



風移聲學及環境顧問

Aeolian View Consultants

Acoustics & Environmental Engineering

**Repositioning and Long Term
Operation Plan of Ocean Park :
Noise Mitigation Audit Plan (NMAP)
for the Special Event at the Summit
(Phase 2 : Operation hour 09:00-01:00)**

**“Countdown for Coloratura 2022”
(Temporary Outdoor Attraction Facilities)**

December 2022 (Rev. 1)

**Report Prepared for
Ocean Park Corporation**

(C:\...\22P039\22Rep-039a (R1))

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Prepared by

K.W.Cheng



Mr. K.W. Cheng
MSc, AMIOA, MHKIOA

1.0 Introduction

The captioned Countdown event, to be held on 31 Dec 2022 (20:00 to 01:00 the next day) * and at a number of localized spots of the Summit inside the Ocean Park, denotes a ‘Temporary Outdoor Attraction Facilities’ and shall involve various environmental issues which are covered under the Environmental Permit (EP) (EP-249/2006/D) for the Repositioning and Long Term Operation Plan of Ocean Park. Such environmental issues include noise from the daily operations in the Ocean Park and in particular require the submission of Noise Mitigation Audit Plan (NMAP) and Noise Mitigation Audit Report (NMAR) to the Environmental Protection Department (EPD).

This report, an updated NMAP, details the change in the noise issue (Countdown event) from that as contained in the latest approved NMAP (i.e. NMAP for the 1st countdown event at Ocean Park in 2021) for subsequent review / approval by the EPD. Note that all those ‘Temporary Outdoor Attraction Facilities’ and ‘Open-air Show’ under the 2 latest approved NMAPs in 2014 and 2015 will be suspended / inactive during this proposed Countdown event.

[Including 2 extra days on 30 Dec 2022 (20:00 to 23:00) and 1 Jan 2023 (20:00 to 23:00) as well]*

2.0 Relevant EP Requirements

2.1 Background

The EP was initially granted in July 2006 upon the approval of the associated Environmental Impact Assessment (EIA) report (Register No.: AEIAR-101/2006) and amendments to the EP were approved in October 2006, November 2010 and December 2013.

To update the opening hours of the Ocean Park and the layout plans for the Waterfront and Summit, an application for Variation of EP (VEP) was submitted to the EPD and new EP (EP-249/2006/D) was issued on 2 July 2014. Noise measurement and audit works were conducted in accordance with Conditions 2.25, 2.26, 2.27, 2.28, 2.29, 2.30 and 2.31 of the EP-249/2006/D and the NMAPs and the NMARs, prepared sequentially in 2014 and 2015 for submission, were subsequently approved by the EPD.

2.2 Noise Related Submissions

Noise related requirements for different operations and over a number of operation time / time extensions (Phases 1, 2 and 3) in the Ocean Park are listed in various clauses, i.e. Conditions, in the EP text as summarized in Table 1 below. Essentially these comprise 3 steps in sequence, namely Noise Mitigation and Audit Plan (NMAP) submission, noise measurement and audit works and Noise Mitigation and Audit Report (NMAR) submission. The proposed Countdown event is simply a short time ‘Temporary Outdoor Attraction Facilities’ of the Special Event classification under the EP and shall run over a few hours from 20:00 hour (31 December 2022) to 01:00 hour (1 January 2023). With respect to the noise issue, the event denotes a variation from the previous approved NMAP and NMAR and accordingly under Condition 2.30 of the EP an **updated NMAP and NMAR** shall be submitted to the Environmental Protection Department (EPD) for approval prior to its proper execution.

Table 1 Extract of Noise Related Coverage under the Environmental Permit (EP)

Operation Classification	Normal Operation		Special Event			Overnight Charity, Education, Conservation or Community Events
			Open-air Show	Temporary Indoor Attraction Facilities *	Sky Fair Plaza Performance	
Extension Phase	Phase 1	Phase 2	Phase 1	Phase 2	Phase 3	-
Location	All	All	Summit	Waterfront	Waterfront	All
Time Period	09:00-23:00	23:00-01:00	09:00-23:00	09:00-01:00	09:00-01:00	23:00-09:00
NMAP Submission Requirement	Condition 2.25					-
NMAP Submission Requirement	Condition 2.26					-
	Condition 2.27	Condition 2.28	Condition 2.29	Condition 2.30	Condition 2.31	Condition 2.32
Notes :						
1. NMAP = Noise Mitigation Audit Plan ; NMAP = Noise Mitigation Audit Report						
2. All conditions above refer to the Permit Conditions under Environmental Permit No. EP-249/2006/D						
3. NMAP submission shall be preceded by the completion of noise measurement and audit works						
4. NMAP & NMAP submission for the Countdown event are taken as under the classification * above						

3.0 Noise Measurement and Noise Mitigation

3.1 Noise Sources

The adequacy of the proposed noise mitigation measures for the Countdown event shall be properly addressed by considering the cumulative noise impact from those existing noise sources (Normal Operation) at the Summit as well as that from the Countdown event. Quantification of this cumulative noise impact shall be with respect to the noise criteria at the 2 most critical Noise Sensitive Receivers (NSRs) : ‘BC1 (Broadview Court)’ and ‘MV (Manly Villa)’ as shown in Figure 1. A list detailing the noise sources and noise mitigation measures at the Summit during the Countdown event as well as the noise criteria at BC1 are tabulated in Table 2 for easy reference.

Table 2 Noise Sources & Noise Mitigation Measures during the Countdown Event

Plant ID	Plant	Location	Operation during Countdown Event			Noise Mitigation Measures
			30 and 31/12/2022, 1/1/2023		31/12/2022 to 1/1/2023	
			09:00-20:00	20:00-23:00	23:00-01:00	
SF01	Split-type A/C unit	Funicular Building	√	-	-	-
SF02	Split-type A/C unit	South Pole Spectacular	√	√	√	-
SF03	Split-type A/C unit	Tuxedos Restaurant	√	-	-	-
SF04	Split-type A/C unit	North Pole Encounter	√	√	√	-
SF05	AC plant	South Pole Spectacular	√	√	√	-
SF06	AC plant group	Tuxedos Restaurant	√	-	-	-
SF07	AC plant	North Pole Encounter	√	√	√	-
SF08	AC plant	Rainforest	√	√	√	-
SF09	Chiller	North Pole Encounter	√	√	√	-
SF10	Pump	North Pole Encounter	√	√	√	-
SF11	Ventilation fan	Funicular Building	√	-	-	-
SF12	PA system	Rainforest	√	√	√	-
SF13	PA system	Thrill Mountain	√	√	√	-
SF14	PA system	Polar Adventure	√	√	√	-
-	All fixed plants in Marine World & Adventure Land	Marine World & Adventure Land	√	-	-	-
N-R14	Arctic Blast	Polar Adventure	√	√	√	-
N-R17	Hair Raiser	Thrill Mountain	√	√	-	Closed (23:00 - 01:00)
N-R13	Rev Booster	Thrill Mountain	√	√	√	-
N-R12	Whirly Bird	Thrill Mountain	√	√	√	-
N-R11	The Flash	Thrill Mountain	√	√	-	Closed (23:00 - 01:00)
N-R15	Bumper Blasters	Thrill Mountain	√	√	√	-
N-R16	The Rapids	Rainforest	√	√	√	-
SF15	Machine plant	Cable Car Station	√	-	-	-
Special Event - Countdown for Coloratura 2022		The Summit	-	√	√	Computerized volume control at the manned spot location
Fixed Plant Noise Assessment Criteria at NSR : BC1 (Broadview Court)			57 dB(A)		54 dB(A)	-

The Countdown event is to be held at 3 localized attraction spots of the Summit inside the Ocean Park (Figure 2). All of them shall involve a number of floor mounted loudspeakers to entertain park-goers with background music from 20:00 to 23:00 hours (30/12/2022 to 1/1/2023) and the countdown moment at midnight (31/12/2022, 23:00 to 01:00 hours). Details of the loudspeaker arrangement are as follows. Technical information of the loudspeakers is shown in Appendix I.

Table 3 Loudspeaker Arrangement

Noise Source		No. of Loudspeakers at Attraction Spot :			
Loudspeaker Model *	Dimensions, mm (H x W x D)	Main Stage	Stage A	Stage B	
1	Main Speaker - Kudo®	356 x 876 x 689	6	-	6
2	Main Speaker - Nexo PS15-R2	675 x 434 x 368	-	2	-
3	Subwoofer - Kudo SB28	-	6	2	4
		Total :	12	4	10
Notes : * To be floor mounted & with onsite volume control for background music playing					

3.2 Noise Measurement Methodology

Field noise measurement (mock-up test) is to be conducted prior to the event for incorporation into the subsequent NMAP submission. This measurement serves as an audit exercise to demonstrate that the noise sources (loudspeakers) shall be regulated to strike noise compliance with the identified noise assessment criteria at the neighbouring NSRs.

