

TABLE 2—ADJUSTMENT TO  $L_{ave\ max}$  TO OBTAIN  $L_{adj\ ave\ max}$  FOR RETARDERS AND CAR COUPLING IMPACTS<sup>1</sup>

[n/T = number of measurements/measurement duration (min)]	C = Adjustment in dB]
0.111 to 0.141	-9
0.142 to 0.178	-8
0.179 to 0.224	-7
0.225 to 0.282	-6
0.283 to 0.355	-5
0.356 to 0.447	-4
0.448 to 0.562	-3
0.563 to 0.708	-2
0.709 to 0.891	-1
0.892 to 1.122	0
1.123 to 1.413	+1
1.414 to 1.778	+2
1.779 to 2.239	+3
2.240 to 2.818	+4
2.819 to 3.548	+5
3.549 to 4.467	+6

<sup>1</sup>  $L_{adj\ ave\ max} = L_{ave\ max} + C$  in dB.  
 Values in Table 2 were calculated from  $[C=10 \log n/T]$  with intervals selected to round off values to the nearest whole decibel. The table may be extended or interpolated to finer interval gradations by using this defining equation.

(3) *Adjusted average maximum A-weighted sound level.* The energy average level for the measured car coupling sounds is calculated to determine the average maximum sound level ( $L_{ave\ max}$ ). It is then adjusted by adding the adjustment (C) from Table 2 appropriate to the number of measurements divided by the duration of the measurement period (n/T), to obtain the adjusted average maximum A-weighted sound level ( $L_{adj\ ave\ max}$ ) for car coupling impacts.

**§ 201.27 Procedures for: (1) Determining applicability of the locomotive load cell test stand standard and switcher locomotive standard by noise measurement on a receiving property; (2) measurement of locomotive load cell test stands more than 120 meters (400 feet) on a receiving property.**

(a) *Microphone.* The microphone must be located at a receiving property measurement location and must be positioned at a height between 1.2 and 1.5 meters (4 and 5 feet) above the ground. Its position with respect to the equipment must be in accordance with the manufacturers' recommendations for Type 1 or 2 performance as appropriate. No person may stand between the microphone and the equipment being measured or be otherwise positioned relative to the microphone at variance to the manufacturers' recommendations for Type 1 or Type 2 performance as appropriate.

(b) *Data.* (1) When there is evidence that at least one of these two types of nearly steady state sound sources is affecting the noise environment, the following measurements must be made. The purpose of these measurements is to determine the A-weighted  $L_{90}$  statistical sound level, which is to be used as described in subparagraph (c) below to determine the applicability of the source standards. Before this determination can be made, the measured  $L_{90}$  is to be "validated" by comparing the measured  $L_{10}$  and  $L_{99}$  statistical sound levels. If the difference between these levels is sufficiently small (4 dB or less), the source(s) being measured is considered to be a nearly steady state source.

(2) Data shall be collected by measuring the instantaneous A-weighted sound level (FAST) at a rate of at least once each 10 seconds for a measurement period of at least 15 minutes and until 100 measurements are obtained. The data may be taken manually by direct reading of the indicator at 10 second intervals ( $\pm 1$  second), or by attaching a statistical analyzer, graphic level recorder, or other equivalent device to the sound level meter for a more continuous recording of the instantaneous sound level.

(3) The data shall be analyzed to determine the levels exceeded 99%, 90%, and 10% of the time, i.e.,  $L_{99}$ ,  $L_{90}$ , and  $L_{10}$ , respectively. The value of  $L_{90}$  is considered a valid measure of the A-weighted sound level for the standards in § 201.16 only if the difference between  $L_{10}$  and  $L_{99}$  has a value of 4 dB or less. If a measured value of  $L_{90}$  is not valid for this purpose, measurements may be taken over a longer period to attempt to improve the certainty of the measurement and to validate  $L_{90}$ . If  $L_{90}$  is valid and is less than the level in applicable standards for these source types, the sources are in compliance. If the measured value of  $L_{90}$  is valid and exceeds the initial 65 dB requirement for any of the source types that appear to be affecting the noise environments, the evaluation according to the following paragraph (c) is required.

(c) *Determination of applicability of the standard when  $L_{90}$  is validated and is in excess of one or more of the source standards.* The following procedures must be

used to determine the compliance of the various source types when  $L_{90}$  is validated and in excess of one or more of the applicable standards.

(1) The principal direction of the nearly steady-state sound at the measurement location must be determined, if possible, by listening to the sound and localizing its apparent source(s). If the observer is clearly convinced by this localization process that the sound emanates only from one or both of these two sources, then:

(i) If only a stationary locomotive(s), including at least one switcher locomotive, are present, the value of  $L_{90}$  is the value of the A-weighted sound level to be used in determining if the 65 dB requirement is exceeded and compliance with the standards in §§ 201.11(c) and 201.12(c) is necessary.

(ii) If only a locomotive load cell test stand and the locomotive being tested are present and operating, the value of  $L_{90}$  is the value of the A-weighted sound level to be used in determining applicability of the standard in § 201.16.

(iii) If a locomotive load cell test stand(s) and the locomotive being tested are present and operating with stationary locomotive(s), including at least one switcher locomotive, the value  $L_{90}$  minus 3 dB is the value of the A-weighted sound level to be used in determining applicability of the standards in §§ 201.11(c), 201.12(c) and 201.16.

(iv) If a locomotive load cell test stand(s) and the locomotive being tested are present and operating, and a stationary locomotive(s) is present, and if the nearly steady-state sound level is observed to change by 10 dB, coincident with evidence of a change in operation of the locomotive load cell test stand but without apparent change in the location of stationary locomotives, another measurement of  $L_{90}$  must be made in accordance with paragraph (b) of this section. If this additional measure of  $L_{90}$  is validated and differs from the initial measure of  $L_{90}$  by an absolute value of 10 dB or more, then the higher value of  $L_{90}$  is the value of the A-weighted sound level to be used in determining applicability of the standard in § 201.16.

(2) In order to accomplish the comparison demonstration of paragraph (c)(3) of this section, when one or more

source types is found not to be in compliance with the applicable standard(s), documentation of noise source information shall be necessary. This will include, but not be limited to, the approximate location of all sources of each source type present and the microphone position on a diagram of the particular railroad facility, and the distances between the microphone location and each of the sources must be estimated and reported. Additionally, if other rail or non-rail noise sources are detected, they must be identified and similarly reported.

(3) If it can be demonstrated that the validated  $L_{90}$  is less than 5 dB greater than any  $L_{90}$  measured at the same receiving property location when the source types that were operating during the initial measurement(s) are either turned off or moved, such that they can no longer be detected, the initial value(s) of  $L_{90}$  must not be used for determining applicability to the standards. This demonstration must be made at a time of day comparable to that of the initial measurements and when all other conditions are acoustically similar to those reported in paragraph (c)(2) of this section.

[45 FR 1263, Jan. 4, 1980; 47 FR 14709, Apr. 6, 1982]

**§ 201.28 Testing by railroad to determine probable compliance with the standard.**

(a) To determine whether it is probably complying with the regulation, and therefore whether it should institute noise abatement, a railroad may take measurements on its own property at locations that:

(1) Are between the source and receiving property

(2) Derive no greater benefit from shielding and other noise reduction features that does the receiving property; and

(3) Otherwise meet the requirements of § 201.25.

(b) Measurements made for this purpose should be in accordance with the appropriate procedures in § 201.26 or § 201.27. If the resulting level is less than the level stated in the standard, then there is probable compliance with the standard.