Document 6.2

ES - Vol 2 Technical Appendix 13A.3 Addendum Noise - Full Survey Results 2 of 3 Regulation 5(2)(a)

The West Midlands Rail Freight Interchange Order 201X

Resound: April 2019

Four Ashes Limited

West Midlands Interchange

Four Ashes Ltd

Calibration Certificates for Position N6 – June/July 2018 Survey

Documentation Métrologique
Metrological documentation

FUSION 11403

Date d'émission : **12/06/2017**
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CONSTAT DE VERIFICATION
VERIFICATION CERTIFICATE

CV-DTE-L-17-PVE-49602

DELIVRE PAR :
ISSUED BY :

ACOEM

Service Métrologie

69760 LIMONEST
France

INSTRUMENT VERIFIE
INSTRUMENT CHECKED

Désignation :
Designation :

Sonomètre Intégrateur-Moyenneur
Integrating-Averaging Sound Level Meter

Constructeur :
Manufacturer :

01dB

Type :
Type :

FUSION

N° de serie :
Serial number :

11403

N° d'identification :
Identification number

Date d'émission :
Date of issue :

12/06/2017

Ce constat comprend 5 pages
This certificate includes *pages*

LE RESPONSABLE METROLOGIQUE
DU LABORATOIRE
HEAD OF THE METROLOGY LAB
François MAGAND

[redacted]

CE DOCUMENT NE PEUT PAS ETRE UTILISE EN LIEU ET PLACE D'UN CERTIFICAT D'ETALONNAGE. CE DOCUMENT EST REALISE SUIVANT LES RECOMMANDATIONS DU FASCICULE DE DOCUMENTATION X 07-011.

THIS DOCUMENT CAN'T BE USED AS CALIBRATION CERTIFICATE. IT IS COMPLIANT WITH THE X 07-011 STANDARD RECOMMENDATIONS.

IDENTIFICATION :
IDENTIFICATION:

	Sonomètre *Sound level meter*	Préamplificateur *Preamplifier*	Microphone *Microphone*
Constructeur : *Manufacturer*	01dB		GRAS
Type : *Type*	FUSION	Interne - Internal	40CE
Numéro de série : *Serial number*	11403		259481

PROGRAMME DE VERIFICATION :
VERIFICATION PROGRAM:

Ce sonomètre a été vérifié sur les caractéristiques suivantes:

- Réponse en fréquence du sonomètre
- Linéarité
- Pondérations fréquentielles A-B-C-Z
- Bruit de fond
- Filtre 1/1 et 1/3 octave

This sound level meter has been verified on its following characteristics:

- *Frequency response of the sound level meter*
- *Linearity*
- *A-B-C-Z Weighting*
- *Background noise*
- *1/1 and 1/3 Octave filter*

METHODE DE VERIFICATION :
VERIFICATION METHOD:

L'appareil est vérifié dans une salle climatisée. Les caractéristiques sont vérifiées étalonnées avec un multimètre et un générateur étalonnés en amplitude et en fréquence. Des corrections constructeurs sont appliquées pour prendre en compte les effets des accessoires et du boîtier selon la norme IEC 61672-3

The instrument is controlled in an air conditioned room. The other characteristics are verified with multimeter and generator calibrated in amplitude and in frequency. Some manufacturer's corrections have been applied to account the acoustical effect from the case of the sound level meter and his accessories (IEC 61672-3).

CONDITIONS DE VERIFICATION :
VERIFICATION CONDITIONS:

Date de l'étalonnage : *Date of Calibration* (french format)	.12 - 6 - 2017.
Nom de l'opérateur : *Operator Name*	**Didier Lafond**
Instruction d'étalonnage : *Calibration instruction*	**P118-NOT-01**
Pression atmosphérique : *Static pressure*	**98,63 kPa**
Température : *Temperature*	**24,4 °C**
Taux d'humidité relative : *Relative humidity*	**43,3 %HR**

MOYENS DE MESURE UTILISES POUR LA VERIFICATION :

INSTRUMENTS USED FOR VERIFICATION:

Désignation Designation	Constructeur Manufacturer	Type Type	N° de série Serial number	N° d'identification Identification number
Générateur de fonction / Waveform generator	Helwet-Packard	HP 33120 A	US36028745	APM 1163
Boite à décades / Decade box	01dB-Metravib	OUT1694	1605202	APM 5541

Tous les moyens de mesure utilisés sont raccordés aux étalons de référence de la société ACOEM. Les étalons de référence de la société ACOEM sont raccordés aux étalons nationaux par un étalonnage COFRAC. La liste de ces étalons est disponible sur simple demande auprès du responsable métrologique du laboratoire.