To avoid significant noise interference from the park-goers during the noise measurement, 2 measurement positions (Positions R1 and R2, being sited more distant away from the anticipated park-goer gathering areas) at the Summit and close to the lines of sight to the 2 most critical NSRs (BC1 and MV) shall be adopted. These 2 measurement positions are as shown in Figure 4. The measurement shall cover the capture of both the background noise (1 single time, each over 1 min) and loudspeaker source (3 times, each over 5 min, simulated sound track feeding all the speakers at the attraction spots) at the measurement positions and in terms of A-weighted equivalent continuous noise level (L_{eq}). Results shall then be corrected by the background noise levels if necessary so as to determine the noise compliance status with the derived Sound Pressure Level (SPL) limit at the 2 measurement positions as determined in Appendix III. Follow-up repeated measurements may be conducted with loudspeaker volume adjustment in case non-compliance is identified.

[Remarks : Simulated sound track for the loudspeaker source shall include e.g. background music or songs for the park-goers during the event or pink noise]

Table 4 Noise Measurement Details & Noise Mitigation Measures

Noise Measurement				Commissioning Noise Limit in SPL, dBA) **		Noise Mitigation Measures
Noise Source *		Measurement Position	Noise Parameter	No. of Measurements	R1 23:00-01:00	
Main Stage	12 speakers	R1 and R2 (Free field position)	L_{eq} (5 min) in dB(A)	3	81	70
Stage A	4 speakers					
Stage B	10 speakers					
Notes : 1. SPL = Sound Pressure Level 2. * Input from simulated sound track [e.g. background music or pink noise] 3. ** Taken as the more stringent limit within the periods (20:00-23:00 or 23:00-01:00) as in Appendix III						

3.3 Instrumentation

The noise measurement shall be undertaken using 2 precision integrating sound level meters and 1 sound level calibrator. The sound level meter shall conform to the Class 1 accuracy requirements under the International Electrotechnical Commission standards IEC 61672-1 (2002) and IEC 61260 (1995). Both the meters and calibrator shall, at the time of measurement, have been calibrated by a recognized laboratory in accordance with relevant IEC laboratory calibration requirements and with calibration certificates valid within 1 year from the calibration dates. Appendix II gives the calibration certificates of the proposed instrumentation.

Table 5 Measurement Equipment

Measurement Equipment	Brand Name & Model No.	Serial No.	Calibration Expiry
Precision integrating sound level meter	NTi-XL2-TA	A2A-08670-E0	13/06/2023
Precision integrating sound level meter	Svantek Svan 959	11238	09/02/2023
Sound level calibrator	Svantek SV 30A	7441	08/02/2023

Field calibration check for the sound level meters using the sound level calibrator shall be conducted immediately before and after each series of measurements to ensure that the change in calibration level is within 0.5 dB. Otherwise the series of measurements shall be retaken onsite. ‘Fast response’ time weighting setting on the sound level meter shall be selected for all the noise measurements. The measurements shall be supervised onsite and endorsed by a qualified professional with at least 7 years of field noise measurement experience as well as being a corporate member of the Hong Kong Institute of Acoustics (HKIOA) or equivalent.

3.4 Noise Mitigation Measures

With all the loudspeakers being handy type and relatively low power rating aimed at serving the localized spot park-goers, noise mitigation measures shall basically be via the computerized volume control at each manned attraction spot location.

4.0 Event Noise Monitoring Exercise

Field noise monitoring at the 2 measurement positions shall be undertaken on the event day (31 Dec 2022). Similar noise measurement arrangement to that for the field noise measurement exercise (mock-up test) as detailed in Sections 3.2 and 3.3 above shall apply. However the noise monitoring exercise shall be conducted once only at the 2 measurement positions (Positions R1 and R2) and at 21:30 hour to coincide with the anticipated increasing crowd of the incoming park-goers. Immediate feedback for loudspeaker volume adjustment shall be directed to the audio crew onsite in case the monitoring results are in excess of the derived Sound Pressure Level (SPL) limits at the 2 measurement positions. Upon volume adjustment of the loudspeaker source (if required), the noise monitoring shall be repeated to verify noise compliance again. An ‘Event Noise Monitoring Report’ shall be prepared afterwards to the Ocean Park for record and for any follow-up review by the EPD if requested.

Table 6 Noise Monitoring Details (Event Day)

Noise Measurement				Commissioning Noise Limit in SPL, dBA)		
Noise Source *		Measurement Position	Noise Parameter	No. of Measurements	R1	R2
Main Stage	12 speakers	R1 and R2 (Free field position)	L _{eq} (5 min) in dB(A)	1	81	70
Stage A	4 speakers					
Stage B	10 speakers					
Notes : 1. SPL = Sound Pressure Level 2. * To be conducted at 21:30 hour, 31 Dec 2022 (Event day)						

5.0 Noise Audit

Noise from the Countdown event shall also comply with the inaudibility requirement at the neighbouring Noise Sensitive Receivers (NSRs) after 23:00 hour as stipulated under the EPD’s guidelines [1]. Site visit beyond 23:00 hour on the event day shall be conducted at / close to the most critical NSR (Broadview Court, Shum Wan Road) to verify the inaudibility compliance status. In case audible noise is perceived and persists, immediate feedback to the audio crew at the attraction spots shall be exercised to lower the source volume / stop the source for inaudibility confirmation.

6.0 References

1. Noise Control Guidelines for Music, Singing & Instrument Performing Activities, Environmental Protection Department, April 2021.

