

MTR Corporation Limited

West Island Line Project

Baseline Monitoring Report (Part 11)

Verified by:  _____

Position: Independent Environmental Checker

Date: 12 October 2010

MTR Corporation Limited

West Island Line Project

Baseline Monitoring Report (Part 11)

Certified by: Glenn Frommer

Position: Environmental Team Leader

Date: 6 October 2010

EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

Background

MTR Corporation Limited (MTRCL) proposes to build a new railway line, the West Island Line (WIL) which is an extension of the Island Line to the Western District. The route length of the fully underground WIL is approximately 3 km with three new underground stations namely Sai Ying Pun Station (SYP), University Station (UNI) and Kennedy Town Station (KET).

Impact Assessment and Baseline Monitoring

With the development of the Environmental Monitoring and Audit Manual (EM&A Manual) in accordance with the guideline set out in the Environmental Impact Assessment (EIA) report prepared by ENSR Asia (HK) Limited in October 2008, Baseline Monitoring (Part 11) had been conducted for noise at the proposed monitoring location in the vicinity of Works Areas O1, O2 and O3 to establish baseline levels for noise for the civil construction work within Works Areas O1, O2 and O3.

Results and Conclusions

Baseline monitoring (Part 11) had been carried out in accordance with the recommendations contained in the Technical Memoranda associated with EIAO and Noise Control Ordinance, where applicable. Results and Conclusions of the report were presented in the subsequent sections of the Baseline Monitoring Report.

1 INTRODUCTION

1.1 BACKGROUND

The West Island Line Project

MTR Corporation Limited (MTRCL) proposes to build a new railway line, the West Island Line (WIL) which is an extension of the Island Line to the Western District. The route length of the fully underground WIL is approximately 3 km with three new underground stations namely Sai Ying Pun (SYP), University (UNI) and Kennedy Town (KET).

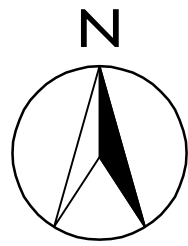
The location of works areas is shown in Figure 1.

- 1.1.1 An EIA study (refer to EIA Report dated October 2008) has been conducted by ENSR Asia (HK) Limited for the proposed WIL Project. An EM&A Manual has provided guidelines in the preparation of this baseline monitoring report.
- 1.1.2 Baseline levels have been established for noise, by which the performance of the construction Contractor may be measured in meeting the required environmental protection standards and requirements under the Environmental Permit, during the course of the construction work. These are presented in subsequent sections of this report.
- 1.1.3 This Baseline Monitoring Report (Part 11) presents the results for the baseline monitorings conducted for noise at the proposed monitoring locations in the vicinity of Works Areas O1, O2 and O3 and establishes baseline levels for noise for the civil construction work within Works Areas O1, O2 and O3. Baseline monitorings for other works areas are to be conducted subsequently and the baseline monitoring reports for these works areas will be submitted accordingly.

1.2 ORGANISATION OF THE REPORT

Following the introduction, the remainder of this Report is arranged as follows:

- Section 2 describes the noise quality monitoring methodology and analyses the monitoring results.
- Section 3 Conclusions



