Companies, Service Standards)**

.07 Minimum Transmission Objectives.

- A. Reference Conditions. The transmission objectives set forth in these regulations are based upon the use of standard telephone sets connected to a 48-volt dial central office and measured at a frequency of 1000 hertz. This does not preclude future designs based on new instruments or voltages other than 48 volts, provided that equivalent or better transmission is obtained.
- B. Loop Resistance. A subscriber line shall have a loop resistance not exceeding the operating design of the associated central office equipment. Amplifiers and long line adaptors may be used to extend the central office equipment design limits; however, the objectives of these regulations shall be met.
- C. Permissible Loss on Subscriber Loops. The maximum transmission loss objective of any one subscriber loop shall be 11 db. Subscribers' loops with losses in excess of 15 dB shall be considered as trouble requiring correction. The maximum transmission loss objective between any two subscribers on separate lines in the same central office shall be 22 db.
- D. Permissible Loss on Local Interoffice Trunks. The maximum overall transmission loss objective, including the loss in terminating equipment on local interoffice trunks, shall be 7 db. Local interoffice trunks with losses in excess of 11 db shall be considered as troubles requiring correction.

E. Permissible Loss on Toll Trunks. The maximum overall transmission loss objective, including the loss in terminating equipment for toll connecting trunks, shall be 4 db. Toll connecting trunks with losses in excess of 8 db shall be considered as troubles requiring correction. The maximum loss in intertoll trunks shall be consistent with the requirements of a nationwide switching plan.

F. Permissible Noise on Subscribers' Lines. Subscribers' lines with noise in excess of 40 db above reference level shall require correction. "Reference level" is defined as 90 db (referred to as one milliwatt).

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**Missouri, 4 Mo. Code of State Regs. 240-32.060 (Telecommunications Service)**

240-32.060 Engineering and Maintenance

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(11) Each company shall maintain the following specifications for its outside plant:

(A) Access line loops shall not have a loop resistance that exceeds the operating design of the connected central office equipment. Loop resistance greater than the design of the central office equipment shall have long line adapters, voice frequency repeaters or other special equipment. Subscriber loops not served by analog or digital carrier technologies shall maintain a minimum of twenty-three (23) milliamperes of loop current when measured at the customer's premises;

(B) Transmission loss of access line loops shall not exceed eight and five-tenths (8.5) decibels when measured at one thousand (1,000) hertz. Loops that are measured with more loss shall be corrected to a maximum loss of eight and five-tenths (8.5) decibels; and

(C) Where inductive loading is necessary, loading procedures shall conform to industry standards for forty-four (44), sixty-six (66) or eighty-eight (88) millihenry load coil spacings.

(12) Each company shall investigate and pursue corrective action for the following faults on working cable pairs when they are detected with the customer's equipment disconnected:

(A) A leakage tip to ring, tip to ground or ring to ground of forty thousand (40,000) ohms of resistance or less;

(B) An imbalance between the tip and ring of a cable pair of ten percent (10%) or more when measured from the central office with a cable analyzer;

(C) A balance reading below sixty (60) decibels with reference to noise with C-message weighting (dBrnC), measured by a noise measuring test set, where the noise metallic reading is sub-tracted from the power influence when the power influence reading is over seventy (70) dBrnC;

(D) Voltage of ten (10) volts direct current (DC) or more on either side of a dry cable pair when measured from the central office;

(E) A power influence reading of ninety (90) dBrnC or more on the cable pair when measured from the central office;

(F) A noise metallic reading of thirty (30) dBrnC or more on the cable pair when measured from the central office;

(G) An alternating current voltage on the tip or ring to ground of more than fifty (50) root mean square volts; and

(H) Any other fault that affects or may contribute to service degradation.

(13) Transmission loss on trunks that only carry traffic within a local calling scope shall not exceed six (6) decibels of loss.

(14) Transmission loss on trunks that carry long distance traffic shall not exceed four (4) decibels of loss.

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**Nebraska, 291 Neb. Admin. Code Title 291, Ch. 5 (Telecommunications Rules and Regulations)**

002.13 Loop Transmission Objectives: Exchange carriers shall furnish and maintain adequate plant, equipment, and facilities necessary to provide satisfactory transmission of telecommunications. Transmission shall be at adequate volume levels and free of excessive distortion. Levels of noise and cross-talk shall be such as not to impair communications.

