Rangebank BESS

Compliance Noise Monitoring

S7794C16

December 2024

sonus.

Sonus Pty Ltd
17 Ruthven Ave
Adelaide SA 5000
Phone: +61 (8) 8231 2100
Email: info@sonus.com.au
www.sonus.com.au

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Author	: Chris Turnbull, MAAS

1 INTRODUCTION

The Rangebank BESS (the **Subject Site**) is a 200MW/400MWh battery energy storage system (**BESS**), located in Cranbourne West, Victoria. The Subject Site was approved on 29 September 2022 and the approval was subsequently amended on 14 February 2023 and 10 August 2023.

This report has been prepared to outline the procedure and results of compliance noise measurements taken in the vicinity of the Subject Site on the 14th and 15th of November 2024.

2 NOISE LEGISLATION

The *Environment Protection Act 2017* (VIC) (the **Act**) outlines the principles of environment protection that are applicable to developments in Victoria. The *Environment Protection Regulations 2021* (VIC) (the **Regulations**) furthers the purposes of the Act by, among other things, specifying matters in relation to noise. Clause 113 of the Regulations states the following:

> ***113. Prediction, Measurement, assessment and analysis of noise must be in accordance with Noise Protocol***
>
> *A person who conducts a prediction, measurement, assessment or analysis of noise within a noise sensitive area for the purposes of the Act or these Regulations, other than Division 5 of this Part, must conduct the prediction, measurement, assessment or analysis in accordance with the Noise Protocol.*
>
> ***Note***
>
> *The Noise Protocol sets out how to conduct the following noise-related assessments –*
>
> *(a) noise limits;*
>
> *(b) background levels;*
>
> *(c) alternative assessment criterion at an alternative assessment location, including when the Live music entertainment venues provisions (which include reference to agent of change) set out in the VPPs apply;*
>
> *(d) effective noise levels.*

The Noise Protocol referenced in the Regulations refers to the EPA Publication 1826.4 *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (the **Noise Protocol**). The Noise Protocol defines two methods for determining noise limits, an urban area method and a rural area method.

For the urban area method (applicable for the Subject Site), the zoning noise limit is first determined, then this may be adjusted, depending on existing background noise levels. Excerpts of the relevant clauses from the Noise Protocol are attached in Appendix A.

3 CRITERIA

The current planning permit for the Subject Site was granted in February 2023 (permit no. PA2101362-1) (the **Permit**). Condition 10 of the Permit requires the use of the land to comply with the noise criteria documented in the Noise Protocol. It is noted that no specific noise criteria are provided in the Permit conditions, only referencing the method for determining appropriate conditions. Appropriate noise criteria have therefore been determined in accordance with the urban area method of the Noise Protocol.

As noted in the Noise Legislation section of this report, the criteria determined in accordance with the Noise Protocol are influenced by the background noise level in the area. It is noted that background noise monitoring was previously conducted in February 2021 by Marshall Day Acoustics (**MDA**), however these measurements are not considered to be representative of the conditions on site for the following reasons:

- Noise monitoring was conducted during COVID, where activities were much reduced.
- Short term noise measurements were taken on a limited number of occasions as opposed to continuous long term noise monitoring.
- Noise measurements were not representative of the closest residences to the Subject Site and were instead taken at locations setback further from the site and often shielded by other residences.

As such, contemporary background noise measurements were conducted to better determine the site conditions, prior to the operation of the BESS. This noise monitoring was conducted at two locations near to the Subject Site between 5 August 2024 and 13 August 2024. The noise monitoring locations and receiver locations can be seen in Figure 1. Noise monitoring equipment was placed on Breens Road and Evans Road at similar distances from major noise sources (roads) as residences.

Figure 1: Site layout and receivers

The background noise level is determined as the arithmetic average of all $L_{A90,1\ hour}$ measurements for each of the day, evening, and night periods, as defined in EPA Publication 1997 *Technical guide: Measuring and analysing industry noise and music noise* (the **Technical Guide**). The resultant background noise levels based on the measurements can be seen in Table 1. It is noted that during the background noise monitoring period, there was construction activity occurring on the opposite side of Evans Road during the day period. As such, the background noise levels for this period have been conservatively assumed to be the same as for the evening period. This results in lower criteria during the day than would otherwise be the case.