All the measuring instruments are calibrated using the ACOEM reference standards. ACOEM reference standards are calibrated with COFRAC certificate of calibration. The reference standard list is available on simple request to the head of the Metrology Lab.

RESULTATS :

RESULTS:

Le jugement de conformité de chaque test est établi suivant les tolérances données dans les normes suivantes : *Conformity decision has been taken with the tolerance descriptions in the following standards:*	IEC 61260 IEC 61672-1 classe	1
	ANSI S1.11 class ANSI S1.4 class	1

Linéarité
Linearity

Description *Description*	Résultat *Result*
Linéarité *Linearity*	Conforme *Compliant*

Pondérations fréquentielles A-B-C-Z
A-B-C-Z Weightings

Description *Description*	Résultat *Result*
Pondération fréquentielle *Frequency weighting*	Conforme *Compliant*

Bruit de fond
Background noise

Description *Description*	Résultat *Result*
Bruit de fond *Noise level*	Conforme *Compliant*

Filtre d'octave
1/1 Octave filter

Description *Description*	Résultat *Result*
Fréquence centrale filtre 1/1 octave *1/1 Octave filter central frequency attenuation*	Conforme *Compliant*

Filtre de 1/3 d'octave
1/3 Octave filter

Description *Description*	Résultat *Result*
Fréquence centrale filtre 1/3 octave *1/3 Octave filter central frequency attenuation*	Conforme *Compliant*

Les données liées au DMK01 sont issues de la réponse en fréquence du microphone associé à l'influence typique du DMK01.

The DMK01's results describes the association of the microphone acoustical response with the tipical DMK01 influence.

Fin du constat de vérification End of verification certificate

Chapitre 2.
CERTIFICAT D'ETALONNAGE
CALIBRATION CERTIFICATE

CE-DTE-L-17-PVE-49602

DELIVRE PAR :
ISSUED BY :

ACOEM

Service Métrologie

69760 LIMONEST
France

INSTRUMENT ETALONNE
CALIBRATED INSTRUMENT

Désignation :
Designation :

Sonomètre Intégrateur-Moyenneur
Integrating-Averaging Sound Level Meter

Constructeur :
Manufacturer :

01dB

Type :
Type :

FUSION

N° de serie :
Serial number :

11403

N° d'identification :
Identification number

Date d'émission :
Date of issue :

12/06/2017

Ce certificat comprend 10 Pages
This certificate includes *Pages*

LE RESPONSABLE METROLOGIQUE
DU LABORATOIRE
HEAD OF THE METROLOGY LAB
François MAGAND

[redacted]

CE CERTIFICAT EST CONFORME AU FASCICULE DE DOCUMENTATION FD X 07-012.
THIS CERTIFICATE IS COMPLIANT WITH THE FD X 07-012 STANDARD DOCUMENTATION

IDENTIFICATION :
IDENTIFICATION:

	Sonomètre *Sound level meter*	Préamplificateur *Preamplifier*	Microphone *Microphone*
Constructeur : *Manufacturer*	01dB		GRAS
Type : *Type*	FUSION	Interne - Internal	40CE
Numéro de série : *Serial number*	11403		259481

PROGRAMME D'ETALONNAGE :
CALIBRATION PROGRAM:

Ce Sonomètre a été étalonné sur les caractéristiques suivantes :

- Réponse en fréquence du sonomètre en champ libre
- Linéarité
- Pondérations fréquentielles A-B-C-Z

The Sound level meter has been calibrated on the following characteristics:

- *Free field frequency response of the sound level meter*
- *Linearity*
- *A-B-C-Z frequency weightings*

METHODE D'ETALONNAGE :
CALIBRATION METHOD:

L'appareil est étalonné dans une salle climatisée. Les caractéristiques sont étalonnées avec un multimètre et un générateur étalonnés en amplitude et en fréquence. Des corrections constructeurs sont appliquées pour prendre en compte les effets des accessoires et du boîtier selon la norme IEC 61672-3

The instrument is calibrated in an air conditioned room.. The other characteristics are verified with multimeter and generator calibrated in amplitude and in frequency. Some manufacturer's corrections have been applied to account the acoustical effect from the case of the sound level meter and his accessories (IEC 61672-3).