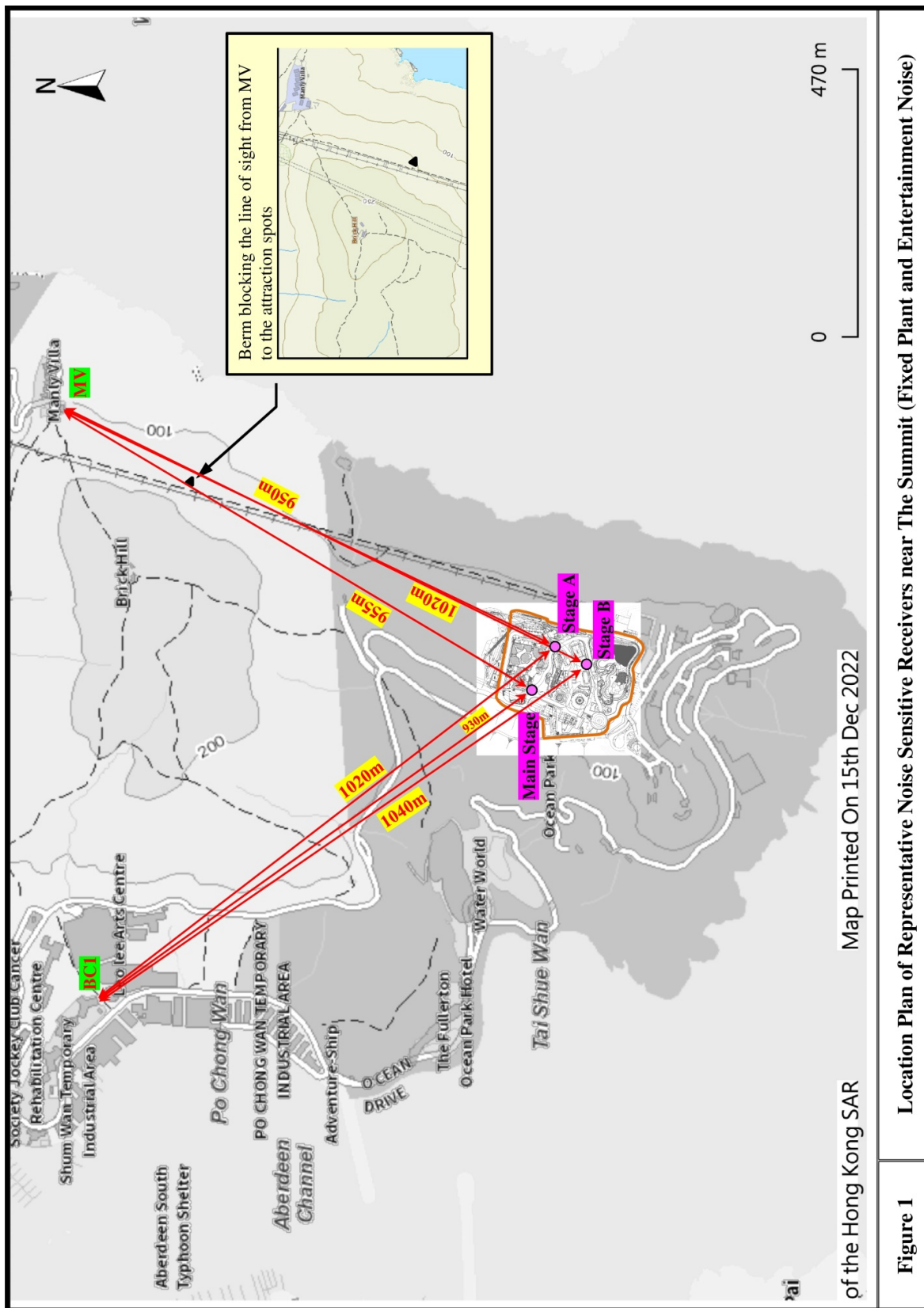
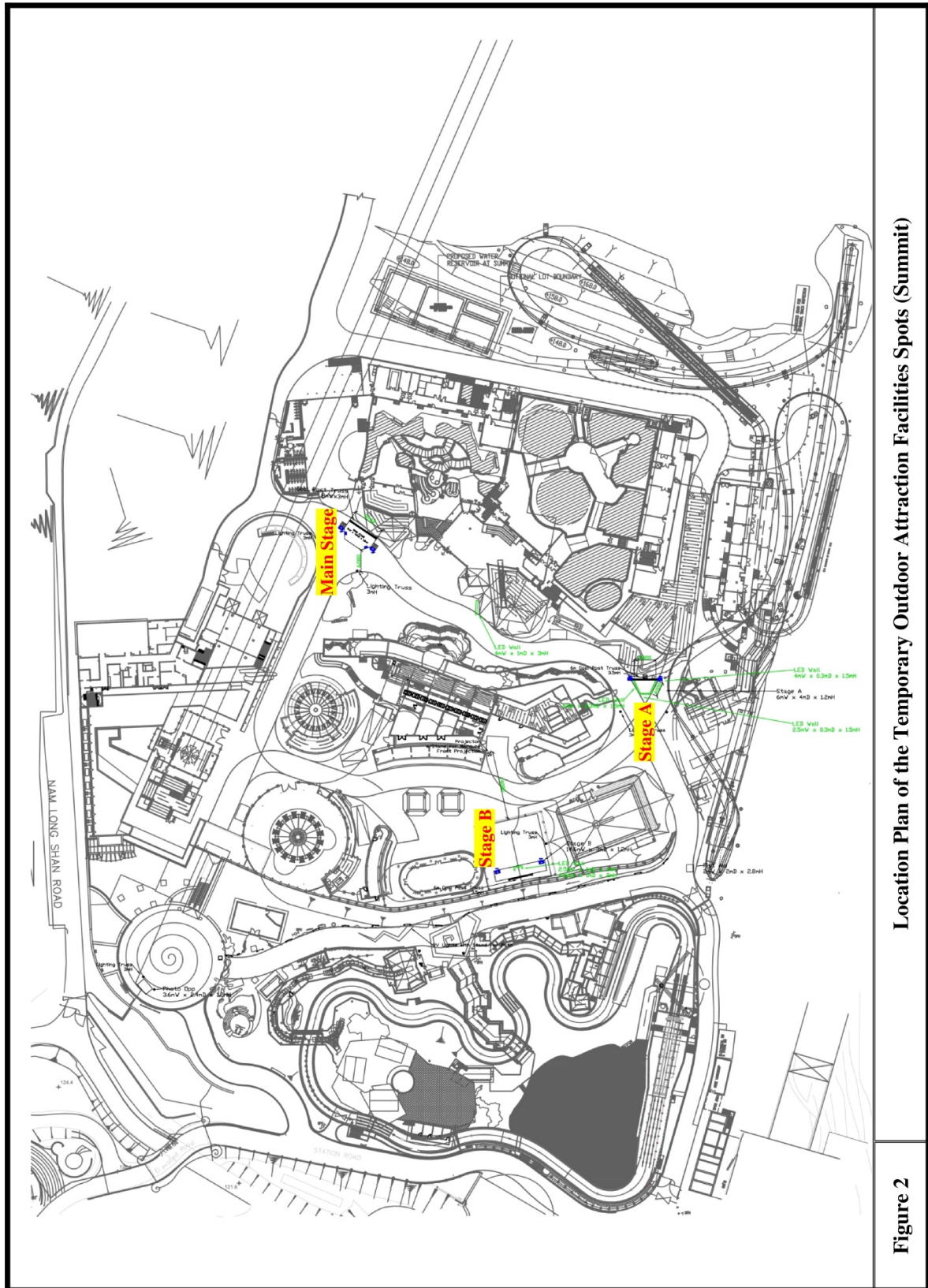
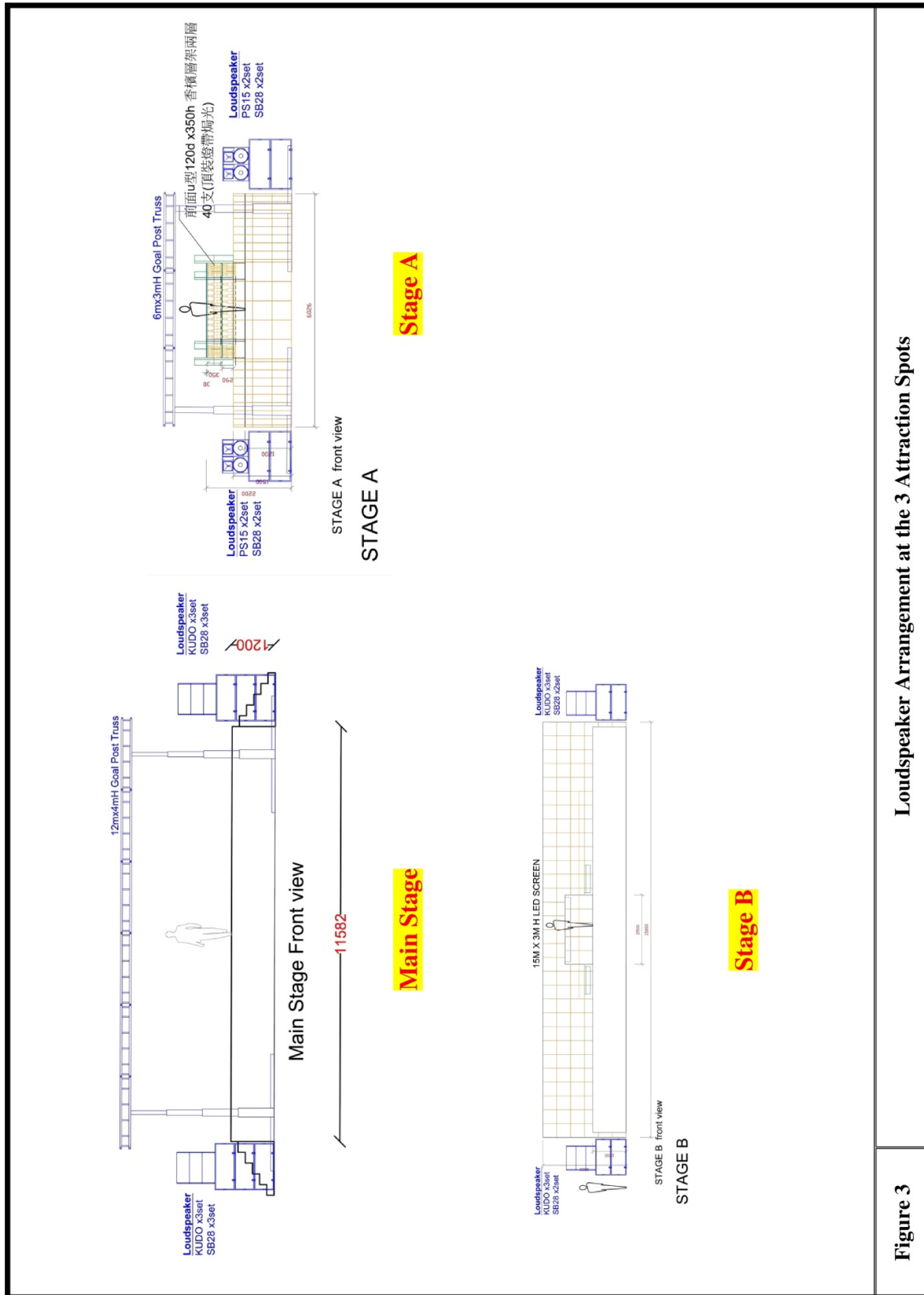