Table 1: Background Noise Levels

Location	Time Period		
	Day	Evening	Night
Breens Road	44 dB(A)*	44 dB(A)	42 dB(A)
Evans Road	56 dB(A)*	56 dB(A)	46 dB(A)

* Background noise levels as per evening period.

The Noise Protocol defines noise limits based on the background classification of the area. This is determined, as per the method in clause 4 of the Noise Protocol, by comparing the zoning levels with the background noise levels. The noise limits are then determined using the background classification in accordance with clauses 5 and 6. Given the zoning levels and the measured background levels, the noise limits can be seen in Table 2. It is noted that the criteria reported below have been decreased by 3 dB(A) to account for the potential cumulative noise from other industrial sources in the vicinity. This is in accordance with the equal sharing principle outlined in the Technical Guide, which adjusts the noise limits based on the total number of industrial noise sources in the vicinity. The applied correction is based on there being a total of 2 industrial premises at the time of application.

Table 2: Noise Protocol noise limits

Receiver	Representative Logging Location	Zoning Level			Background Classification	Noise Limits		
		Day	Evening	Night		Day	Evening	Night
R1	Breens Road	53	47	42	High	47	44	42
R2		53	47	42	High	47	44	42
R3		53	47	42	High	47	44	42
R4		54	48	43	High	47	44	42
R5		54	48	43	High	47	44	42
R6		55	48	43	High	47	44	42
W1	Evans Road	58	51	46	High	59	56	46
W2		58	52	46	High	59	56	46
W3		58	52	47	High	59	56	46
W4		58	52	47	High	59	56	46

4 MEASUREMENT PROCEDURE

Attended noise measurements were taken on the nights of the 14th and 15th of November 2024. Measurements were initially taken at the most exposed residence, R1. This location was, however, not located downwind from the Subject Site and was therefore not exposed to the worst-case conditions for noise propagation. Where the noise level is affected by atmospheric conditions, clause 76 of the Noise Protocol requires an alternate assessment location to be used, as stated below:

> *Where the effective noise level at the noise sensitive area is likely to be affected by atmospheric conditions, an alternative assessment location located near to the commercial, industrial or trade premises must be used unless there is no appropriate alternative assessment location (refer clause 77).*

An alternate assessment location was therefore chosen that was downwind from the Subject Site, D1. The locations where the measurements were taken can be seen in Table 3 and graphically in Figure 2.

Table 3: Measurement Locations

Measurement Location	Coordinates (UTM WGS84 55H)	
	Easting	Northing
R1	347325	5783025
D1	347329	5783450

The BESS was operated at maximum capacity (200MW) for the duration of the testing on each night. The schedule in Table 4 outlines the operating modes and conditions during the testing.

Table 4: Operating Schedule

Time	Mode	Inverter Fan Speed	Battery Cooling Mode
11:00pm to 11:30pm	200MW discharge	80%	Mode 8*
11:30pm to Midnight	200MW charge	80%	Mode 8*
Midnight to 12:30am	200MW discharge	80%	Mode 8*
12:30am to 1:00am	200MW charge	80%	Mode 8*

* Mode 8 = long duration cubes operating with the *Envicool* chiller and HVAC both switched on.

Fluence has indicated that these operating conditions represent "*worst case" acoustic contribution with the site under full load, inverter fans operating at 80% and all chillers and HVAC in standard operating modes*.

Figure 2: Measurement Locations

Noise measurements were taken using a Rion NL-52 sound level meter (serial number 00220543), last calibrated on 19 September 2024. The calibration certificate and datasheet for the sound level meter can be seen in Appendix B. The sound level meter was placed on a tripod to facilitate the measurements, with an example of a typical measurement setup shown in Figure 3. The sound level meter was calibrated before and after the noise measurements to a level of 94.0 dB(A) with no drift observed. The measurements were taken using the 'fast' time weighting and 'A' frequency weighting.