CONDITIONS D'ETALONNAGE :
CALIBRATION CONDITIONS:

Date de l'étalonnage : .12 - 6 - 2017.
Date of Calibration (french format)

Nom de l'opérateur : **Didier Lafond**
Operator Name

Instruction d'étalonnage : **P118-NOT-01**
Calibration instruction

Pression atmosphérique : **98,63 kPa**
Static pressure

Température : **24,4 °C**
Temperature

Taux d'humidité relative : **43,3 %HR**
Relative humidity

MOYENS DE MESURES UTILISES POUR L'ETALONNAGE :

INSTRUMENTS USED FOR CALIBRATION:

Désignation	Constructeur	Type	N° de série	N° d'identification
Designation	Manufacturer	Type	Serial number	Identification number
Générateur de fonction / Waveform generator	Helwet-Packard	HP 33120 A	US36028745	APM 1163
Boite à décades / Decade box	01dB-Metravib	OUT1694	1605202	APM 5541

Tous les moyens de mesure utilisés sont raccordés aux étalons de référence de la société ACOEM. Les étalons de référence de la société ACOEM sont raccordés aux étalons nationaux par un étalonnage COFRAC. La liste de ces étalons est disponible sur simple demande auprès du responsable métrologique du laboratoire.

All the measuring instruments are calibrated using the ACOEM reference standards. ACOEM reference standards are calibrated to national standard with COFRAC certificate of calibration. The reference standards list is available on simple request to the head of the Metrology lab.

RESULTATS :

RESULTS:

Les incertitudes élargies mentionnées sont celles correspondant à deux incertitudes types (k=2). Les incertitudes types sont calculées en tenant compte des différentes composantes d'incertitudes, étalons de référence, moyens d'étalonnage, conditions d'environnement, contribution de l'instrument étalonné, répétabilité …

Mentioned expanded uncertainties correspond to two standard uncertainty types (k=2). Standard uncertainties are calculated including different uncertainty components, reference standards, instruments used, environmental conditions, calibrated instrument contribution, repeatability…

Pondération fréquentielle
Frequency Weighting

Pondération fréquentielle (voie interne) - Frequency weighting (primary					
0° Short windscreen	*Z*	*A*	*B*	*C*	Incertitude uncertainty (dB)
63 Hz	-0,7	-27,0	-10,1	-1,6	0,45
125 Hz	-0,6	*-16,9*	*-4,9*	-0,8	0,45
250 Hz	-0,6	-9,3	-2,0	-0,6	0,29
500 Hz	-0,4	-3,6	-0,6	-0,3	0,29
1000 Hz	-0,3	-0,3	-0,3	-0,3	0,29
2000 Hz	0,4	1,6	0,3	0,2	0,29
4000 Hz	-0,5	0,4	-1,3	-1,4	0,39
8000 Hz	-1,5	-3,1	-4,8	-5,0	0,61
16000 Hz	-1,6	-13,6	-15,4	-15,5	0,61