816800 N



830900 E

831900 E

832900 E

SAI WAN

SAI YING RUN

WESTERN HARBOUR

Little Green Island

SULPHUR CHANNEL

815800 N

FIG 1.3

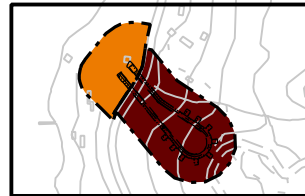


FIG 1.4

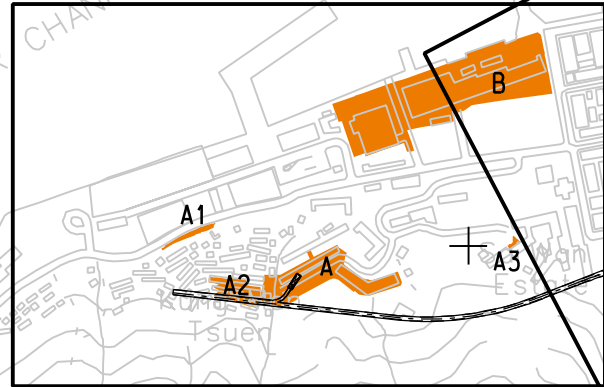


FIG 1.5

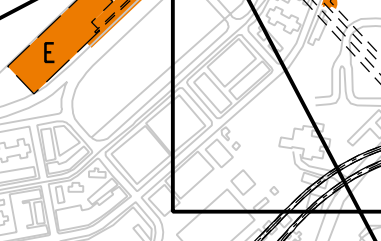


FIG 1.6

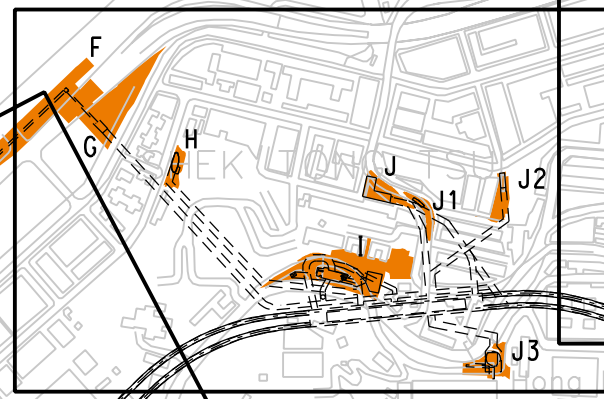


FIG 1.7

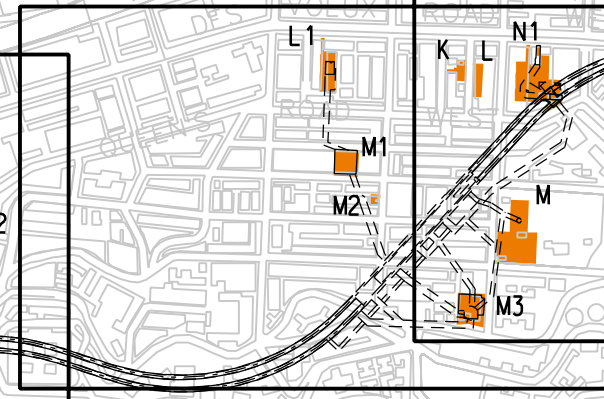
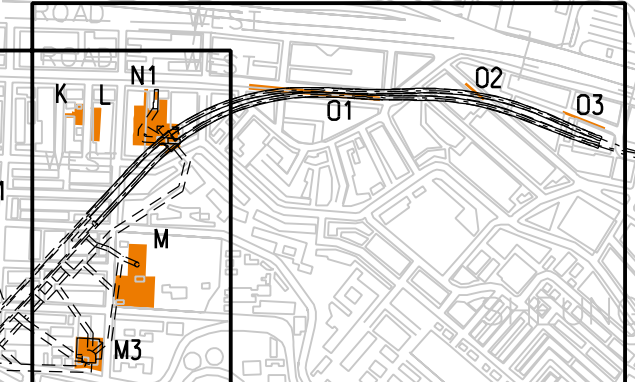


FIG 1.8



LEGEND:

- WORKS AREA/WORKS SITE
- WORKS AREA(UNDERGROUND)

WEST ISLAND LINE
ENVIRONMENTAL REPORT FOR VARIATION OF ENVIRONMENTAL PERMIT APPLICATION (EP-313/2008)
MAJOR GROUND LEVEL WORKS AREAS/ WORKS SITES - KEY PLAN

AECOM

SCALE	A3 1:10000	DATE	JUN. 09
CHECK	FWYW	DRAWN	WDF
JOB No.	60017115	Figure 1	REV -

2009-6-15 11:30:38 D:\XL

p:\projects\60017115\DRAWING\FIGURE\FIG 1.2.dgn

2 NOISE

2.1 MONITORING METHODOLOGY

Monitoring was undertaken by the Environmental Team to establish noise baseline levels in the vicinity of the Works Areas O1, O2 and O3, to provide data against which any environmental impacts due to construction activities can be compared.

Baseline monitoring stations CN18, CN19 and CN20 as specified in the EM&A Manual have been established at the following locations, see Figure 2:

- CN18 - Princeton Tower
- CN19 - Yu Hing Mansion
- CN20 - Ka on Building

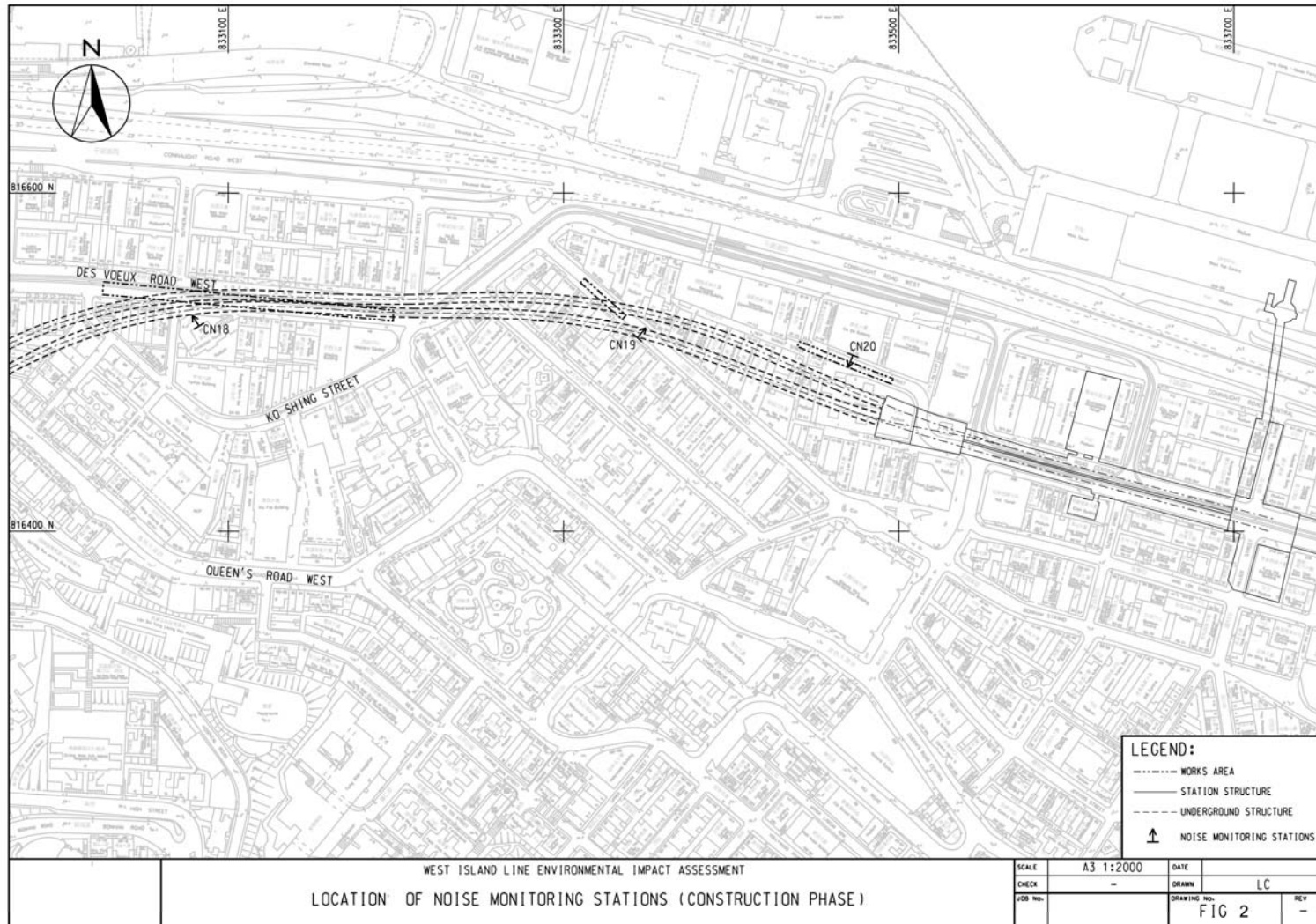
Consecutive noise measurements were undertaken over a period of at least 14 days to establish the ambient noise levels at representative nearest sensitive receivers. Continuous 5 minute A-weighted noise levels were recorded throughout the daytime, evening and night-time on weekdays (Monday to Saturday) and also on Sundays. The noise levels were presented for weekdays over each 30 minute period between 0700 and 1900hr to produce the baseline conditions.

Monitoring was conducted using B&K sound analysis equipment – B&K SLM 2236 and 2238. Microphones were extended 1m from building facades and oriented towards the works area.

Weather conditions throughout the monitoring period were mild and relatively dry, with light wind normally from the north, with some days from the east. The average measured wind speed during the baseline monitoring was in the range 1.1 – 3.8m/s.

2.2 CALIBRATION REQUIREMENTS

B&K 2236 and 2238 sound level meters which complied with the International Electrotechnical Commission Publication 651:1979 (Type 1) and 804:1985 (Type 1), specification as referred to in the Technical Memoranda to the NCO were used for the baseline monitoring. The B&K sound level meters and B&K 4231 calibrator are verified by the certified laboratory or manufacturer once every two years by MaxLab Calibration Centre Limited to ensure they perform to the same level of accuracy as stated in the manufacturer's specifications. Calibration certificates are attached in Annex B.



Immediately prior to and following each set of measurements at any NSR, the accuracy of the sound level meter was checked using an acoustic calibrator generating a known sound pressure level at a known frequency. If the calibration levels before and after the measurement differ by more than 1.0dB the measurement shall be repeated to obtain a reliable result (note: maximum deviation during this initial baseline monitoring period was 0.3dB). Periods of prolonged or repeated overloading of the sound level meter detector were avoided by setting the meter with adequate headroom prior to commencing measurements. Measurements were recorded to the nearest 0.1 dB, with values of 0.05 being rounded up.