Figure 3: Typical Measurement Setup

It is noted that the operation of the site was only occasionally audible while conducting the measurements at R1, with noise from traffic being the dominant noise source observed. As the wind was observed to be blowing towards the site from this location, measurements were subsequently taken at an alternate assessment location positioned downwind of the site during this period. Site operations were the dominant noise source at this alternate location. The measurements were paused to remove the effects of extraneous noise, including the noise from aircraft, trains, and excessive traffic. The potential for tonality was observed during the measurements at D1.

5 MEASUREMENT RESULTS

The results of the measurements and the atmospheric conditions at the time of the measurements can be seen in Table 5. The atmospheric conditions have been taken from the nearest Bureau of Meteorology station to the Subject Site, being the station at Frankston (Ballam Park). The observations for the time closest to the start of the measurement have been reported.

Table 5: Measurement Results

Measurement Number	Measurement Location	Measurement Time	Measured Noise Level	Temperature	Humidity	Wind Speed	Wind Direction
1	R1	14/11 11:00pm	36 dB(A)	11.9°	70%	4 km/h	SSW
2	R1	14/11 11:30pm	34 dB(A)	11.7°	73%	4 km/h	S
3	D1	14/11 11:56pm	50 dB(A)	11°	77%	4 km/h	S
4	D1	15/11 12:10am	50 dB(A)	11°	77%	4 km/h	S
5	R1	15/11 12:34am	33 dB(A)	10.8°	77%	4 km/h	SSE
6	R1	15/11 01:00am	32 dB(A)	10.6°	75%	4 km/h	SSE
7	R1	15/11 11:00pm	41 dB(A)	14.3°	75%	11 km/h	E
8	R1	15/11 11:30pm	40 dB(A)	13.9°	78%	9 km/h	ESE
9	D1	16/11 12:05am	50 dB(A)	13.8°	79%	11 km/h	ESE
10	R1	16/11 12:30am	38 dB(A)	13.5°	80%	6 km/h	ESE

It is noted that although the Frankston weather station indicates a variation in wind direction, direct observations at the time of the noise measurements at D1 indicated that the location was downwind of the BESS during the noise measurements.

In order to determine compliance based on the measurements taken at the alternate assessment location, the noise levels were extrapolated back to the primary assessment location, R1, using the alternate assessment criterion principles of the Noise Protocol. This was accomplished by comparing the predicted noise levels at these two locations. The results of this extrapolation can be seen in Table 6.

Table 6: Extrapolated Noise Level

Measurement Number	Extrapolated Noise Level
3	41 dB(A)
4	40 dB(A)
9	40 dB(A)

The Noise Protocol requires the measured noise level to be adjusted for noise character where it is found to contain excessive tonality, impulsiveness, or intermittency. Tonality was observed during the attended measurements at D1 (but not at R1). The data were then further analysed in accordance with the procedure outlined in Annex C of the Noise Protocol. This further analysis indicated that a 2 dB(A) penalty for tonality is warranted for the measurements at D1. It is noted that with the additional distance and masking influence of ambient noise, the prominence of the tonality would be less at R1 than at D1.

An overall noise level for each location has been determined based on the average of the measured noise levels. In addition, a 2 dB(A) penalty has been conservatively applied to the extrapolated noise levels for a tonal noise character. This results in a level of 36 dB(A) at R1 and a level of 42 dB(A) when extrapolating from the measurements conducted at D1. Both of these levels will achieve the criterion of 42 dB(A) applicable at R1.

It can therefore be seen that the operation of the Subject Site complied with the relevant criterion from the Noise Protocol at the nearest noise sensitive location at the time of the measurements.

6 CONCLUSION

The planning permit for the Rangebank BESS includes the requirement for the use of the land to comply with the noise criteria documented in the Noise Protocol.

The noise criteria were determined in accordance with the Noise Protocol, including background noise monitoring conducted in August 2024, prior to operation of the BESS.

Noise monitoring was conducted on the evenings of 15 and 16 November. Fluence has confirmed that at the time of the monitoring, equipment was operating under *"worst case" acoustic contribution, with the site under full load, inverter fans operating at 80% and all chillers and HVAC in standard operating modes*.