002.13A Local line loops shall have a loop resistance not exceeding the operating design of the associated central office equipment. Longer loops may be used by employment of long line adapters and amplifiers, or special equipment.

002.13B Transmission loss as set forth herein means the loss that occurs in a telephone connection, measured in decibels (db) at one thousand (1000) hertz per second, exclusive of test pads, impedance matching coils used for measurement, and similar devices. Transmission loss on local access line loops shall not exceed ten (10) db.

002.13C The maximum overall transmission loss objective, including the loss of terminating equipment on local interoffice trunks, shall be seven (7) db.

002.13D Noise, as set forth herein means noise expressed in db above reference level, with the standard C-message weighting (dbnC) at applicable circuitry impedances. Reference level is defined as minus ninety (-90) dbm (minus 90 decibels referred to one milliwatt). The maximum noise objective for local access line loops shall be thirty (30) dbnC.

002.13E The maximum power influence or noise-to-ground objective for local access line loops shall be ninety (90) dbnC.

002.13F The minimum loop current objective for local access lines shall be twenty (20) milliamps (ma).

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**Oregon, Or. Admin. R. 860-023-0055 (Telecommunications Service Standards)**

860-023-0055 Retail Telecommunications Service Standards for Large Telecommunications Utilities

Every large telecommunications utility must adhere to the following standards:

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(10) Customer Access Line Testing. All customer access lines must be designed, installed, and maintained to meet the levels in subsection (b) of this section.

(a) Measurement: Each large telecommunications utility must make all loop parameter measurements at the network interface, or as close as access allows.

(b) Objective Service Level: Each access line must meet the following levels:

(A) Loop Current: The serving wire center loop current, when terminated into a 400-ohm load, must be at least 20 milliamperes;

(B) Loop Loss: The maximum loop loss, as measured with a 1004-hertz tone from the serving wire center, must not exceed 8.5 decibels (dB);

(C) Metallic Noise: The maximum metallic noise level, as measured on a quiet line from the serving wire center, must not exceed 20 decibels above referenced noise level -- C message weighting (dBrnC);

(D) Power Influence: As a goal, power influence, as measured on a quiet line from the serving wire center, must not exceed 80 dBrnC.

*[Note: Similar standards for competitive carriers in 860-032-0012; similar standards for small LECs in 860-034-0390]*

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### **South Carolina, S.C. Code Regs. 103-663.3 (Telecommunications Utilities, Standards and Quality of Service, Service Standards)**

103-663.3 Subscriber Loop-Transmission Objectives.

The following standards are objectives to be used by the ORS staff during testing at the subscriber's station protector. Acceptable measurements are:

DC Line Current: greater than 20 mA

Circuit Loss: less than 8.5 db

Circuit Noise: less than 20 dBrnC

Power Influence: less than 90 dBrnC

Balance greater than 60 dB, (Where Balance (dB) = Power Influence - Circuit Noise)

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### **Texas, 16 Tex. Admin. Code § 26.54 (Substantive Rules Applicable to Telecommunications Service Providers)**

§ 26.54. Service Objectives and Performance Benchmarks

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(7) Transmission requirements. All voice-grade trunk facilities shall conform to accepted transmission design factors and shall be maintained to meet the following objectives when measured from line terminals of the originating central office to the line terminals of the terminating central office. A periodic report for central offices or exchanges as requested by the commission staff shall be provided by the DCTU, in order to demonstrate compliance with the following objectives.

(A) Interoffice local exchange service calls. Excluding calls between central offices in the same building, 95% of the measurements on the network of a DCTU should have from two to ten decibels loss at 1000+20 hertz and no more than 30 decibels above reference noise level ("C" message weighting).

(B) Direct distance dialing. Ninety-five percent of the transmission measurements should have from three to 12 decibels loss at 1000+20 hertz and no more than 33 decibels above reference noise level ("C" message weighting).

(C) Subscriber lines. All newly constructed and rebuilt subscriber lines shall be designed for a transmission loss of no more than eight decibels from the serving central office to the customer premises network interface. All subscriber lines shall be maintained so that transmission loss does not exceed ten decibels. Subscriber lines shall in addition be constructed and maintained so that metallic noise does not exceed 30 decibels above reference noise level ("C" message weighting) on 90% of the lines. Metallic noise shall not exceed 35 decibels above reference noise level ("C" message weighting) on any subscriber line.