Limit levels for these locations are shown in *Table 2.2*.

Table 2.2 Limit Levels for Construction Noise

Time Period	Noise Level (dB) for NSR around Works Areas O1/O2/O3
Daytime (0700-1900), Monday through Saturday excluding Public Holidays	$L_{Aeq\ 30mins} 75^{(1)}$
All evenings (1900-2300)	Subject to control under the Noise Control Ordinance
General Holidays (including all Sundays) during the daytime and evening (0700-2300)	Subject to control under the Noise Control Ordinance
All night time periods (2300-0700)	Subject to control under the Noise Control Ordinance

⁽¹⁾ Limit level guideline, for educational establishments the limit level shall be 70, reduced to 65 during examination periods.

2.3 MONITORING RESULTS

Noise baseline monitoring was conducted at the monitoring stations CN18/ CN20 between 9 March 2010 and 23 March 2010 and at monitoring station CN19 between 10 March 2010 and 24 March 2010.

5 minute, "fast" detector response, levels were recorded in the following indices, L_{Aeq} , L_{A10} , L_{A90} . The baseline data was initially downloaded into a spreadsheet, directly from the noise loggers in ASCII format for checking, and then imported into the database. The L_{Aeq} results for each 5 minute period of weekday were averaged. An average of two 24 hour Sunday periods was covered in the monitoring periods. 'Time Slot Averaged', 'Noise Control Period Averaged' baseline noise levels are presented for the monitoring location in *Annex A*.

At the monitoring station CN18, it was observed that the vehicular traffic along Des Voeux Road West was the dominant noise sources contributed to the background noise. At the monitoring station CN19, it was observed that the vehicular traffic along Wing Lok Street was the dominant noise sources contributed to the background noise. At the monitoring station CN20, it was observed that the vehicular traffic along New Market Street was the dominant noise sources contributed to the background noise.

3 CONCLUSION

3.1 BASELINE LEVEL

3.1.1 Noise

Baseline monitorings were conducted at the monitoring stations CN18 and CN20 from 9 March 2010 to 23 March 2010 and at the monitoring station CN19 from 10 March 2010 to 24 March 2010. Baseline noise levels have been established for weekday and Sunday periods.

Baseline noise levels between 69.5 and 72.8 dB(A) had been recorded at the monitoring station CN18 from 0700 – 1900hr. Baseline noise levels between 60.2 and 70.8 dB(A) had been recorded from 0700 – 1900hr for the monitoring station CN19. Baseline noise levels between 64.2 and 67.1 dB(A) had been recorded from 0700 – 1900hr for the monitoring station CN20.

The major noise sources noticed at the monitoring station CN18 were the vehicular traffic along Des Voeux Road West. The major noise sources as observed at the monitoring station CN19 were the vehicular traffic along Wing Lok Street. The major noise sources noticed at the monitoring station CN20 were the vehicular traffic along New Market Street.

3.2 ACTION AND TARGET LEVELS

3.2.1 Noise

Action level exceedance occurs when one or more documented complaints are received.

Limit level is set at $L_{Aeq\ 30mins}75^{(1)}$ for normal working hours (i.e. 0700 – 1900 hours on any day not being a Sunday or general holiday), as suggested in EIAO-TM and the Practice Note for Professional Persons ProPECC PN2/93. For restricted hours (i.e. 1900 – 0700 hours for weekdays and all day on Sundays and general holidays), limit level shall be subjected to control under the Noise Control Ordinance (NCO).

⁽¹⁾Limit level guideline, for educational establishments the limit level shall be 70, reduced to 65 during examination periods.

ANNEX A

Noise Baseline Measurements

Noise Baseline Report

Project: West Island Line
Report for Location: Princeton Tower (CN18)
Baseline between: 09/03/2010 - 23/03/2010

Report date: 28/09/2010

Parameter : Leq

Time Slot Averaged Baselines

Weekdays Noise Level, dB(A)