At the times of noise monitoring, the noise from the BESS was barely audible at the closest residences. However, as the wind was not blowing toward the measurement location, an additional analysis was conducted by measuring the noise at an alternate location, as required by the Noise Protocol. The measured noise levels were then extrapolated to location of residences, under worst case meteorological conditions (wind toward residences) in accordance with the Noise Protocol. These levels therefore represent the worst case operational conditions (confirmed by Fluence), under the worst case meteorological conditions.

Based on the above, the measured noise levels complied with the Noise Protocol. At all other times (in lower noise operating conditions and/or with different meteorological conditions), it is expected that noise levels will be lower at residences.

APPENDIX A: RELEVANT NOISE PROTOCOL CLAUSES

Part I:

Commercial, industrial and trade premises

A: Determining noise limits for commercial, industrial and trade premises

1. Noise limits – urban area method

(1) Noise limits must be set at an assessment location within a *noise sensitive area* as defined by the Regulations. The values of the noise limits must be whole numbers, rounded to the nearest decibel.

(2) Determine the zoning level for each period using the method in clauses 7 to 15.

(3) Assess the background level in accordance with clauses 39 to 51.

(4) Determine whether the background level, relative to the zoning level, for each period as relevant is neutral, low or high:

a. for the day period the background level is –

i. neutral when it is at least 6 dB, and no more than 12 dB, below the zoning level;

ii. high when the background level plus 6 dB exceeds its respective zoning level; and

iii. low when the background level is 13 dB or more below the zoning level.

b. for the evening and night periods the background level is –

i. neutral when it is at least 3 dB and no more than 9 dB below the zoning level;

ii. high when the background level plus 3 dB exceeds the zoning level; and

iii. low when the background level is 10 dB or more below the zoning level.

(5) If the background level is neutral, the noise limit for the respective period is the zoning level determined according to clauses 7 to 15.

(6) Where the background noise level is not neutral, the noise limit for each period is based on whether the background relative to the zoning level is low or high (and having regard to the base noise limits in Regulation 118(2)(a) and the night period noise limit in Regulation 118(3) –

a. for the day period:

i. if the background level relative to the zoning level is high, the noise limit for the day period is the background level plus 6 dB;

ii. if the background level relative to the zoning level is low, the noise limit for the day period must be calculated from the following formula –

noise limit = ½ (zoning level + background level) + 4.5 dB.

b. for the evening period:

i. if the background level relative to the zoning level is high, the noise limit for the evening period is the background level plus 3 dB;

ii. if the background level relative to the zoning level is low, the noise limit for the evening period must be calculated from the following formula –

noise limit = ½ (zoning level + background level) + 3 dB.

c. for the night period:

i. if the background level relative to the zoning level is high, the noise limit for the night period is the background level plus 3 dB, but no greater than 55 dB(A);

ii. if the background level relative to the zoning level is low, the noise limit for the night period must be calculated from the following formula –

noise limit = ½ (zoning level + background level) + 3 dB.

1.1 Zoning level

(7) To determine the zoning level, the relevant planning scheme or schemes for the area under consideration must be used. (Refer to Annex A).

(8) Two concentric circles of diameter 140 metres and 400 metres must be drawn or reproduced to scale on the relevant map, centred on the measurement point in the noise sensitive area (but if an alternative assessment location is specified, the centre of the two circles must be located at an appropriate point in the noise sensitive area).

(9) The zones and reservations specified by the planning scheme or schemes within each circle must be designated by the Authority as type 1, type 2 or type 3 according to the tables in Annex A to this Noise Protocol, as amended from time to time.

(10) In designating a zone or reservation as a type, the Authority must have regard to the nature of uses permitted in that zone or reservation and must generally designate –

a. residential, rural and open spaces as type 1; and

b. commercial, business and light industry as type 2; and

c. general industry and major roads as type 3.

(11) If a zone or reservation is not listed in Annex A to this Noise Protocol, the Authority, having regard to the nature of the uses permitted in similar zones or reservations, will designate a type accordingly.

(12) A type designated by the Authority under clause 11 must be published on the Authority's website.