Figure 1 Location Plan of Representative Noise Sensitive Receivers near The Summit (Fixed Plant and Entertainment Noise)



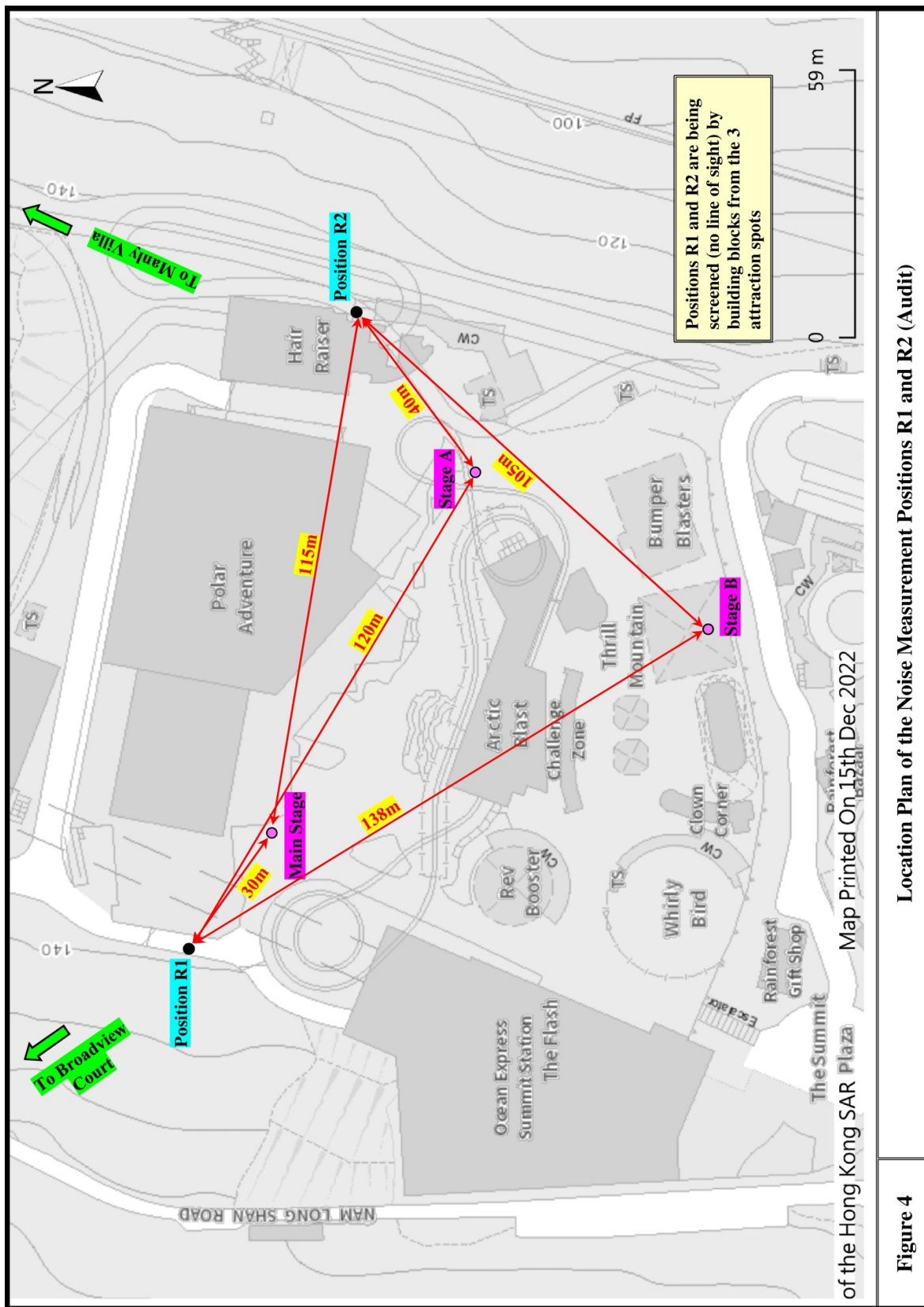
Location Plan of the Temporary Outdoor Attraction Facilities Spots (Summit)

Figure 2



Loudspeaker Arrangement at the 3 Attraction Spots

Figure 3



Location Plan of the Noise Measurement Positions R1 and R2 (Audit)

Figure 4

Appendix I

Technical Information of the Loudspeakers



Figure 1: KUDO® system components (part 1)



5 KUDO® ENCLOSURE

The L-ACOUSTICS® KUDO® enclosure contains two 1.75" HF diaphragm compression drivers coupled to individual DOSC® waveguides, four 5" MF transducers mounted in a V-shaped configuration, and two direct-radiating 12" LF transducers mounted in a bass reflex-loaded enclosure. Based on a quad amplified 3-way design, the nominal impedance of the KUDO® enclosure is 8 ohms for each of the HF and MF sections and each of both LF sections.

EN

Fulfilling WST® (Wavefront Sculpture Technology) coupling conditions with a coplanar transducer configuration and a dual DOSC® waveguide the KUDO® can be qualified as a true line source array. This configuration also provides even coverage without secondary lobes over the KUDO® coverage pattern.

The KUDO® is unique in the sense that in conjunction to WST® coverage pattern adjustment can now be performed in the perpendicular plane of the DOSC® waveguides using the K-LOUVER® Modular Directivity Technology. Four coverage pattern settings can be mechanically adjusted: 50° (symmetric), 110° (symmetric), 25° x 55° (asymmetric), and 55° x 25° (asymmetric).

The KUDO® fully integrated rigging allows KUDO® enclosures to combine the functions of a variable curvature vertical line source array (like V-DOSC®) and a constant curvature horizontal line source array (like ARCS®).

Given the choice of four directivity settings and 2 orientations the KUDO® multi-mode WST® enclosure is offering an unrivaled level of flexibility that represent the equivalent of 8 different products. The Figure 4 shows three vertical line source array configurations, the fourth one being the symmetric of the 55° / 25° picture. The other four configurations are obtained by setting the enclosures as horizontal line source arrays.

The KUDO® cabinet is made of high grade Baltic birch plywood with remarkable mechanical and acoustical properties for improved long term durability.

