APPENDIX F. COMPUTING MAXIMUM NOISE LEVEL (L_{max}) FOR A SINGLE TRAIN PASSBY

This appendix provides procedures for the computation of L_{max} for a single train passby, for those readers desiring such procedures. Table F-1 contains the equations to compute L_{max}. The procedure is summarized as follows.

- Collect the following input information:
    - SEL_{ref}'s from Chapter 6, specific to both the locomotive type and car type of the train
    - N_{locos}, the number of locomotives in the train
    - N_{cars}, the number of cars in the train
    - L_{locos}, the total length of the train's locomotive(s), in feet (or N_{locos}(unit length)
    - L_{cars}, the total length of the train's set of rail car(s), in feet (or N_{cars}(unit length)
    - S, the train speed, in miles per hour
    - D, the closest distance between the receiver of interest and the train, in feet
- Compute $L_{max,locos}$ from the locomotive(s) using the first equation in Table F-1.
- Compute $L_{max,cars}$ from the rail car(s) using the second equation in Table F-1.
- Choose the larger of the two L_{max}'s as the L_{max} for the total train passby.

Table F-1. Conversion to L_{max} at the Receiver, for a Single Train Passby	
Source	**Equation**
Locomotives	$L_{\max,lo\cos} = SEL_{lo\cos} + 10\log\left(\frac{S}{50}\right) - 10\log\left(\frac{L}{50}\right) + 10\log(2\propto) - 3.3$
Rail Cars	$L_{\max,cars} = SEL_{cars} + 10\log\left(\frac{S}{50}\right) - 10\log\left(\frac{L}{50}\right) + 10\log[2\propto + \sin(2\propto)] - 3.3$
Total Train	$L_{\max,total} = \max[L_{\max,lo\cos} \, or \, L_{\max,cars}]$
D = closest distance between receiver and source, in feet L = total length of measured group of locomotive(s) *or* rail car(s), in feet S = vehicle speed, in miles per hour $\propto = \arctan\left(\frac{L}{2D}\right)$, in radians	

Example F-1. Computation of L_{max} for Train Passby

A commuter train will pass by a receiver of interest and its L_{max} is desired. For this train, the following conditions apply:

SEL_{ref} = 92 dB for locomotives and
= 82 dB for rail cars
N_{locos} = 1
N_{cars} = 6
S = 43 miles per hour
D = 125 feet.

The locomotive and rail cars each have a unit length of 70 feet. Therefore,

L_{locos} = 70 feet
L_{cars} = 420 feet

Using the equations in Table F-1,

$\propto_{lo\cos}$ = 0.27
$\propto_{cars}$ = 1.03

and the resulting Lmax's are as follows:

$L_{max,locos}$ = 84 dBA
$L_{max,cars}$ = 74 dBA
$L_{max,total}$ = 84 dBA.

End of Example F-1