(13) The total area of the 140 metre circle and the 400 metre circle must be measured from the relevant map specified in clause 8 above.

(14) The area of all type 2 and 3 zones and reservations must be measured for each of the two circles from the same map and the following applies –

a. The influencing factor (IF) must be calculated from the following formula:

$$IF = \tfrac{1}{2}\left(\frac{\text{area type 3} + \tfrac{1}{2}(\text{area type 2})}{\text{total area of circle}}\right)140\text{m circle} + \tfrac{1}{2}\left(\frac{\text{area type 3} + \tfrac{1}{2}(\text{area type 2})}{\text{total area of circle}}\right)400\text{m circle}$$

b. Alternatively, the fraction of each circle occupied by type 2 and 3 zones and reservations must be measured and the influencing factor (IF) calculated from the following equivalent formula:

IF = 0.25 (Sum of type 2 fractions for both circles) + 0.5 (Sum of type 3 fractions for both circles).

(15) The zoning level for a day period, evening period or night period must be determined from figure 1 below and must be rounded to the nearest decibel.

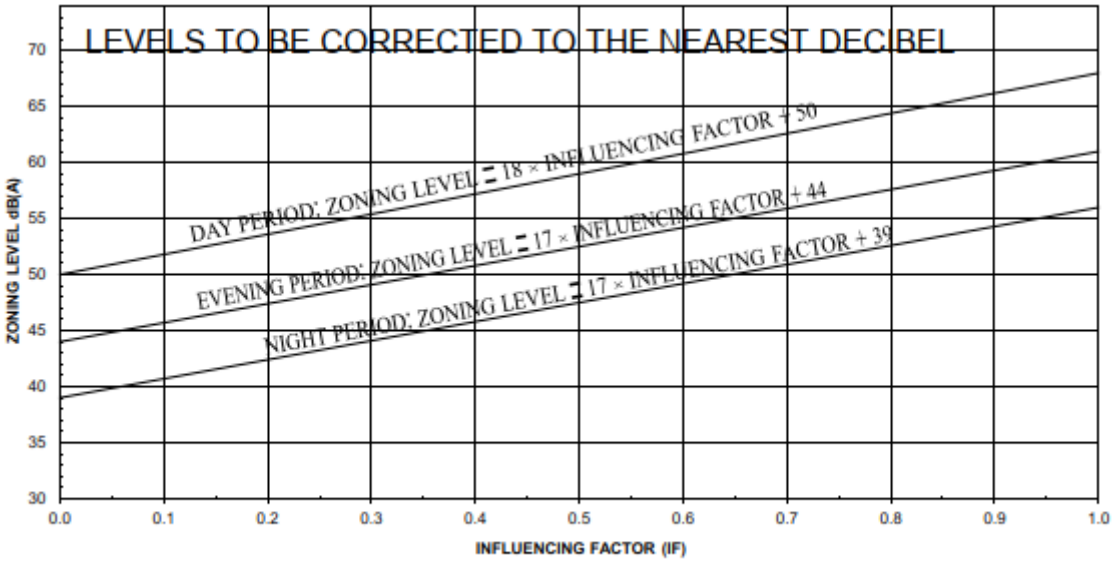

Figure 1: Zoning Level vs Influencing Factor

4. Assess background level to set noise limits for the urban area method or the rural area method

4.1 Measurement of background level

(39) The background level must, where possible, be measured outdoors at the assessment location in the noise sensitive area.

(40) Where it is not possible for the measurement of the background level to be made in the noise sensitive area, then the measurement may be made at another point (background equivalent location) which is representative of the likely background level at the assessment location in the noise sensitive area.

(41) The background level must be measured during dry conditions with wind conditions satisfying Beaufort Wind Scale 0, 1, 2 or 3.

(42) The background level must include all noise sources except noise from any commercial, industrial or trade premises which appears to be intrusive at the point where the background level is measured.

(43) When the microphone is located outdoors and 1 to 2 metres from an acoustically reflecting surface an adjustment of -2.5 dB must be made to the measured L_{A90}.

(44) No adjustment for noise character is applied to the measured background level.

(45) The background level must be rounded to the nearest decibel.