	LAeq,30min	L10	L90
07:00-07:30	69.5	72.2	65.1
07:30-08:00	69.9	72.4	66.0
08:00-08:30	70.2	72.5	66.8
08:30-09:00	71.2	73.2	67.8
09:00-09:30	72.4	74.2	69.0
09:30-10:00	72.0	73.8	69.0
10:00-10:30	72.2	74.4	69.0
10:30-11:00	72.0	73.8	69.1
11:00-11:30	72.0	73.9	69.0
11:30-12:00	72.5	74.1	69.4
12:00-12:30	71.8	73.6	69.1
12:30-13:00	72.0	74.0	68.9
13:00-13:30	72.5	74.4	69.3
13:30-14:00	72.4	74.4	69.5
14:00-14:30	72.6	74.4	69.8
14:30-15:00	72.8	74.7	69.9
15:00-15:30	72.2	74.0	69.6
15:30-16:00	72.3	74.2	69.6
16:00-16:30	71.9	73.6	69.2
16:30-17:00	71.7	73.5	68.9
17:00-17:30	71.8	73.6	69.1
17:30-18:00	71.8	73.6	69.1
18:00-18:30	71.6	73.5	68.8
18:30-19:00	71.7	73.6	68.6

Noise Control Period Averaged Baselines

Weekdays Noise Level, dB(A)

	LAeq,30min	L10	L90
07:00-19:00	71.9	73.8	68.9
	LAeq,5min	L10	L90
19:00-23:00	70.5	72.7	66.9
23:00-07:00	67.1	69.1	63.8

Sundays/General Holidays Noise Level, dB(A)

	LAeq,5min	L10	L90
07:00-19:00	70.9	73.0	67.5
19:00-23:00	69.7	72.1	65.9
23:00-07:00	67.1	69.1	64.1

Logarithmic Averaging is being used.

Noise Baseline Report

Project: West Island Line
Report for Location: Yu Hing Mansion (CN19)
Baseline between: 10/03/2010 - 24/03/2010

Report date: 28/09/2010

Parameter : Leq

Time Slot Averaged Baselines

Weekdays Noise Level, dB(A)

	LAeq,30min	L10	L90
07:00-07:30	60.2	61.6	56.3
07:30-08:00	63.1	64.5	60.9
08:00-08:30	65.4	66.2	63.9
08:30-09:00	67.3	68.2	65.7
09:00-09:30	68.1	69.5	66.1
09:30-10:00	68.5	69.8	66.7
10:00-10:30	68.4	69.4	66.9
10:30-11:00	68.1	69.0	66.6
11:00-11:30	67.9	68.7	66.6
11:30-12:00	67.6	68.6	66.1
12:00-12:30	63.4	65.1	61.1
12:30-13:00	64.1	65.5	62.0
13:00-13:30	67.2	68.4	65.3
13:30-14:00	68.2	69.2	66.6
14:00-14:30	68.3	69.5	66.7
14:30-15:00	70.8	74.9	66.3
15:00-15:30	68.9	70.0	67.3
15:30-16:00	68.6	69.6	67.0
16:00-16:30	68.5	69.8	66.5
16:30-17:00	67.7	68.8	66.1
17:00-17:30	67.8	69.3	65.7
17:30-18:00	67.8	69.4	65.7
18:00-18:30	65.1	66.5	62.9
18:30-19:00	60.3	61.8	57.9

Noise Control Period Averaged Baselines

Weekdays Noise Level, dB(A)

	LAeq,30min	L10	L90
07:00-19:00	67.4	68.9	65.4
	LAeq,5min	L10	L90
19:00-23:00	58.6	60.5	55.0
23:00-07:00	53.5	55.2	50.6

Sundays/General Holidays Noise Level, dB(A)

	LAeq,5min	L10	L90
07:00-19:00	66.5	67.7	65.1
19:00-23:00	57.6	60.0	53.2
23:00-07:00	52.2	53.9	49.4

Logarithmic Averaging is being used.

Noise Baseline Report

Project: West Island Line
Report for Location: Ka On Building (CN20)
Baseline between: 09/03/2010 - 23/03/2010

Report date: 28/09/2010

Parameter : Leq

Time Slot Averaged Baselines

Weekdays Noise Level, dB(A)

	LAeq,30min	L10	L90
07:00-07:30	64.2	64.9	63.0
07:30-08:00	65.1	65.9	63.8
08:00-08:30	65.6	66.3	64.4
08:30-09:00	66.2	66.9	65.0
09:00-09:30	66.5	67.5	65.1
09:30-10:00	66.8	67.7	65.3
10:00-10:30	66.8	67.7	65.5
10:30-11:00	67.1	68.0	65.7
11:00-11:30	67.0	67.9	65.6
11:30-12:00	66.7	67.6	65.4
12:00-12:30	66.6	67.6	65.1
12:30-13:00	66.6	67.5	65.2
13:00-13:30	66.7	67.6	65.3
13:30-14:00	66.6	67.5	65.4
14:00-14:30	66.7	67.7	65.4
14:30-15:00	66.8	67.7	65.4
15:00-15:30	66.8	67.7	65.4
15:30-16:00	66.6	67.4	65.3
16:00-16:30	66.7	67.6	65.4
16:30-17:00	66.7	67.7	65.4
17:00-17:30	66.6	67.6	65.2
17:30-18:00	66.5	67.4	65.0
18:00-18:30	66.3	67.1	65.0
18:30-19:00	65.9	66.9	64.4

