

busy leads only as defined in §§ 68.3 and 68.200(j).

TABLE I

Ringing type	Range of compatible ringing frequencies Hz	Simulated ringing voltage superimposed 56.5 volts dc	Impedance limitation (ohms)
A	20 ± 3	40 to 130 volts rms	1400
	30 ± 3	40 to 130 volts rms	1000
B	15.3 to 68.0	40 to 150 volts rms	1600
C	15.3 to 17.4	54 to 120 volts rms	1600
D	19.3 to	54 to 120 volts rms	1600
	20.7 ¹ (frequency-selective).		
E	24.3 to 25.7	54 to 120 volts rms	1600
F	29.3 to	54 to 120 volts rms	1600
	30.7 ¹ (frequency-selective).		
G	32.6 to 34.0	54 to 130 volts rms	1600
H	39.2 to 40.9	62 to 130 volts rms	1600
J	41.0 to 43.0	62 to 130 volts rms	1600
K	49.0 to 51.0	62 to 140 volts rms	1600
L	52.9 to 55.1	62 to 140 volts rms	1600
M	58.8 to 61.2	68 to 150 volts rms	1600
N	65.4 to 68.0	68 to 150 volts rms	1600
P	15.3 to 34.0	54 to 130 volts rms	1600
Q	20 ± 3	40 to 130 volts rms	1400

¹NOTE: Requirements at these frequencies, which are identical to Type A frequencies, are not consistent with the Type A requirements; equipment intended for use both on Type A facilities and facilities using frequency-selective ringing must comply with the requirements on Types A, D and F independently.

[45 FR 20853, Mar. 31, 1980, as amended at 45 FR 61632, Sept. 17, 1980; 45 FR 79486, Dec. 1, 1980; 46 FR 40192, Aug. 7, 1981; 48 FR 34044, July 27, 1983; 51 FR 950, Jan. 9, 1986; 51 FR 28237, Aug. 6, 1986; 61 FR 42394, Aug. 15, 1996; 61 FR 47434, Sept. 9, 1996]

§ 68.314 Billing protection.

(a) *Call duration requirements on data equipment connected to the public switched network, or to tie trunks, or to private lines that access the public switched network.* Registered data terminal equipment and registered protective circuitry shall comply with the following requirements when answering an incoming call, except in off-hook states in which the signals are transmitted and/or received by electroacoustic transducers only:

NOTE: This paragraph (a) will be applicable to terminal equipment and registered protective circuitry employed with digital services where such digital services are interconnected with the analog telephone network.

(1) *Registered protective circuitry.* Registered protective circuitry connected to associated data equipment shall as-

sure that the following signal power limitations are met for at least 2 seconds after the off-hook condition is presented to the telephone network in response to an incoming call:

(i) Signals that appear at the protective circuitry/telephone network interface for delivery to the telephone network shall be limited to -55 dB with respect to one milliwatt as such signals are delivered into a loop simulator circuit or a 600 ohm termination, as appropriate; and

(ii) Signals that appear at the protective circuitry-associated data equipment interface for delivery to associated data equipment shall be limited as follows: for any received signal power (appearing at the protective circuitry-telephone network interface) up to 0 dB with respect to one milliwatt (at any frequency in the range of 200 to 3200 Hertz), the power of signals delivered to associated data equipment shall be no greater than the signal power that would be delivered as a result of received signal power of -55 dB with respect to one milliwatt.

(2) *Registered terminal equipment.* Registered terminal equipment for data applications shall assure that, when an incoming telephone call is answered, the answering terminal equipment prevents both transmission and reception of data for at least 2 seconds after the answering terminal equipment transfers to the off-hook condition. For the purpose of this requirement, a fixed sequence of signals that is transmitted (and originated within) and/or received by the registered terminal equipment each time it answers an incoming call shall not be considered data, provided that such signals are for one or more of the following purposes:

- (i) Disabling echo control devices,
- (ii) Adjusting automatic equalizers and gain controls,
- (iii) Establishing synchronization, or
- (iv) Signaling the presence and if required, the mode of operation, of the data terminal at the remote end of a connection.

(b) *Voice and data equipment on-hook signal requirements for equipment connected to the public switched network, or*

to tie trunks, or to private lines that access the public switched network. Registered protective circuitry and registered terminal equipment shall comply with the following:

(1) The power delivered into a 2-wire loop simulator circuit or into the transmit and receive pairs of a 4-wire loop simulator or into a 600 ohm termination (where appropriate) in the on-hook state, by loop-start or ground-start equipment shall not exceed -55dB with respect to one milliwatt within the frequency band from 200 to 4000 Hertz. Registered protective circuitry shall also assure that for any input level up to 10dB above the maximum level that is expected under normal operation, the power to a 2-wire loop simulator circuit or the transmit and receive pairs of a 4-wire loop simulator circuit or into a 600 ohm termination (where appropriate) does not exceed the above limits.