(46) To determine the background level, the L_{A90} must be measured continuously over each hour of the day, evening and night period that the commercial, industrial or trade premises under investigation normally operates.

(47) Where the conditions of clause 46 cannot be met, the L_{A90} may be measured over less than the full period using the short background method in clause 48.

(48) For the short background method, at least two measurements of the L_{A90} must be made, each of at least 10-minutes duration, in each period, so as to obtain a representative measure of the background level for the periods when the commercial, industrial or trade premises normally operates.

4.2 Determination of background level

(49) Where the hourly L_{A90} levels ($L_{A90,\ 1\ hour}$) have been measured, the background level is determined for each period as the arithmetic average of the $L_{A90,\ 1\ hour}$ for each hour of that period for which the commercial, industrial or trade premises under investigation normally operates.

(50) For the purpose of clause 49, for the relevant period, the background level must be based on valid $L_{A90,\ 1\ hour}$ measurements for each and every hour that the premises under investigation normally operates.

(51) Where the L_{A90} levels have been measured using the short background method in clause 48, the measurements in each period must be arithmetically averaged to obtain the background level during the relevant period.

APPENDIX B: SOUND LEVEL METER DETAILS

CERTIFICATE OF CALIBRATION

CERTIFICATE NO: SLM51268

EQUIPMENT TESTED: Sound Level Meter

Manufacturer:	Rion		
Type No:	NL-52	**Serial No:**	00220543
Mic. Type:	UC-59	**Serial No:**	03377
Pre-Amp. Type:	NH-25	**Serial No:**	10543

Owner: Sonus Pty Ltd
17 Ruthven Ave
Adelaide SA 5000

Tests Performed: IEC 61672-3:2013

Comments: All Tests passed for Class 1. (See overleaf for details)

CONDITIONS OF TEST:

Ambient Pressure	994	hPa ±1 hPa	**Date of Receipt :**	17/09/2024
Temperature	25	°C ±1° C	**Date of Calibration :**	19/09/2024
Relative Humidity	29	% ±5%	**Date of Issue :**	23/09/2024

Acu-Vib Test Procedure: AVP10 (SLM) based on IEC 61672-3.

CHECKED BY: KB

AUTHORISED SIGNATURE: Hein Soe

Accredited for compliance with ISO/IEC 17025 - Calibration
Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

This report applies only to the item identified in the report and may not be reproduced in part.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.

Acu-Vib Electronics
ACOUSTICS AND VIBRATIONS
Head Office & Calibration Laboratory
Unit 14, 22 Hudson Avenue, Castle Hill NSW 2154
(02) 9680 8133
www.acu-vib.com.au

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WORLD RECOGNISED ACCREDITATION
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Acoustic and Vibration Measurements

