the output of the analyzer without slow time-weighting, slow time-weighting must be simulated in the subsequent processing. Simulated slow time-weighted sound pressure levels can be obtained using a continuous exponential averaging process by the following equation:

$$L_s\ (i,k) = 10 \log\ [(0.60653)\ 10^{0.1\ Ls[i,\ (k-1)]} + (0.39347)\ 10^{0.1\ L\ (i,\ k)}]$$

where $L_s(i,k)$ is the simulated slow time-weighted sound pressure level and L(i,k) is the as-measured 0.5s time average sound pressure level determined from the output of the analyzer for the k-th instant of time and i-th one-third octave band. For k = 1, the slow time-weighted sound pressure $L_s[i, (k - 1 = 0)]$ on the right hand side should be set to 0 dB. An approximation of the continuous exponential averaging is represented by the following equation for a four sample averaging process for k ≥4:

$$L_s\ (i,k) = 10 \log\ [(0.13)\ 10^{0.1\ L[i,(k-3)]} + (0.21)\ 10^{0.1\ L[i,\ (k-2)]} + (0.27)\ 10^{0.1\ L[i,\ (k-1)]} + (0.39)\ 10^{0.1\ L[i,\ k]}]$$

where L_s (i, k) is the simulated slow time-weighted sound pressure level and L (i, k) is the as measured 0.5s time average sound pressure level determined from the output of the analyzer for the k-th instant of time and the i-th one-third octave band.

The sum of the weighting factors is 1.0 in the two equations. Sound pressure levels calculated by means of either equation are valid for the sixth and subsequent 0.5s data samples, or for times greater than 2.5s after initiation of data analysis.

NOTE: The coefficients in the two equations were calculated for use in determining equivalent slow time-weighted sound pressure levels from samples of 0.5s time average sound pressure levels. The equations do not work with data samples where the averaging time differs from 0.5s.

A36.3.7.6 The instant in time by which a slow time-weighted sound pressure level is characterized must be 0.75s earlier than the actual readout time.

NOTE: The definition of this instant in time is needed to correlate the recorded noise with the aircraft position when the noise was emitted and takes into account the averaging period of the slow time-weighting. For each 0.5 second data record this instant in time may also be identified as 1.25 seconds after the start of the associated 2 second averaging period.

A36.3.7.7 The resolution of the sound pressure levels, both displayed and stored, must be 0.1 dB or finer.

A36.3.8 *Calibration systems.*

A36.3.8.1 The acoustical sensitivity of the measurement system must be determined using a sound calibrator generating a known sound pressure level at a known frequency. The minimum standard for the sound calibrator is the class 1L requirements of IEC 60942 as amended (incorporated by reference, see §36.6).

A36.3.9 *Calibration and checking of system.*

A36.3.9.1 Calibration and checking of the measurement system and its constituent components must be carried out to the satisfaction of the FAA by the methods specified in sections A36.3.9.2 through A36.3.9.10. The calibration adjustments, including those for environmental effects on sound calibrator output level, must be reported to the FAA and applied to the measured one-third-octave sound pressure levels determined from the output of the analyzer. Data collected during an overload indication are invalid and may not be used. If the overload condition occurred during recording, the associated test data are invalid, whereas if the overload occurred during analysis, the analysis must be repeated with reduced sensitivity to eliminate the overload.

A36.3.9.2 The free-field frequency response of the microphone system may be determined by use of an electrostatic actuator in combination with manufacturer's data or by tests in an anechoic free-field facility. The correction for frequency response must be determined within 90 days of each test series. The correction for non-uniform frequency response of the microphone system must be reported to the FAA and applied to the measured one-third octave band sound pressure levels determined from the output of the analyzer.

A36.3.9.3 When the angles of incidence of sound emitted from the aircraft are within ±30° of grazing incidence at the microphone (see Figure A36–1), a single set of free-field corrections based on grazing incidence is considered sufficient for correction of directional response effects. For other cases, the angle of incidence for each 0.5 second sample must be determined and applied for the correction of incidence effects.

A36.3.9.4 For analog magnetic tape recorders, each reel of magnetic tape must carry at least 30 seconds of pink random or pseudo-random noise at its beginning and end. Data obtained from analog tape-recorded signals will be accepted as reliable only if level differences in the 10 kHz one-third-octave-band are not more than 0.75 dB for the signals recorded at the beginning and end.

A36.3.9.5 The frequency response of the entire measurement system while deployed in the field during the test series, exclusive of the microphone, must be determined at a level within 5 dB of the level corresponding to the calibration sound pressure level on the level range used during the tests for each one-third octave nominal midband frequency from 50 Hz to 10 kHz inclusive, utilizing pink random or pseudo-random noise. Within six months of each test series the output of the