(2) The power delivered into a 2-wire loop simulator circuit or into the transmit and receive pairs of a 4-wire loop simulator circuit, in the on-hook state, by reverse battery equipment shall not exceed -55dB with respect to one milliwatt, unless the equipment is arranged to inhibit incoming signals.

(c) *Voice and data equipment loop current requirements for equipment connected to the Public Switched network.* The loop current through registered terminal equipment or registered protective circuitry, when connected to a 2-wire or 4-wire loop simulator circuit with the 600 ohm resistor and 500 microfarad capacitor of the 2-wire loop simulator circuit or both pairs of the 4-wire loop simulator circuit disconnected shall, for at least 5 seconds after the equipment goes to the normal off-hook state which would occur in response to ringing (called party condition):

(1) Be at least as great as the current obtained in the same loop simulator circuit with a 200 ohm resistance connected across the tip and ring of the 2-wire loop simulator circuit or connected across the tip/ring and tip 1/ring 1 conductors (tip and ring connected together and tip 1 and ring 1 connected together) of the 4-wire loop simulator circuit in place of the registered termi-

nal equipment or registered protective circuitry; or

(2) Not decrease by more than 25 percent from its maximum value attained during this 5-second interval; unless the equipment is returned to the on-hook state during the above 5 second interval.

(d) *Signaling interference requirements.*

(1) Terminal equipment connected to the Public Switched Network or private lines identified in §68.2(a) (2) and (3). Registered terminal equipment and registered protective circuitry shall not deliver signals into a 2-wire loop simulator circuit or the transmit and receive pairs of a 4-wire loop simulator circuit or a 600-ohm termination (where appropriate) from sources internal to the registered equipment or circuitry, with energy in the 2450 to 2750 Hertz band unless an equal amount of energy is presented in the 800 to 2450 Hertz band.

(2) Registered terminal equipment for connection to subrate or 1.544 Mbps digital services shall not deliver digital signals to the telephone network with encoded analog content energy in the 2450 to 2750 Hertz band unless at least an equal amount of encoded analog energy is present in the 800 to 2450 Hertz band.

(e) *Operating requirements for automatic identified outward dialing—(1) General.* Registered terminal equipment that provides Automatic Identified Outward Dialing (AIOD) features shall meet those operating requirements necessary to ensure compatibility with the local telephone company serving central office. A sufficient set of operating characteristics for interfacing with central office AIOD channels is contained in the Electronics Industries Association (EIA) Standard RS-464, Section 4.4.1., dated December 1979.

(2) *Station number assignment.* Station number assignments in registered terminal equipment with AIOD capabilities, including spare numbers for subsequent activities by the customer, must be programed into the equipment by a qualified installer only and such numbers must be restricted to the group of station numbers provided by the telephone company. If the registered terminal equipment is arranged so that

the customer can reassign and/or activate new station numbers, means shall be provided so that the customer can verify that the 4-digit number assigned to a station set, incoming tie trunk, or the attendant for AIOD purposes is the same as the number identified by the registered terminal equipment for AIOD when an outgoing call to a central office is originated.

(f) *On-hook signal requirements for registered terminal equipment for connection to subrate or 1.544 Mbps digital services.* Registered terminal equipment and registered protective circuitry shall comply with the following:

(1) The power delivered to the telephone network in the on-hook state as derived by a zero level decoder shall not exceed -55 dBm equivalent power for digital signals within the frequency band from 200 to 4000 Hertz. Registered protective circuitry shall also assure that for any input level up to 10 dB above the maximum level that is expected under normal operation, the power to a zero level decoder does not exceed the above limits.

(2) The power derived by a zero level decoder, in the on-hook state, by reverse battery equipment shall not exceed -55 dB with respect to one milliwatt, unless the equipment is arranged to inhibit incoming signals.

(g) *Off-hook signal requirements for registered terminal equipment connecting to 1.544 Mbps digital services.* Upon entering the normal off-hook state, in response to alerting, for analog subrate channels, registered terminal equipment shall continue to transmit the signaling bit sequence representing the off-hook state for 5 seconds, unless the equipment is returned to the on-hook state during the above 5 second interval.

(h) Operating Requirements for Direct-Inward-Dialing ("DID"). (1) Answer supervision for DID calls to stations connected to the telephone company network through a Private Branch Exchange or similar system ("PBX") shall be returned to the central office on all calls which are:

- (i) Answered by the called DID station,
- (ii) Answered by an attendant,

- (iii) Routed to an announcement, except for "number invalid," "not in service," or "not assigned" recordings,

- (iv) Routed to a dialing prompt, or
- (v) Routed back to the public switched network by the PBX, including calls routed to "number invalid," "not in service," or "not assigned" recordings.