Specifications


		NL-52	NL-42
Applicable standards		IEC 61672-1: 2013/2002 class 1 ANSI/ASA S1.4-2014/Part1 class 1 JIS C 1509-1: 2017 class 1	IEC 61672-1: 2013/2002 class 2 ANSI/ASA S1.4-2014/Part2 class 2 JIS C 1509-1: 2017 class 2
		CE Marking WEEE Directives, Chinese RoHS (export model for China only)	
Measurement functions		Simultaneous measurement of the following items, with selected time weighting and frequency weighting	
	Processing (main ch)	Instantaneous sound pressure level: L_P Equivalent continuous sound pressure level: L_{eq} Sound exposure level: L_E Maximum sound pressure level: L_{max} Minimum sound pressure level: L_{min} Percentile sound levels: L_N (0.1 to 99.9 %, 0.1-increment steps, max. 5 values)	
	Processing (sub ch)	Instantaneous sound pressure level: L_P	
	Additional processing	In addition to main processing items, one of the following can be selected for simultaneous processing: C-weighted equivalent continuous sound level: L_{Ceq} C-weighted peak sound level: L_{Cpeak} Z-weighted peak sound level: L_{Zpeak} I-time-weighted equivalent continuous sound level: L_{AIeq} ＊2 Maximum I-time-weighted equivalent continuous sound level: L_{AImax} ＊2 The power average of the maximum level of each 5 second interval: L_{Atm5} The frequency weighting for the additional processing synchronizes with the frequency weighting of the sub-channel, so when the sub-channel has A-weighting, L_{Atm5} can be selected. When C-weighting (Z-weighting) is selected, the additional processing L_{Ceq} and L_{Cpeak} (L_{Zpeak}) are selectable.	
Microphone	Type	UC-59	UC-52
	Sensitivity level	−27 dB	−33 dB
Measurement range		A-weighting: 25 dB to 138 dB C-weighting: 33 dB to 138 dB Z-weighting: 38 dB to 138 dB C-weighting peak sound level: 55 dB to 141 dB Z-weighting peak sound level: 60 dB to 141 dB	
Inherent noise	A-weighting	17 dB or less	19 dB or less
	C-weighting	25 dB or less	27 dB or less
	Z-weighting	30 dB or less	32 dB or less
Frequency range		10 Hz to 20 kHz	20 Hz to 8 kHz
Frequency weighting		A, C, and Z	
Time weighting		F (Fast) and S (Slow)	
Level range		Single range (Linearity range: 113 dB)	
	Bar graph display range max	Max. 110 dB (20 to 130 dB)	
	Switching of bar graph display	Set the upper/ lower limit in 10 dB increments.	
RMS detection circuit		Digital processing method	
Sampling cycle		20.8 μs (L_P, L_{eq}, L_E, L_{max}, L_{min}, L_{peak} : sampling frequency: 48 kHz) 100 ms (L_N)	
Calibration		Electrical calibration performed according to IEC and JIS standards, using internally generated signals: acoustic calibration performed with the NC-75.	
Correction functions		Windscreen correction: Compliant with IEC 61672-1 and JIS C 1509-1 standards when the windscreen is installed. Diffuse sound field correction: Correction of frequency characteristics in order to comply with standards (ANSI S1.4) in diffuse sound field.	
Delay time		The meter can be set to start measuring a specified time (OFF, 1, 3, 5 or 10 s) after the start button has been pressed or when a user-set trigger is exceeded.	
Back erase function		When the PAUSE key is pressed to pause measurement, the preceding (user selectable) 0, 1, 3 or 5 s data are excluded from processing.	
Display		Backlit semitransparent color TFT LCD display WQVGA (400 x 240 dots) ＊LCD with touch panel (Capacitive Touch Panel) Numerical display update frequency: 1 s Bar graph update frequency: 100 ms	
Store	Manual	Data for measurement results are stored manually in single address increments.	
	Number of data	Internal memory: max. 1 000 sets SD Card: depends on the capacity of the SD Card＊1	
	Auto＊2	Instantaneous values (L_P mode) and processed values (L_{eq} mode) are stored continuously and automatically at preset intervals.	
	L_P sampling cycle	100 ms, 200 ms, 1 s, L_{eq} 1s	
	L_{eq} sampling cycle	10 s, 1, 5, 10, 15, 30 min, 1, 8, 24 h, and user selected time (up to 24 hours)	
	Measurement Time	Max. 1 000 h in Auto L_P storage mode, max. 100 000 addresses in Auto L_{eq} storage mode(depends on the capacity of the SD card)＊1	
Data recall		Allows viewing of stored data	