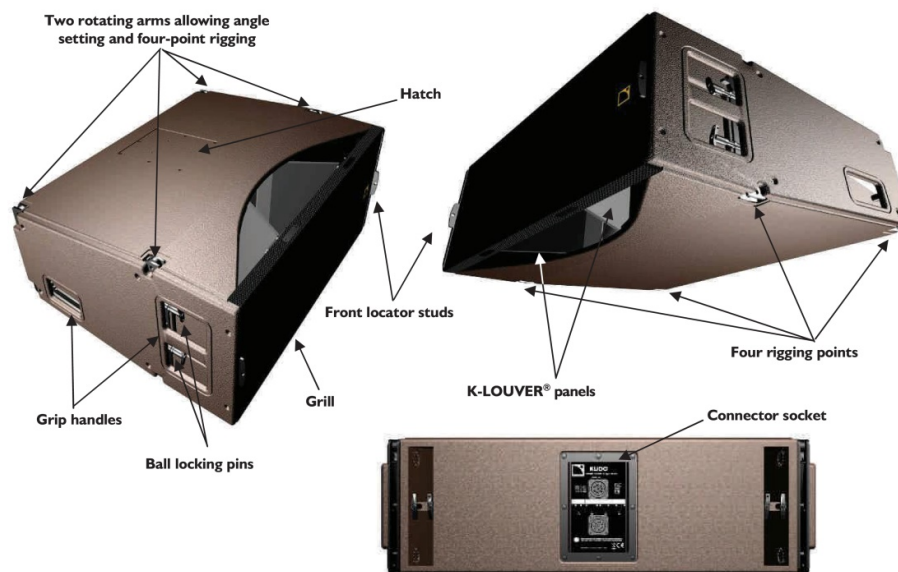


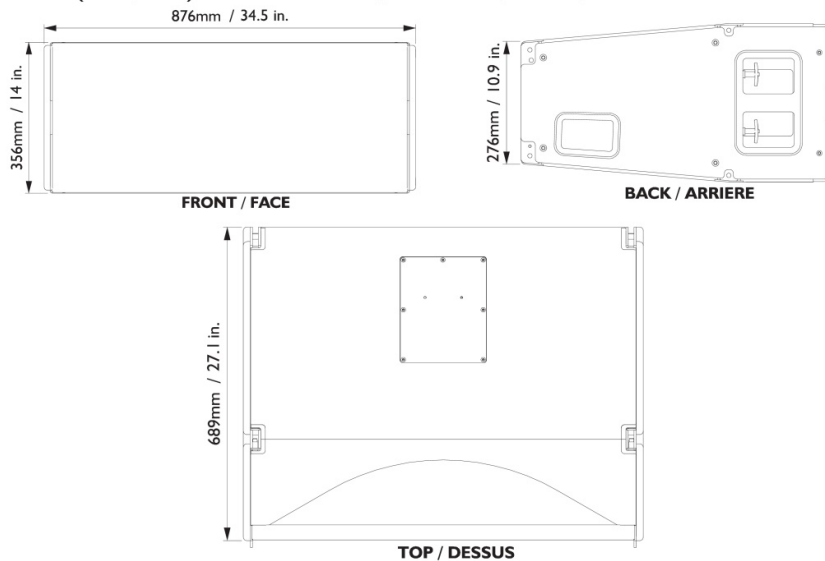
Figure 3: The KUDO® enclosure

KUDO® MULTI-MODE WST® ENCLOSURE

USER MANUAL
 VERSION 2.1

9 SPECIFICATIONS

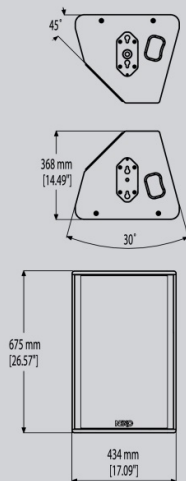
Reference	KUDO®		
Frequency Response			
Usable bandwidth (-10 dB)	35 Hz - 20 kHz ((KUDO50_25] preset)		
Maximum SPL ¹	140 dB ((KUDO50_40] preset)		
Nominal Directivity (-6 dB)			
(Vertical array)	Horizontal	50° or 110° symmetric, 25°/55° or 55/25° asymmetric.	
	Vertical	Dependant upon number of elements and line source curvature (between 0° and 10° inter-element angles at 1° resolution).	
(Horizontal array)	Horizontal	10° x number of enclosures.	
	Vertical	50° or 110° symmetric, 25°/55° or 55/25° asymmetric.	
Transducers			
LF	2 x 12" weather-resistant, direct-radiating transducers mounted in a bass reflex-tuned enclosure.		
MF	4 x 5" weather-resistant, high efficiency, V-shape mounted transducers.		
HF	2 x 1.75" diaphragm compression drivers coupled to DOSC® waveguides.		
Filtering	Active 3-way quad-amplified enclosure		
Nominal impedance	LF: 2 x 8 Ω	MF section: 8 Ω	HF section: 8 Ω
Long term RMS power handling capacity	LF: 2 x 450 W	MF: 312 W	HF: 75 W ((KUDO50_40] preset)
Connectors	2 x 8-point PA-COM® (male and female, wired in parallel)		
Dimensions (W x H/h x D)	876 x 356/276 x 689 mm / 34.5 x 14/10.9 x 27.1 inch		



PS15-R2 Loudspeaker



PS15



Key Features

- High-power system (136dB Peak SPL @ 1m) with 15in LF and 2in HF drivers.
- Rotatable asymmetrical horn and unique cabinet architecture ensure versatility; user-adaptable for both PA and stage monitoring applications.
- Two-way, switchable passive or active design for precise performance-matching to user requirements.
- Sophisticated control electronics ensure reliable, linear operation.
- Supported with a full range of mounting and flying accessories.

System Applications

- High-power mid-sized touring, installed PA for clubs, A/V, theater, Houses of Worship, broadcast, etc.
- High-quality, extremely powerful stage monitoring for A/V, theatre, cabarets, broadcast, etc.
- Fill-in system for any PA requiring side, down and near-field augmentation.

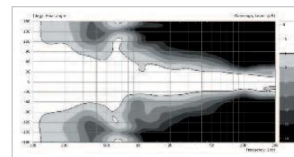


A high power system capable of producing 136dB Peak SPL, the new PS15-R2 Loudspeaker can be safely driven with up to 2000 Watts of amplifier power. Controlled by the new, dedicated PS 15 TDController-R2, or the NXAMP Powered Controller, the PS15-R2 achieves high SPLs and wide bandwidth performance, despite being only half the weight and volume of common trapezoidal loudspeaker systems.

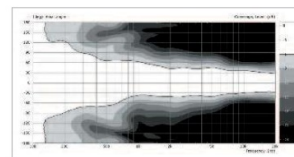
Along with the flexible coverage patterns enabled by NEXO's proprietary constant directivity asymmetrical dispersion horn, the architecture and weight balance of the PS15-R2 are designed to provide both uncompromised PA and stage monitor performance from a single speaker.

Left and Right versions of the PS15-R2 have been developed to provide a true stereo image – particularly important for wedge applications.

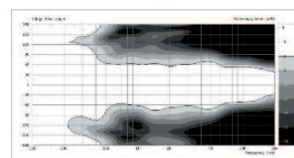
The 2-way passive 8Ω design uses a single amplifier channel to deliver bi-amped performance, reducing system cost, size and complexity, while the new cabinet design incorporates a pole mount and a new hardware adapter compatible with a vast array of touring and fixed installation accessories.



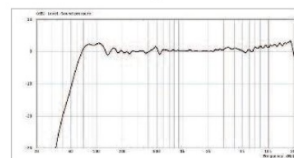
PS15-R2 horizontal coverage, +25°



PS15-R2 horizontal coverage, 0°



PS15-R2 horizontal coverage, -25°



PS15-R2 response

PS15-R2 Loudspeaker

NEXO

PS15



NEXO is one of the world's leading sound reinforcement loudspeaker manufacturers. Founded in 1979, the company is dedicated to crafting practical solutions with solid engineering. Each new design begins with a proprietary sophisticated computer simulation process that allows every parameter to be extensively modeled and simulated, leading to breakthrough cost and performance gains. NEXO's comprehensive product line includes loudspeakers, analogue and digital control electronics and amplification; all designed to deliver consistent sound quality and long term reliability for a broad range of applications.

NEXO S.A.
Parc d'Activité
du Pré de la Dame Jeanne
B.P. 5
60128 PLAILLY
Tel: +33 (0) 3 44 99 00 70
Fax: +33 (0) 3 44 99 00 30
e-mail: info@nexo.fr

NEXO LatAM
Tel: +1 305 677 9322
Fax: +1 360 234 7870
e-mail: info@nexo.fr

NEXO Asia
GPO Box 806
Hong Kong
SAR China
Tel: +852 9096 3472
Fax: +852 2104 3214
e-mail: info@nexo.fr

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www.nexo.fr

PS15-R2 LOUDSPEAKER PRODUCT FEATURES

Components	LF 1 x 15" (38 cm) long excursion Neodymium 8Ω driver. HF 1 x 2" throat, 3" Titanium diaphragm compression driver + Low Distortion, Constant Directivity Asymmetrical Dispersion Horn.
Height x Width x Depth	675 x 434 x 368 mm (26.57" x 17.08" x 14.48").
Weight	28 kg (62 lbs).
Speaker Connectors	2x4 pole in & loop thru (switch passive to active inside).
Construction	Baltic Birch Ply finished with textured black coating.
Fittings	Handles 2 metal recessed pockets.
Front Finish	Moulded dark grey metal grille.
Flying Points	Two plate connecting with external accessories.
Stand fittings	Built in steel stand fitting (35mm / 1 3/8").

SYSTEM SPECIFICATIONS PS15-R2 with PS15 TDController-R2

Frequency Response [a]	50 Hz - 18 kHz ±3 dB.
Usable Range @-6dB [a]	47 Hz - 18 kHz.
Sensitivity 1W @ 1m [b]	102 dB SPL Nominal / 99 dB SPL Wideband.
Nominal Peak SPL @ 1m [b]	133 to 136 dB Peak.
HF Dispersion [c]	50° to 100° Horizontal x 55° Vertical Rotatable Horn, 4 positions.
Directivity - Q & DI [c]	Q : 16 Nominal / DI : 12 dB Nominal (f > 1.5 kHz).
Crossover Frequencies	1.1 kHz Passive or Active (internally switchable).
Nominal Impedance	Passive 8Ω or Active LF 8Ω, HF 16Ω.
Recommended Amplifiers	Passive 1000 to 2000 W 8Ω. Active LF 1000 to 2000 W 8Ω / HF 250 to 500 W 16Ω. Important: Active mode only available on NXAMP.

SYSTEM OPERATIONS

Electronic Controller	The PS15TD Controller-R2 is precisely matched to the PS15-R2 & RS15 cabinets and includes protections. Using PS15-R2 & RS15 without a properly connected PS15 TDController-R2 will result in poor sound quality and can damage the components.
Dispersion configuration	After dismounting the front grille from its fixings, the HF Horn can be rotated in 4 positions for dispersion configuration.
Sub-bass	The PS15-R2 can be used without optional RS15 Sub-bass. Active two-way operation with RS15 is included in the PS15 TDController-R2. One RS15 matches 2 x PS15-R2, additional RS15 may be used for enhanced LF capability.
Speaker Cables	PS15R2 are wired 2-/2+ on Input Speakers in Passive Mode. PS1R25 are wired LF 1-/1+ & HF 2-/2+ on Input Speakers in Active Mode. Please refer to RS15 User Manual for RS15 for RS15 connection.