(2) DID calls which do not require the PBX to return answer supervision are those:

- (i) Which are not routed back to the public switched network and, in addition, are:

- (A) Unanswered, i.e., the called DID station receives a ring or other alerting signal, but does not answer, or the DID station to which the call is forwarded receives a ring or other alerting signal, but does not answer,

- (B) Routed to a busy signal,
- (C) Routed to a reorder signal, or
- (D) Routed to a recorded announcement stating "number invalid," "not in service," or "not assigned"; and those

- (ii) Which are routed back to the public switched network and, in addition, are:

- (A) Unanswered, i.e., the called station receives a ring or other alerting signal, but does not answer, or the DID station to which the call is forwarded receives a ring or other alerting signal, but does not answer,

- (B) Routed to a busy signal, or
- (C) Routed to a reorder signal.

(3) Answer supervision on DID calls shall be provided in accordance with industry engineering standards.

(4) PBX and similar systems manufactured one year from December 31, 1990, shall comply with the paragraph. PBX and similar systems of earlier manufacture shall comply with the paragraph if newly installed or relocated on a customer's premises eighteen months from December 31, 1990, or any time thereafter. Such equipment must be reregistered by the manufacturer or other person responsible for equipment compliance with part 68, if already registered but not compliant with this paragraph (h). Compliance with the paragraph shall require that the equipment be designed, manufactured and installed so that it will return answer supervision in conformity

with this rule in a manner which cannot be readily altered by software control or other user controlled media.

(5) As used in this § 68.314(h), *Private Branch Exchange or similar system* ("PBX") means customer premises equipment, such as private branch exchanges, key equipment, multifunction systems, multiplexers, and any equipment for which adopted industry standard signalling is the standard mode of returning answer supervision.

[45 FR 20853, Mar. 31, 1980, as amended at 47 FR 10219, Mar. 10, 1982; 47 FR 39687, Sept. 9, 1982; 47 FR 42750, Sept. 29, 1982; 49 FR 48725, Dec. 14, 1984; 50 FR 27251, July 2, 1985; 51 FR 950, Jan. 9, 1986; 51 FR 16690, May 6, 1986; 55 FR 46066, Nov. 1, 1990]

§ 68.316 Hearing aid compatibility magnetic field intensity requirements: Technical standards.

A telephone handset is hearing aid compatible for the purposes of this section if it complies with the following standard, published by the Telecommunications Industry Association, copyright 1983, and reproduced by permission of the Telecommunications Industry Association:

ELECTRONIC INDUSTRIES ASSOCIATION RECOMMENDED STANDARD RS-504 MAGNETIC FIELD INTENSITY CRITERIA FOR TELEPHONE COMPATIBILITY WITH HEARING AIDS

[Prepared by EIA Engineering Committee TR-41 and the Hearing Industries Association's Standards and Technical Committee]

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Magnetic Field Intensity Criteria for Telephone Compatibility With Hearing Aids

(From EIA Standards Proposal No. 1652, formulated under the cognizance of EIA TR-41 Committee on Voice Telephone Terminals and the Hearing Industries Association's Standards and Technical Committee.)

1 Introduction

Hearing-aid users have used magnetic coupling to enable them to participate in telephone communications since the 1940's. Magnetic pick-ups in hearing-aids have provided for coupling to many, but not all, types of telephone handsets. A major reason for incompatibility has been the lack of handset magnetic field intensity requirements. Typically, whatever field existed had been provided fortuitously rather than by design. More recently, special handset designs, e.g., blue grommet handsets associated with public telephones, have been introduced to provide hearing-aid coupling and trials were conducted to demonstrate the acceptability of such designs. It is anticipated that there will be an increase in the number of new handset designs in the future. A standard definition of the magnetic field intensity emanating from telephone handsets intended to provide hearing-aid coupling is needed so that hearing-aid manufacturers can design their product to use this field, which will be guaranteed in handsets which comply with this standard.

1.1 This standard is one of a series of technical standards on voice telephone terminal equipment prepared by EIA Engineering Committee TR-41. This document, with its companion standards on Private Branch Exchanges (PBX), Key Telephone Systems (KTS), Telephones and Environmental and Safety Considerations (Refs: A1, A2, A3 and A4) fills a recognized need in the telephone industry brought about by the increasing use in the public telephone network of equipment supplied by numerous manufacturers. It will be useful to anyone engaged in the manufacture of telephone terminal equipment and hearing-aids and to those purchasing, operating or using such equipment or devices.

1.2 This standard is intended to be a living document, subject to revision and updating as warranted by advances in network and terminal equipment technology and changes in the FCC Rules and Regulations.

2 Scope

2.1 The purpose of this document is to establish formal criteria defining the magnetic field intensity presented by a telephone to