Noise Control Period Averaged Baselines

Weekdays Noise Level, dB(A)

	LAeq,30min	L10	L90
07:00-19:00	66.5	67.4	65.1
	LAeq,5min	L10	L90
19:00-23:00	64.3	65.5	62.6
23:00-07:00	60.2	61.2	58.8

Sundays/General Holidays Noise Level, dB(A)

	LAeq,5min	L10	L90
07:00-19:00	64.2	65.4	62.3
19:00-23:00	63.9	65.4	61.9
23:00-07:00	60.5	61.4	59.0

Logarithmic Averaging is being used.

ANNEX B

Calibration Certificates for Monitoring Equipment



MAXLAB

CALIBRATION CERTIFICATE

Certificate Information

Date of Issue 30th December, 2008

Certificate Number MLCN081194S

Customer Information

Company Name
Address

MTR Corporation Limited
MTR Tower, Telford Plaza,
33 Wai Yip St., Kowloon Bay,
Kowloon,
Hong Kong

Unit Under Test (UUT)

Description

Precision Integrating Sound Level Meter

Manufacturer

Brüel & Kjær

Model Number

Type 2236

Serial Number

1794284

Equipment Number

-

Calibration Result

- * The UUT range indication was found defective, but range selection and measurement were not affected.
- * All calibration results are within the manufacturer's specification.
- * Calibration data are detailed on the attached sheet(s).

Approved By

Laboratory Manager

- * Calibration equipment used for this calibration are traceable to national / international standards.
- * The results on this Calibration Certificate only relate to the values measured at the time of the calibration and the uncertainties quoted will not include allowance for the UUT long term drift, variation with environmental changes, vibration and shock during transportation, overloading, mishandling, misuse, and the capacity of any other laboratory to repeat the measurement.
- * MaxLab Calibration Centre Limited shall not be liable for any loss or damage resulting from the use of the UUT.
- * The copy of this Certificate is owned by MaxLab Calibration Centre Limited. No part of this Certificate may be reproduced without the prior written approval of MaxLab Calibration Centre Limited.



MAXLAB

CALIBRATION CERTIFICATE

Certificate Information

Date of Issue 30th December, 2008

Certificate Number

MLCN081194S

Calibration Status

Date of Calibration

30th December, 2008

Calibration Equipment Used

4231 (MLTE008)/ CA0801167/ 24th Feb 2010

Calibration Procedure

MLCG00 & MLCG15.

Calibration Uncertainty

±0.2 dB

Calibration Condition

Lab

Temperature

23 °C ± 5 °C

Relative Humidity

55% ± 25%

UUT

Stabilizing Time

24 hours

Warm-up Time

10 minutes

Supply Voltage

Not applicable

Calibration Data

UUT Setting				UUT Rdg	Std Rdg	UUT Error	UUT Error Limit
Frequency Wt.	Parameter	Response	Range (dB)				
A (1 kHz Input)	SPL	F	20 - 100	93.9 dB	94 dB	-0.1 dB	0.7 dB
		S		93.9 dB	94 dB	-0.1 dB	0.7 dB
		I		93.9 dB	94 dB	-0.1 dB	0.7 dB
C (1 kHz Input)		F	20 - 100	93.9 dB	94 dB	-0.1 dB	0.7 dB
		S		93.9 dB	94 dB	-0.1 dB	0.7 dB
		I		93.9 dB	94 dB	-0.1 dB	0.7 dB
L (1 kHz Input)		F	20 - 100	94.0 dB	94 dB	0.0 dB	0.7 dB
		S		94.0 dB	94 dB	0.0 dB	0.7 dB
		I		94.0 dB	94 dB	0.0 dB	0.7 dB
A (1 kHz Input)		F	40 - 120	113.9 dB	114 dB	-0.1 dB	0.7 dB
		S		113.9 dB	114 dB	-0.1 dB	0.7 dB
		I		113.9 dB	114 dB	-0.1 dB	0.7 dB



MAXLAB

CALIBRATION CERTIFICATE

Certificate Information

Date of Issue

6th November, 2008

Certificate Number

MLCN080967S

Customer Information

Company Name

MTR Corporation Limited

Address

MTR Tower, Telford Plaza,
33 Wai Yip St., Kowloon Bay,
Kowloon,
Hong Kong

Unit Under Test (UUT)

Description

Integrating Sound Level Meter

Manufacturer

Brüel & Kjær

Model Number

2238

Serial Number

2337690

Equipment Number

-

Calibration Result

- * All calibration results were within IEC 60651 Type 1 specification.
- * Calibration data are detailed on the attached sheet(s).