SHIPPING & ORDERING SPECIFICATIONS

Packaging	PS15-R2 is packaged as a single product.
Shipping Weight & Volume	33 kg (72.6 lbs) / 0.2 cubic metres (7 cubic feet).
Accessories	A full selection of mounting Accessories is available, please contact your Nexo Agent for details.

As part of a policy of continual improvement, NEXO reserves the right to change specifications without notice.

[a] Response curves & data : Anechoic Far Field for the PS15-R2 + PS15TDController-R2, Half-Space Anechoic radiation for the RS15R2 + PS15TDController-R2.

[b] Sensitivity & Peak SPL data : these will depend on spectral distribution and crest factor of program material. Measured with band limited Pink Noise. Nominal refers to Voice Decade (300 Hz - 3 kHz), Wideband to the specified ±3 dB range. Data are for speaker + processor + recommended amplifier combinations.

Peak SPL is at clipping of recommended amplifier. Measurements made with PS15-R2s in passive operation mode.

[c] Directivity curves & data : obtained by computer treatment on off axis response curves.

E&OE September 2009.

Architectural and Engineering Specifications

The 2-way loudspeaker system shall have one 15 inch shielded Neodymium 8Ω cone transducer and a 2 inch compression driver on a low distortion constant directivity asymmetrical dispersion horn. The system's horizontal coverage shall range from 50° to 100°, with vertical coverage of +25° and -30°. The user shall be able to rotate the horn in 4 directions as required by the application. The system shall have a Q of 16 and a Directivity Index that is 12 at frequencies above 1.5kHz. Nominal Sensitivity shall be 102dB (99dB wideband). When driven by a NEXO NXAMP 4x1, NXAMP 4x4 a PS15 TDController- R2 or by a NX242 properly connected to amplification capable of delivering 1000 to 2000 Watts into an 8Ω (nominal) load the system shall be capable of 133dB to 136dB peak SPL, with a frequency response of 50Hz to 18kHz ±3dB (47Hz to 18Hz -6dB). The system shall include an active or passive crossover with internal switching. Electrical connections shall be made via one of the two 4-pole NL4MP SPEAKON connectors.

The system shall have a tuned ported multi-angle enclosure constructed of 18ply Baltic birch, finished in either black or white textured coating and having exterior dimensions no greater than 675mm H x 434mm W x 368mm D (26.6in H x 17.1in W x 14.5in D); the system shall weigh 29.0kg (65.0lbs). Exterior hardware shall include 1 metal plate, 2 attachment points and 1-pole socket. Interior components shall be protected by a powder coated perforated steel grille. The system shall be the NEXO PS15 R2 with a PS15 TDController-R2, NXAMP 4x1, NXAMP 4x4 or NX242.

LIMITED WARRANTY

NEXO loudspeakers and electronics are covered against defects in workmanship or materials for a period of two (2) years from the original date of purchase. At the option of NEXO the defective item will be repaired/replaced with no charge for materials/labour. The item is to be adequately packaged and dispatched, pre-paid, to a NEXO authorised distributor/service centre. Unauthorised repair shall void the warranty. The NEXO warranty does not cover cosmetics or finish and does not apply to any items which in NEXO's opinion have failed due to used abuse, accidents, modifications or any type of misuse. All images and text herein are the property of NEXO SA, and deemed accurate, although specifications are subject to change without notice.

Appendix II

Calibration Certificates



ATSL 聲學測試服務有限公司
Acoustic Testing Services Limited

Unit E, 2/F., Century Industrial Centre, 33-35 Au Pui Wan Street, Fo Tan, Shatin, New Territories, Hong Kong
Tel: (852) 2690 9126 Fax: (852) 2690 9125 E-mail: info@ATSL.com.hk http://www.ATSL.com.hk

Certificate of Calibration

Certificate No. ATS22-008-CC003

Customer: **Aeolian View Consultants**
Flat 23E, 23/F., Block 1, Kingley Industrial Building,
35 Yip Kan Street, Wong Chuk Hang,
Hong Kong

Unit-under-test (UUT):

Description:	Sound Analyzer	, Microphone	, Pre-amplifier
Manufacturer:	NTi Audio		
Type No.:	XL2-TA	, MC230	, MA220
Serial No.:	A2A-08670-E0	, 9422	, 5045


Conditions during calibration:

Temperature:	26°C
Relative Humidity:	58%

Test Specifications: Calibration Check

Date of calibration: 13 June 2022

Calibration Results: All calibration points are within manufacturer's specification.

Certified by:  
Mr. Y. T. LEUNG / Technical Manager
MIOA, MHKIOA, MHKIQEP

Issue Date: 14 June 2022

Certificate No.: ATS22-008-CC003 Page 1 of 3



Unit E, 2/F., Century Industrial Centre, 33-35 Au Pui Wan Street, Fo Tan, Shatin, New Territories, Hong Kong
Tel: (852) 2690 9126 Fax: (852) 2690 9125 E-mail: info@ATSL.com.hk http://www.ATSL.com.hk

1. The instrument under test was allowed to stabilize in the laboratory for over 24 hours.

2. Calibration equipment

Description:	Acoustical Calibrator
Manufacturer:	Brüel & Kjær
Type No.:	4226
Serial No.:	2919264
Last Calibration Date:	20 August 2021
Certificate No.:	2HB21001798-0001

The calibration equipment used for calibration is traceable to National Standards via China Ceprei Laboratory Calibration & Testing Centre.

3. The Sound Analyzer has been calibrated in accordance with the requirements as specified in IEC 61672 Class 1, and vendor specific procedures.

4. The values given in this certification only related to the values measured at the time of the calibration and any uncertainties quoted will not allowance for the equipment long-term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the calibration. Acoustic Testing Services Limited shall not be liable for any loss or damage resulting from the use of the equipment.

Certificate No.: ATS22-008-CC003



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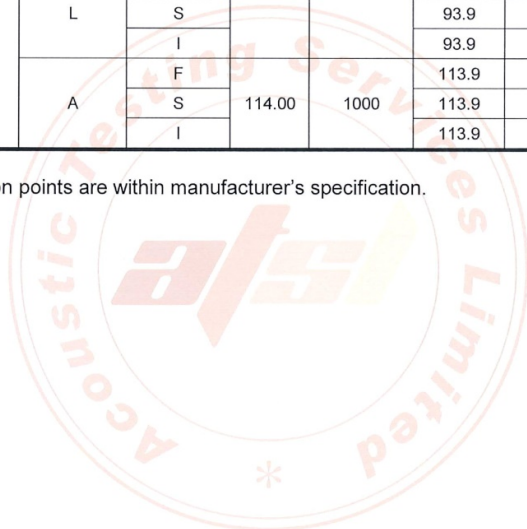


Unit E, 2/F., Century Industrial Centre, 33-35 Au Pui Wan Street, Fo Tan, Shatin, New Territories, Hong Kong
 Tel: (852) 2690 9126 Fax: (852) 2690 9125 E-mail: info@ATSL.com.hk http://www.ATSL.com.hk

5. Calibration Results

Setting of unit-under-test (UUT)				Applied value		UUT Reading, dB	IEC 61672-1 Class 1 Tolerance Limits, dB	Conclusion		
Range, dB	Parameter	Frequency Weighting	Response	Level, dB	Frequency, Hz					
20-120	SPL	A	F	94.00	1000	93.9	± 0.7	PASS		
			S			93.9	± 0.7	PASS		
			I			93.9	± 0.7	PASS		
		C	F			93.9	± 0.7	PASS		
			S			93.9	± 0.7	PASS		
			I			93.9	± 0.7	PASS		
		L	F			93.9	± 0.7	PASS		
			S			93.9	± 0.7	PASS		
			I			93.9	± 0.7	PASS		
		A	F			114.00	1000	113.9	± 0.7	PASS
			S					113.9	± 0.7	PASS
			I					113.9	± 0.7	PASS

All calibration points are within manufacturer's specification.