(D) PBX, key, and multiline trunk circuits. PBX, key, and multiline trunk circuits shall be designed and maintained so that transmission loss at the subscriber station does not exceed eight decibels. If the PBX or other terminating equipment is customer-owned and if transmission loss exceeds eight decibels the DCTU's responsibility shall be limited to providing a trunk circuit with no more than five decibels loss from the central office to the point of connection with customer facilities.

(E) Impulse Noise Limits. The requirements for impulse noise limits shall be as follows: (i) For switching offices, the noise level count shall not exceed five pulses above the threshold in any continuous five minute period on 50% of test calls. The reference noise level threshold shall be less than: 54 dBrnC for CrosS.B.ar switch, 59 dBrnC for step-by-step switch, and 47 dBrnC for electronic or digital switch. (ii) For trunks, the noise level count shall not exceed five pulses above the threshold in any continuous five minute period on 50% of trunks in a group. The reference noise level threshold shall be less than 54 dBrnCO for voice frequency trunks, and 62 dBrnCO for digital trunks. (iii) For loop facilities, the noise level count shall not exceed 15 pulses above the threshold in any continuous 15 minute period on any loop. The reference noise level threshold shall be less than 59 dBrnC when measured at central office (CO), or referred to CO through 1004 Hz loss.

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**Washington, Wash. Admin. Code § 480-120-401 (Telephone Companies, Safety and Standards Rules)**

WAC 480-120-401. Network performance standards.

(1) All companies must meet the applicable network performance standards set forth in this section. The standards applied to each service quality measurement are the minimum acceptable quality of service under normal operating conditions. All performance standards apply to each central office individually and must be measured at or below that level. The performance standards do not apply to abnormal conditions, including, but not limited to work stoppage directly affecting provision of service in the state of Washington, holidays, force majeure, or major outages caused by persons or entities other than the local exchange company (LEC) or its agents.

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(4) Outside plant.

(a) Local loops. Each LEC must design, construct, and maintain subscriber loops to the standard network interface or demarcation point as follows:

(i) For voice grade, local exchange service loops must meet all performance characteristics specified in Section 4 of the Institute of Electrical and Electronic Engineers (IEEE) Standard Tele-phone Loop Performance Characteristics. Information about this standard regarding the version adopted and where to obtain it is set forth in WAC 480-120-999.

(ii) For voice grade service, the circuit noise level on customer loops measured at the customer network interface must be equal to or less than 20.0 dBrnC, except that digitized loops and loops in excess of 18,000 feet must have a noise level objective of less than 25.0 dBrnC, and noise levels must not exceed 30 dBrnC.

(b) Special circuits. Off-premise station circuit loss must not exceed 5.0 dB at 1004 Hz when measured between the customer switch demarcation and the customer station demarcation. LECs with over fifty thousand access lines must maintain design criteria for special circuits. Companies must make channel performance criteria available to customers upon request.

(c) Digital services. LECs must meet the availability objectives for digital private line circuit performance specified in the American National Standards for Telecommunications, "Network Performance Parameters for Dedicated Digital Services for Rates Up To and Including DS3 - Specifications." Information about this standard regarding the version adopted and where to obtain it is set forth in WAC 480-120-999. Upon request of a customer, a LEC may provide to that customer digital services that do not meet the performance standards set forth in (b) of this subsection.

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**West Virginia, W. Va. CSR § 150-6-6 (Rules and Regulations for the Government of Telephone Utilities)**

§ 150-6-6. Standards of quality of service.

6.1. Basic telephone company obligations.

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h. Subscriber loop requirements.

1. Where analog voice telecommunications service is provided to a subscriber, the local distribution circuit (loop) shall meet the following specifications when measurements are taken at the local exchange carrier's NID connecting point:

- A. Loop current: 20 mA to a 400 ohm load.
- B. Circuit loss: (-)8.5 db or less.
- C. Circuit noise: 20 dbmC or less.
- D. Power influence: 80 db or less.
- E. Balance (power influence minus circuit noise): 60 db or more.

2. Where digital telecommunications service is provided to a subscriber, the local exchange carrier shall meet or exceed the minimum data transmission speed for the specific digital

telecommunications service provided to the subscriber. Each digital telecommunications service offering shall be set forth in the carrier's Commission-approved tariff.