Approved By

Laboratory Manager

- * Calibration equipment used for this calibration are traceable to national / international standards.
- * The results on this Calibration Certificate only relate to the values measured at the time of the calibration and the uncertainties quoted will not include allowance for the UUT long term drift, variation with environmental changes, vibration and shock during transportation, overloading, mishandling, misuse, and the capacity of any other laboratory to repeat the measurement.
- * MaxLab Calibration Centre Limited shall not be liable for any loss or damage resulting from the use of the UUT.
- * The copy of this Certificate is owned by MaxLab Calibration Centre Limited. No part of this Certificate may be reproduced without the prior written approval of MaxLab Calibration Centre Limited.



MAXLAB

CALIBRATION CERTIFICATE

Certificate Information

Date of Issue 6th November, 2008

Certificate Number MLCN080967S

Calibration Status

Date of Calibration 5th November, 2008
Calibration Equipment Used 4231 (MLTE008)/ CA0801167/ 24th Feb 2010
Calibration Procedure MLCG00 & MLCG15.
Calibration Uncertainty ± 0.2 dB

Calibration Condition	Lab	Temperature	23 °C \pm 5 °C
		Relative Humidity	55% \pm 25%
	UUT	Stabilizing Time	24 hours
		Warm-up Time	10 minutes
		Supply Voltage	Not applicable

Calibration Data

UUT Setting				UUT Rdg	Std Rdg	UUT Error	UUT Error Limit
Detector	Frequency Wt.	Time Wt.	Range (dB)				
RMS	A (1 kHz Input)	F	20 - 100	93.8 dB	94 dB	-0.2 dB	0.7 dB
		S		93.8 dB	94 dB	-0.2 dB	0.7 dB
		I		93.8 dB	94 dB	-0.2 dB	0.7 dB
	C (1 kHz Input)	F	20 - 100	93.8 dB	94 dB	-0.2 dB	0.7 dB
		S		93.8 dB	94 dB	-0.2 dB	0.7 dB
		I		93.8 dB	94 dB	-0.2 dB	0.7 dB
	L (1 kHz Input)	F	20 - 100	93.8 dB	94 dB	-0.2 dB	0.7 dB
		S		93.8 dB	94 dB	-0.2 dB	0.7 dB
		I		93.8 dB	94 dB	-0.2 dB	0.7 dB
	A (1 kHz Input)	F	40 - 120	113.8 dB	114 dB	-0.2 dB	0.7 dB
		S		113.8 dB	114 dB	-0.2 dB	0.7 dB
		I		113.8 dB	114 dB	-0.2 dB	0.7 dB
	C (1 kHz Input)	F	40 - 120	113.8 dB	114 dB	-0.2 dB	0.7 dB
		S		113.8 dB	114 dB	-0.2 dB	0.7 dB
		I		113.8 dB	114 dB	-0.2 dB	0.7 dB
	L (1 kHz Input)	F	40 - 120	113.8 dB	114 dB	-0.2 dB	0.7 dB
		S		113.8 dB	114 dB	-0.2 dB	0.7 dB
		I		113.8 dB	114 dB	-0.2 dB	0.7 dB



MAXLAB

CALIBRATION CERTIFICATE

Certificate Information

Date of Issue 6th November, 2008

Certificate Number MLCN080968S

Customer Information

Company Name

MTR Corporation Limited

Address

MTR Tower, Telford Plaza,
33 Wai Yip St., Kowloon Bay,
Kowloon,
Hong Kong

Unit Under Test (UUT)

Description

Integrating Sound Level Meter

Manufacturer

Brüel & Kjær

Model Number

2238

Serial Number

2456919

Equipment Number

-

Calibration Result

- * All calibration results were within IEC 60651 Type 1 specification.
- * Calibration data are detailed on the attached sheet(s).

Approved By

Laboratory Manager

- * Calibration equipment used for this calibration are traceable to national / international standards.
- * The results on this Calibration Certificate only relate to the values measured at the time of the calibration and the uncertainties quoted will not include allowance for the UUT long term drift, variation with environmental changes, vibration and shock during transportation, overloading, mishandling, misuse, and the capacity of any other laboratory to repeat the measurement.
- * MaxLab Calibration Centre Limited shall not be liable for any loss or damage resulting from the use of the UUT.
- * The copy of this Certificate is owned by MaxLab Calibration Centre Limited. No part of this Certificate may be reproduced without the prior written approval of MaxLab Calibration Centre Limited.