Certificate No.: ATSS2-008-CC003



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Unit E, 2/F., Century Industrial Centre, 33-35 Au Pui Wan Street, Fo Tan, Shatin, New Territories, Hong Kong
Tel: (852) 2690 9126 Fax: (852) 2690 9125 E-mail: info@ATSL.com.hk http://www.ATSL.com.hk

Certificate of Calibration

Certificate No. ATS22-008-CC001

Customer: **Aeolian View Consultants**
Flat 23E, 23/F., Block 1, Kingley Industrial Building,
35 Yip Kan Street, Wong Chuk Hang,
Hong Kong

Unit-under-test (UUT):

Description:	Sound Analyzer	,	Microphone	,	Pre-amplifier
Manufacturer:	Svantek	,	BSWA	,	Svantek
Type No.:	Svan-959	,	231	,	SV 12L
Serial No.:	11238	,	540602	,	73661


Conditions during calibration:

Temperature: 22°C
Relative Humidity: 58%

Test Specifications: Calibration Check

Date of calibration: 09 February 2022

Test Results: All calibration points are within manufacturer's specification.

Certified by: 
Mr. Y. F. LEUNG
MIOA, MHKIOA, MHKIQEP



Issue Date: 09 February 2022

Certificate No.: ATS22-008-CC001

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Unit E, 2/F., Century Industrial Centre, 33-35 Au Pui Wan Street, Fo Tan, Shatin, New Territories, Hong Kong
Tel: (852) 2690 9126 Fax: (852) 2690 9125 E-mail: info@ATSL.com.hk http://www.ATSL.com.hk

1. The instrument under test was allowed to stabilize in the laboratory for over 24 hours.

2. Calibration equipment

Description: Acoustical Calibrator
Manufacturer: Brüel & Kjær
Type No.: 4231
Serial No.: 2478237
Last Calibration Date: 13 April 2021
Certificate No.: AV210055

The test equipment used for calibration is traceable to National Standards via Standards and Calibration Laboratory, the Government of the HKSAR.

3. The sensitivity of the microphone has been adjusted by the calibration function of the Sound Analyzer (calibrated as 94.0dB at 1000Hz) before the calibration. And the adjusted sensitivity was recorded.

Adjusted Microphone Sensitivity (mV/Pa)	32.32
---	-------

4. The Sound Analyzer has been calibrated in accordance with the requirements as specified in IEC 61672 Class 1, and vendor specific procedures.

5. The values given in this certification only related to the values measured at the time of the calibration and any uncertainties quoted will not allowance for the equipment long-term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the calibration. Acoustic Testing Services Limited shall not be liable for any loss or damage resulting from the use of the equipment.



Certificate No.: ATS22-008-CC001

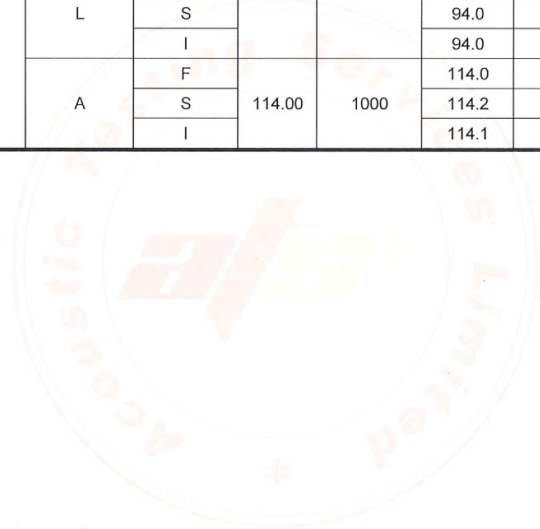
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Unit E, 2/F., Century Industrial Centre, 33-35 Au Pui Wan Street, Fo Tan, Shatin, New Territories, Hong Kong
 Tel: (852) 2690 9126 Fax: (852) 2690 9125 E-mail: info@ATSL.com.hk http://www.ATSL.com.hk

6. Calibration Results

Setting of unit-under-test (UUT)				Applied value		UUT Reading, dB	IEC 61672-1 Class 1 Tolerance Limits, dB	Conclusion		
Range, dB	Parameter	Frequency Weighting	Response	Level, dB	Frequency, Hz					
20-120	SPL	A	F	94.00	1000	94.0	± 0.7	PASS		
			S			94.0	± 0.7	PASS		
			I			94.0	± 0.7	PASS		
		C	F			94.0	± 0.7	PASS		
			S			94.0	± 0.7	PASS		
			I			94.0	± 0.7	PASS		
		L	F			94.0	± 0.7	PASS		
			S			94.0	± 0.7	PASS		
			I			94.0	± 0.7	PASS		
		A	F			114.00	1000	114.0	± 0.7	PASS
			S					114.2	± 0.7	PASS
			I					114.1	± 0.7	PASS





Unit E, 2/F., Century Industrial Centre, 33-35 Au Pui Wan Street, Fo Tan, Shatin, New Territories, Hong Kong
Tel: (852) 2690 9126 Fax: (852) 2690 9125 E-mail: info@ATSL.com.hk http://www.ATSL.com.hk

Certificate of Calibration

Certificate No. ATS22-008-CC002

Customer: **Aeolian View Consultants**
Flat 23E, 23/F., Block 1, Kingley Industrial Building,
35 Yip Kan Street, Wong Chuk Hang,
Hong Kong

Unit-under-test (UUT):

Description: Acoustic Calibrator
Manufacturer: Svantek
Type No.: SV-30A
Serial No.: 7441

Conditions during calibration:

Temperature: 22°C
Relative Humidity: 58%

Test Specifications: Calibration Check

Date of calibration: 09 February 2022

Test Results: All calibration points are within manufacturer's specification.

Certified by: 
Mr. Y. T. LEUNG
MIOA, MHKIOA, MHKIQEP



Issue Date: 09 February 2022

Certificate No.: ATS22-008-CC002

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Unit E, 2/F., Century Industrial Centre, 33-35 Au Pui Wan Street, Fo Tan, Shatin, New Territories, Hong Kong
 Tel: (852) 2690 9126 Fax: (852) 2690 9125 E-mail: info@ATSL.com.hk http://www.ATSL.com.hk

1. The instrument under test was allowed to stabilize in the laboratory for over 24 hours.

2. Calibration equipment

Description:	Sound Analyzer	Reference Microphone
Manufacturer:	Brüel & Kjær	Brüel & Kjær
Type No.:	2270	4189
Serial No.:	3029788	3037051
Last Calibration Date:	24 August 2021	24 August 2021
Certificate No.:	AV210161	AV210161

The test equipment used for calibration is traceable to Standards and Calibration Laboratory, the Government of the HKSAR.

3. Calibration Results

Nominal value dB	Measured value dB	Expanded Measurement Uncertainty of Reference Microphone B&K 4189 at 1000 Hz dB
94.00	94.0	0.2
114.00	114.0	0.2



Certificate No.: AT22-008-CC002

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Appendix III

Derivation of Commissioning Noise Limits for Loudspeaker Sources

23:00-23:00

Noise Sensitive Receiver (NSR)	NSR			Propagation	Ocean Park (Summit)					
	Fixed Plant Noise Assessment Criteria *	Total Predicted SPL (Normal Operation Source)	Allowable Net SPL (at NSR)	Distance (NSR to Attraction Spot)	Attraction Spot	Maximum Allowable SWL (at attraction spot)	Distance (Attraction Spot to Position R1 or R2)	Audit Position **	Commissioning Noise Limit	
	SPL _(NSR)	SPL _(Total)	SPL _(Net)	D		SWL _(Spot)	d	R1 or R2	R1	R2
	dB(A)	dB(A)	dB(A)	m	dB(A)	m	dB(A)	dB(A)		
BCI (Broadview Court)	57	54	54.3	930	Main Stage	127	30	81	82	-
				1020	Stage A	128	120	70		
				1040	Stage B	128	138	69		
MV (Manly Villa)	54	54	44 ***	955	Main Stage	117	115	60	-	70
				950	Stage A	117	40	69		
				1020	Stage B	117	105	61		

Notes :

- SPL = Sound Pressure Level ; SWL = Sound Power Level
- * Extracted from Table 3.1e, Environmental Review Report (ERR) in May 2014
- ** under free field condition
- $SPL_{(Net)} = 10 \log[10^{SPL_{(NSR)/10}} - 10^{SPL_{(Total)}/10}]$
 $SWL_{(Spot)} = SPL_{(Net)} - 3$ (Façade Reflection) - $10 \log(3)$ (contribution at 1 attraction spot) + 10 (Barrier effect #) + $20 \log(D) + 11$
 $SPL_{(i)} = SPL_{(Spot)} - 5$ (Barrier effect ▼) - $20 \log(d) - 11$
[Where # No direct line of sight from NSR to Attraction Spots ; ▼ No direct line of sight from Position R1 or R2 to Attraction Spots (See Figures 1 and 4)]
- *** As $SPL_{(NSR)} = SPL_{(Total)} = 54$ dB(A), $SPL_{(Net)}$ is deliberately taken to be 44 dB(A) for the subsequent commissioning limit derivation
[Numerically 10 dB(A) below $SPL_{(NSR)}$ implies negligible contribution to $SPL_{(NSR)}$]