Setup memory		Up to five setup configurations can be saved in internal memory, for later recall Start up via file settings previously stored on SD card possible
Waveform recording＊3		
File format		Uncompressed waveform WAVE file
Sampling frequency		Select 48 kHz, 24 kHz or 12 kHz
Data length		Select 24 bit or 16 bit
Outputs DC output		Output DC signals using a frequency weighting characteristic selected by processing.
	Output voltage	2.5 V, 25 mV / dB at bar graph display full scale
AC output		Output AC signals using a frequency weighting characteristic selected by processing or by A, C, Z-weighting.
	Output voltage	1 V (rms values) at bar graph display full scale
Comparator output＊2		Turns on when the open-collector output exceeds the set value (max. applied voltage 24 V, max. current 60 mA, allowable dissipation 300 mW).
USB		Allows USB to be connected to a computer and recognized as a removable disk Allows USB to be controlled via communication commands
RS-232C communication		Allows for RS-232C communication via use of a dedicated cable
Data continuous output＊2		
Type of data	Instantaneous value	L_P
	Processed value	L_{eq}, L_{max}, L_{min}, L_{peak}
Output interval		100 ms
Print out		Printing of measurement results on dedicated printer DPU-414
Power requirements		Four IEC R6 (size AA) batteries (alkaline or rechargeable batteries) or external power supply
Battery life (23 ˚C)		Alkaline battery LR6 (AA): 26 h Ni-MH secondary battery: 25 h At the maximum ＊Depends on the setting
AC adapter		NC-98C (NC-34 for previous models cannot be used)
External power voltage		5 to 7 V (rated voltage: 6 V)
Current consumption		Approximately 90 mA (normal operation, rated voltage)
Ambient conditions	Temperature	−10 to +50 ˚C
	Humidity	10 to 90 % RH (non-condensing)
Dustproof / water-resistant performance＊4		IP code: IP54 (except for microphone) See precautions regarding waterproofing
Dimensions, weight		Approx. 250 (H) x 76 (W) x 33 mm(D), approx. 400 g (with batteries)
Supplied accessories		Storage case x 1, Windscreen WS-10 x 1, Windscreen fall prevention rubber x 1, Hand strap x 1, LR6 (AA) alkaline batteries x 4, SD card 512 MB×1 (NX-42EX preinstalled model only)

Options

Product name	Product number
Extended function program (Inst.on 512 MB SD card)	NX-42EX
Waveform recording program＊2 (Inst.on 2 GB SD card)	NX-42WR
Octave, 1/3 octave real-time analysis program＊2 (Inst.on 512 MB SD card)	NX-42RT
Reverberation time measurement program＊2 (Inst.on 512 MB SD card)	NX-42RV
FFT analysis program＊2 (Inst.on 512 MB SD card)	NX-42FT
Data management software for environmental measurement	AS-60
Data management software for environmental measurement (Includes the octave and 1/3 octave data management software)	AS-60RT
Data management software for environmental measurement (Includes the vibration level data management software)	AS-60VM
Waveform analysis software	AS-70
SD Card 512 MB	MC-51SD1
SD Card 2 GB	MC-20SD2
SD Card 32 GB	MC-32SD3
AC adapter (100 V to 240 V)	NC-98C
Battery pack	BP-21A
Microphone extension cables	EC-04 (from 2 m)
BNC-Pin output code	CC-24
Comparator output cable	CC-42C
Printer	DPU-414
Printer cable	CC-42P
RS 232C serial I/O cable	CC-42R
USB cable	Generic USB cable can be used
Sound calibrator	NC-75
All-weather windscreen	WS-15
Windscreen mounting adapter	WS-15006
Rain-protection windscreen	WS-16
Sound level meter tripod	ST-80
All-weather windscreen tripod	ST-81

＊1 Use Rion fully guaranteed products. ＊2 NX-42EX required (sold separately). ＊3 NX-42WR required (sold separately).
＊4 Protection against harmful dust and water splashing from any direction.

Precautions regarding waterproofing

Before use, verify that the rubber bottom cover and the battery compartment lid are firmly closed.
To maintain the water and dust proof rating, internal packing replacement is required every two years (at cost).

JCSS 0197

RION Co., Ltd. is recognized by the JCSS which uses ISO/IEC 17025 (JIS Q 17025) as an accreditation standard and bases its accreditation scheme on ISO/IEC 17011. JCSS is operated by the accreditation body (IA Japan) which is a signatory to the Asia Pacific Laboratory Accreditation Cooperation (APLAC) as well as the International Laboratory Accreditation Cooperation (ILAC). The Quality & Environmental Management system Center of RION Co., Ltd. is an international MRA compliant JCSS operator with the accreditation number JCSS 0197.

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Distributed by:

RION CO., LTD.
http://rion-sv.com/
3-20-41, Higashimotomachi, Kokubunji, Tokyo 185-8533, Japan
Tel: +81-42-359-7888 Fax: +81-42-359-7442

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This product is certified to an International Protection rating of IP54 (dust protected and resistant to splashing water).
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