

Appendix 7.4.13 Assessment for Tonality, Intermittency and Impulsiveness

Noise Measurement Setup

Noise surveys were carried out at 12:30 to 17:30 hours on 5 November 2013 to investigate the correction of tonality, intermittency and impulsiveness of the fixed plant noise source.

The noise measurements were undertaken using Type 1 sound level meters, namely Svantek SVAN 958. During each measurement, the sound level meter was checked using an acoustic calibrator generating a sound pressure level of 94.0 dB(A) at 1kHz immediately before and after the noise measurement. The measurements were accepted as valid only if the calibration levels before and after the noise measurements were agreed to within 1.0 dB(A). Moreover, the sound level meters and acoustic calibrators are calibrated in accredited laboratories yearly to ensure reliable performance.

A 60 mins measurement period at each measurement location was conducted on the 5 November 2013 from 12:30 to 17:30 hours. Two locations have been chosen at the NSRs SLW-1 and TS-1 (House No.1, Sha Lo Wan and House, Tin Sum) in this assessment. Noise levels were recorded in 1/3 octave bands with 0.1 sec equivalent continuous noise level (L_{eq}) logging step to identify the totality, intermittency and impulsiveness of the fixed plant noise source including the sources of ground noise for aircraft noise-generating activities on HKIA such as taxiing, engine testing, maintenance activities and use of auxiliary power-units (APUs) etc. Dominant noise during the measurement has been identified as aircraft noise, non-aircraft noise (i.e. ground noise) and other noise (i.e. construction noise, helicopter noise, and noise caused by people walking and cycling around).

Aircraft noise and fixed noise source periods have been recorded during the measurement so that the fixed non-aircraft noise period can be identified in order to evaluate any correction for the characteristics of tonality, intermittency and impulsiveness. Details of the noise measurement were summarised in **Table 1**.

Table 1: Summary of Noise Measurement

Description	Details
Date of Monitoring	05-Nov-2013
Measurement Start Time	12:30
Measurement End Time	17:30
Measurement Time Length (min)	60 per measurement point
Weather Condition	Cloudy
Noise Meter Model	Svantek SVAN 958
Dominant Noise Sources during Monitoring	Aircraft noise, non-aircraft noise/ fixed plant noise, and other noise (ie. Construction noise, helicopter noise, people walking and cycling around)
Remarks	Free Field Measurement

Photos of the measurement setup are shown below:



Evaluation of Tonality, Intermittency and Impulsiveness

For the fixed noise impact assessments, the correction of tonality, intermittency and impulsiveness are determined in according to the Technical Memorandum for the Assessment of Noise from Places other than Domestic Premises, Public Places or Construction Sites (IND-TM) issued under the Noise Control Ordinance (NCO). Details of the criteria and assessment results have been summarized as follows:

Correction of Tonality

In accordance with the IND-TM, a correction for tonality shall be applied if, between 31.5 Hz and 16 kHz, any 1/3 octave band or any pair of adjacent 1/3 octave bands of the A-weighted spectrum of the noise under investigation satisfy all of the following conditions:

- The level of the 1/3 octave band under consideration, or, in the case of a pair of bands, the level of the highest band in that pair, is not more than 15.0 dB(A) below the level of the highest 1/3 octave band;
- The level of the 1/3 octave band under consideration, or, in the case of a pair of bands, the arithmetic average of the levels of the two bands, is >1.0 dB(A) higher than the level of each of the adjacent bands on either side of the band or pair of bands under consideration; and
- The level difference, known as the tonality factor, f_{tone} , between the level of the 1/3 octave band under consideration, or, in the case of a pair of bands, the arithmetic average of the levels of the two bands, and the arithmetic average of the levels of the adjacent bands on either side of the band or pair of bands under consideration is ≥ 3.0 dB(A).

Table 2: Summary of Tonality Correction

F_{tone} (dB)	Below 250 Hz	250 Hz or above
Greater than or equal to 3.0 and less than 6.0	No correction	3
Greater than or equal to 6.0 and less than 9.0	3	6
Greater than or equal to 9.0	6	6

According to the noise measurement results, the correction of tonality was evaluated in every 30 mins for all the 1/3 octave bands and pairs of adjacent 1/3 octave band during the identified fixed noise source period.

During the time period 12:30 to 13:30 hours at NSR SLW-1 and 16:30 to 17:30 hours at NSR TS-1 for the identified fixed noise source period, the characteristics of tonality was checked. No correction in tonality has been identified during the whole measurement periods.

Correction of Intermittency

In accordance with the IND-TM, a correction for intermittency shall be applied satisfies all of the following conditions:

- (a) A-weighted sound pressure level subject to rapid changes in level of ≥ 5.0 dB(A);
- (b) Occurring with a degree of regularity within the sample time period; and
- (c) Typical magnitude of these changes in level known as the intermittency factor, f_{int} .

During the time period 12:30 to 13:30 hours at NSR SLW-1 and 16:30 to 17:30 hours at NSR TS-1 for the identified fixed noise source period, the characteristics of intermittency was checked. No correction in intermittency has been identified during the whole measurement periods.

Correction of Impulsiveness

In accordance with the IND-TM, a correction for impulsiveness shall be applied satisfies all of the following conditions:

- (a) The fluctuation of the instantaneous sound pressure level at the NSR is large;
- (b) The fluctuation of noise occurs within a short time period; and
- (c) The fluctuation of noise occurs for a significant number of times.

During the time period 12:30 to 13:30 hours at NSR SLW-1 and 16:30 to 17:30 hours at NSR TS-1 for the identified fixed noise source period, the characteristics of impulsiveness was checked. No correction in impulsiveness has been identified during the whole measurement periods.