23:00-01:00

Noise Sensitive Receiver (NSR)	NSR			Propagation	Ocean Park (Summit)					
	Fixed Plant Noise Assessment Criteria *	Total Predicted SPL (Normal Operation Source)	Allowable Net SPL (at NSR)	Distance (NSR to Attraction Spot)	Attraction Spot	Maximum Allowable SWL (at attraction spot)	Distance (Attraction Spot to Position R1 or R2)	Audit Position **	Commissioning Noise Limit	
	SPL _(NSR)	SPL _(Total)	SPL _(Net)	D		SWL _(Spot)	d	R1 or R2	R1	R2
	dB(A)	dB(A)	dB(A)	m	dB(A)	m	dB(A)	dB(A)		
BCI (Broadview Court)	54	47	53.0	930	Main Stage	126	30	80	81	-
				1020	Stage A	126	120	68		
				1040	Stage B	127	138	68		
MV (Manly Villa)	50	26	50.0	955	Main Stage	123	115	66	-	76
				950	Stage A	123	40	75		
				1020	Stage B	123	105	67		

Notes :

- SPL = Sound Pressure Level ; SWL = Sound Power Level
- * Extracted from Table 3.1e, Environmental Review Report (ERR) in May 2014
- ** under free field condition
- $SPL_{(Net)} = 10 \log[10^{SPL_{(NSR)/10}} - 10^{SPL_{(Total)}/10}]$
 $SWL_{(Spot)} = SPL_{(Net)} - 3$ (Façade Reflection) - $10 \log(3)$ (contribution at 1 attraction spot) + 10 (Barrier effect #) + $20 \log(D) + 11$
 $SPL_{(i)} = SPL_{(Spot)} - 5$ (Barrier effect ▼) - $20 \log(d) - 11$
[Where # No direct line of sight from NSR to Attraction Spots ; ▼ No direct line of sight from Position R1 or R2 to Attraction Spots (See Figures 1 and 4)]

Environmental Review Report (ERR) in May 2014

Table 3.1e Proposed Fixed Plant Noise Assessment Criteria during the Proposed Extended Opening Hours

NSR	Description	Noise Monitoring Location	Minimum Measured Noise Levels, during 09:00-10:00 hrs / 22:00-23:00 hrs, dB(A)	Fixed Plant Noise Assessment Criteria during 10:00 - 22:00 hrs ^(a) , dB(A)	Fixed Plant Noise Assessment Criteria, during 09:00-10:00 hrs / 22:00-23:00 hrs, dB(A), i.e. Minimum of [1] and [2]	Minimum Measured Noise Levels, during 23:00-01:00 hrs of the next day, dB(A)	Minimum Measured Noise Levels, during 08:00-02:00 hrs of the next day, dB(A)	IND-TM ANL-5, during 07:00-23:00 hrs/23:00-07:00 hrs of the next day, dB(A)	Fixed Plant Noise Assessment Criteria, during 23:00-01:00 hrs of the next day, dB(A), i.e. Minimum of [3] and [5]	Fixed Plant Noise Assessment Criteria, during 08:00-09:00/01:00-02:00 hrs of the next day, dB(A), i.e. Minimum of [4] and [5]
PT51	Old Teaching Block (Police Training School)	NM1	66/62	60	60	61	66/63	60/50	50	60/50
SW2	Wong Chuk Hang San Wai	NM3	64/61	60	60	54	66/53	60/50	50	60/50
HA	The Hazelton									
CV2	Country Villa									
XC	Xanadu Court									
OR	Orchid Valley	NM5	56/55	55	55	50	55/45	60/50	50	55/45
HY	Hau Yau									
IV1	Island View	NM6	59/54	60	54	53	58/54	60/50	50	58/50
MV	Manly Villa	NM4	59/54	56	54	53	57/53	60/50	50	57/50
BC1	Broadview Court	NM8	57/57	62	57	54	53/52	65/55 ^(b)	54	53/52

Notes:

- (a) The noise criteria during 10:00 - 22:00 hrs are taken from Table 3.4 of the approved EIA Report.
(b) The Broadview Court is located within 100m from the industrial area.

Total Predicted SPL Estimation (Normal Operation Source)

BC1

Plant ID	Plant *	Location	Predicted SPL *, dB(A)	
			20:00-23:00	23:00-01:00
SF02	Split-type A/C unit	South Pole Spectacular	6	6
SF04	Split-type A/C unit	North Pole Encounter	15	15
SF05	AC plant	South Pole Spectacular	12	12
SF07	AC plant	North Pole Encounter	21	21
SF08	AC plant	Rainforest	22	22
SF09	Chiller	North Pole Encounter	26	26
SF10	Pump	North Pole Encounter	18	18
SF12	PA system	Rainforest	27	27
SF13	PA system	Thrill Mountain	34	34
SF14	PA system	Polar Adventure	33	33
N-R14	Arctic Blast	Polar Adventure	38	38
N-R17	Hair Raiser	Thrill Mountain	50	-
N-R13	Rev Booster	Thrill Mountain	46	46
N-R12	Whirly Bird	Thrill Mountain	34	34
N-R11	The Flash	Thrill Mountain	49	-
N-R15	Bumper Blasters	Thrill Mountain	22	22
N-R16	The Rapids	Rainforest	28	28
Total Predicted SPL at BC1 , $SPL_{(Total)} =$			54	47

Notes : * Extracted from Annex C10, Environmental Review Report (ERR)

Total Predicted SPL Estimation (Normal Operation Source)

MV

Plant ID	Plant *	Location	Predicted SPL *, dB(A)	
			20:00-23:00	23:00-01:00
-	All rides	Whiskers Harbour	47	-
LN-R7	Sea Life Carousel	Aqua City	46	-
WF01	PA system	Whiskers Harbour	45	-
WF02	PA system	Bird of Paradise	43	-
WF03	PA system	Amazing Asian Animals	39	-
WF04	PA system	Entry Plaza	35	-
WF05	PA system	Aqua City	47	-
WF06	Split-type A/C unit	Coral Building	33	-
WF07	Split-type A/C unit	East Retail at Entry Plaza	32	-
WF08	Split-type A/C unit	West Retail at Entry Plaza	30	-
WF09	Split-type A/C unit	The Grand Aquarium	31	-
WF10	Split-type A/C unit	The Hong Kong Jockey Club Sichuan Treasures	29	-
WF11	Split-type A/C unit	New Birds House	24	-
WF12	Split-type A/C unit	Amazing Bird Theatre	32	-
WF13	Split-type A/C unit	Old Hong Kong	26	-
WF14	Split-type A/C unit	Panda Café	29	-
WF15	Split-type A/C unit	Giant Panda Adventure and Panda Village	22	-
WF16	Split-type A/C unit	Annex Administration Building	22	-
WF17	Split-type A/C unit	Administration Building	34	-
WF18	Pump Cluster	The Hong Kong Jockey Club Sichuan Treasures	31	-
WF19	AC plant	West Retail at Entry Plaza	34	-
WF20	AC plant	East Retail at Entry Plaza	34	-
WF21	AC plant cluster	The Grand Aquarium	21	-
WF22	AC plant	The Hong Kong Jockey Club Sichuan Treasures	39	-
WF23	AC plant	Old Hong Kong	28	-
WF24	AC plant	Panda Café	38	-
WF25	AC plant cluster	Old Warehouse & CPU	16	-
WF26	Cooling tower	The Grand Aquarium	42	-
WF27	Compressor	West Retail at Entry Plaza	16	-
WF28	Chiller	The Grand Aquarium	40	-
WF29	Chiller	Giant Panda Adventure and Panda Village	26	-
WF30	Fan Room	West Retail at Entry Plaza	22	-
WF31	Ventilation fan	The Hong Kong Jockey Club Sichuan Treasures	33	-
WF32	Ventilation fan	West Retail at Entry Plaza	27	-
WF33	Ventilation fan	New Bird House	21	-
WF34	Ventilation fan	Amazing Bird Theatre	28	-
WF35	Ventilation fan	Panda Café	38	-
WF36	Machine plant	Ocean Express Station (Waterfront)	26	26
WF37	Machine Plant	Cable Car Station	31	-
LN-A11	Sky Fair Plaza Performance Venue	Aqua City	39	-
Total Predicted SPL at MV , $SPL_{(Total)} =$			54	26
Notes : * Extracted from Annex C10, Environmental Review Report (ERR)				