MAXLAB

CALIBRATION CERTIFICATE

Certificate Information

Date of Issue 6th November, 2008

Certificate Number MLCN080968S

Calibration Status

Date of Calibration 5th November, 2008
 Calibration Equipment Used 4231 (MLTE008)/ CA0801167/ 24th Feb 2010
 Calibration Procedure MLCG00 & MLCG15.
 Calibration Uncertainty ± 0.2 dB

Calibration Condition Lab Temperature 23 °C \pm 5 °C
 UUT Relative Humidity 55% \pm 25%
 Stabilizing Time 24 hours
 Warm-up Time 10 minutes
 Supply Voltage Not applicable

Calibration Data

Detector	UUT Setting			UUT Rdg	Std Rdg	UUT Error	UUT Error Limit
	Frequency Wt.	Time Wt.	Range (dB)				
RMS	A (1 kHz Input)	F	20 - 100	93.8 dB	94 dB	-0.2 dB	0.7 dB
		S		93.8 dB	94 dB	-0.2 dB	0.7 dB
		I		93.8 dB	94 dB	-0.2 dB	0.7 dB
	C (1 kHz Input)	F	20 - 100	93.8 dB	94 dB	-0.2 dB	0.7 dB
		S		93.8 dB	94 dB	-0.2 dB	0.7 dB
		I		93.8 dB	94 dB	-0.2 dB	0.7 dB
	L (1 kHz Input)	F	20 - 100	93.8 dB	94 dB	-0.2 dB	0.7 dB
		S		93.8 dB	94 dB	-0.2 dB	0.7 dB
		I		93.8 dB	94 dB	-0.2 dB	0.7 dB
	A (1 kHz Input)	F	40 - 120	113.7 dB	114 dB	-0.3 dB	0.7 dB
		S		113.7 dB	114 dB	-0.3 dB	0.7 dB
		I		113.7 dB	114 dB	-0.3 dB	0.7 dB
	C (1 kHz Input)	F	40 - 120	113.7 dB	114 dB	-0.3 dB	0.7 dB
		S		113.7 dB	114 dB	-0.3 dB	0.7 dB
		I		113.7 dB	114 dB	-0.3 dB	0.7 dB
	L (1 kHz Input)	F	40 - 120	113.7 dB	114 dB	-0.3 dB	0.7 dB
		S		113.7 dB	114 dB	-0.3 dB	0.7 dB
		I		113.7 dB	114 dB	-0.3 dB	0.7 dB



MAXLAB CALIBRATION CERTIFICATE

Certificate Information

Date of Issue 6th November, 2008

Certificate Number MLCN080969S

Customer Information

Company Name MTR Corporation Limited
Address MTR Tower, Telford Plaza,
33 Wai Yip St., Kowloon Bay,
Kowloon,
Hong Kong

Unit Under Test (UUT)

Description Sound Level Calibrator
Manufacturer Brüel & Kjær
Model Number 4231
Serial Number 1795385
Equipment Number -

Calibration Result

- * All calibration results within the manufacturer's specification.
- * Calibration data are detailed on the attached sheet(s).

Approved By

Laboratory Manager

- * Calibration equipment used for this calibration are traceable to national / international standards.
- * The results on this Calibration Certificate only relate to the values measured at the time of the calibration and the uncertainties quoted will not include allowance for the UUT long term drift, variation with environmental changes, vibration and shock during transportation, overloading, mishandling, misuse, and the capacity of any other laboratory to repeat the measurement.
- * MaxLab Calibration Centre Limited shall not be liable for any loss or damage resulting from the use of the UUT.
- * The copy of this Certificate is owned by MaxLab Calibration Centre Limited. No part of this Certificate may be reproduced without the prior written approval of MaxLab Calibration Centre Limited.



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CALIBRATION CERTIFICATE

Certificate Information

Date of Issue 6th November, 2008

Certificate Number MLCN080969S

Calibration Status

Date of Calibration 6th November, 2008
Calibration Equipment Used 4231 (Spec) (MLTE008)/ CA0801167/ 24th Feb 2008
1351 (MLTE049)/ MLEC08/06/02/ 14th Jun 2009
Calibration Procedure MLCG00 & MLCG15.
Calibration Uncertainty ± 0.1 dB

Calibration Condition	Lab	Temperature	23 °C \pm 5 °C
		Relative Humidity	55% \pm 25%
	UUT	Stabilizing Time	24 hours
		Warm-up Time	Not applicable
		Supply Voltage	Not applicable

Calibration Data

UUT Setting	STD Rdg	UUT Error	UUT Error Limit
94 dB	94.0 dB	0.0 dB	0.2 dB
114 dB	114.0 dB	0.0 dB	0.2 dB