Linéarité
Linearity

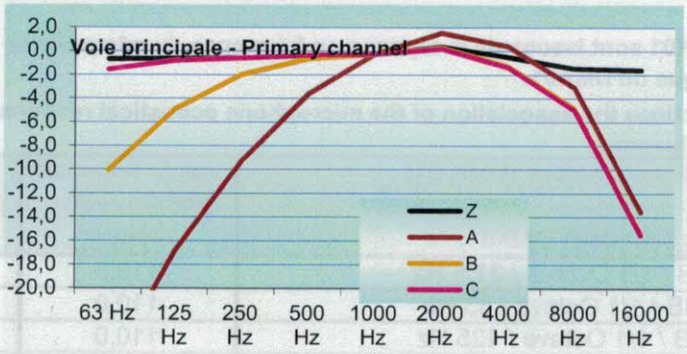
Linéatité (voie principale) *Linearity (Primary channel)*	Valeur nominale *Nominal value* (dB)	Valeur affichée *Displayed value* (dB)	Incertitudes *Uncertainty* (dB)
Leq 35 dBZ / 8000 Hz	35,0	34,9	0,23
Leq 40 dBZ / 8000 Hz	40,0	40,1	0,23
Leq 50 dBZ / 8000 Hz	50,0	50,0	0,20
Leq 60 dBZ / 8000 Hz	60,0	60,0	0,20
Leq 70 dBZ / 8000 Hz	70,0	70,0	0,20
Leq 80 dBZ / 8000 Hz	80,0	80,0	0,20
Leq 90 dBZ / 8000 Hz	90,0	90,0	0,20
Leq 100 dBZ / 8000 Hz	100,0	100,0	0,20
Leq 110 dBZ / 8000 Hz	110,0	109,9	0,20
Leq 120 dBZ / 8000 Hz	120,0	119,8	0,20
Leq 130 dBZ / 8000 Hz	130,0	129,8	0,20
Leq 134 dBZ / 8000 Hz	134,0	133,7	0,20
Leq 134 dBA / 8000 Hz	134,0	133,7	0,20
Leq 130 dBA / 8000 Hz	130,0	129,7	0,20
Leq 120 dBA / 8000 Hz	120,0	119,8	0,20
Leq 110 dBA / 8000 Hz	110,0	109,8	0,20
Leq 100 dBA / 8000 Hz	100,0	100,0	0,20
Leq 90 dBA / 8000 Hz	90,0	90,0	0,20
Leq 80 dBA / 8000 Hz	80,0	80,0	0,20
Leq 70 dBA / 8000 Hz	70,0	70,0	0,20
Leq 60 dBA / 8000 Hz	60,0	60,0	0,20
Leq 50 dBA / 8000 Hz	50,0	50,0	0,20
Leq 40 dBA / 8000 Hz	40,0	40,0	0,23
Leq 30 dBA / 8000 Hz	30,0	30,0	0,23
Leq 26 dBA / 8000 Hz	26,0	26,1	0,23

Filtre
Filter

Filtre par bande d'octave (Voie principale) *Octave filter (primary channel)*	Valeur nominale *Nominal value* (dB)	Valeur affichée *Displayed value* (dB)	Incertitudes *Uncertainty* (dB)
Leq 110 dB / 1/1 Octave / 31,5 Hz	110,0	109,9	0,5
Leq 110 dB / 1/1 Octave / 63 Hz	110,0	109,9	0,5
Leq 110 dB / 1/1 Octave / 125 Hz	110,0	109,9	0,5
Leq 110 dB / 1/1 Octave / 250 Hz	110,0	110,0	0,3
Leq 110 dB / 1/1 Octave / 500 Hz	110,0	110,0	0,3
Leq 110 dB / 1/1 Octave / 1000 Hz	110,0	110,0	0,3
Leq 110 dB / 1/1 Octave / 2000 Hz	110,0	110,0	0,4
Leq 110 dB / 1/1 Octave / 4000 Hz	110,0	110,0	0,4
Leq 110 dB / 1/1 Octave / 8000 Hz	110,0	109,9	0,4

Filtre tiers d'octave (Voie principale) *Third octave filter (Primary channel)*	Valeur nominale *Nominal value* (dB)	Valeur affichée *Displayed value* (dB)	Incertitudes *Uncertainty* (dB)
Leq 110 dB / 1/3 Octave / 25 Hz	110,0	109,9	0,5
Leq 110 dB / 1/3 Octave / 31,5 Hz	110,0	109,9	0,5
Leq 110 dB / 1/3 Octave / 40 Hz	110,0	110,0	0,5
Leq 110 dB / 1/3 Octave / 50 Hz	110,0	109,9	0,5
Leq 110 dB / 1/3 Octave / 63 Hz	110,0	109,9	0,5
Leq 110 dB / 1/3 Octave / 80 Hz	110,0	110,0	0,5
Leq 110 dB / 1/3 Octave / 100 Hz	110,0	110,0	0,5
Leq 110 dB / 1/3 Octave / 125 Hz	110,0	110,0	0,5
Leq 110 dB / 1/3 Octave / 160 Hz	110,0	110,0	0,5
Leq 110 dB / 1/3 Octave / 200 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 250 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 315 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 400 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 500 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 630 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 800 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 1000 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 1250 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 1600 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 2000 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 2500 Hz	110,0	110,1	0,4
Leq 110 dB / 1/3 Octave / 3150 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 4000 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 5000 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 6300 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 8000 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 10000 Hz	110,0	109,9	0,6

Réponse acoustique
Acoustic response



OPTION DMK 01 (1/3)

Les données liées au DMK01 sont issues de la réponse en fréquence du microphone associé à l'influence typique du DMK01.

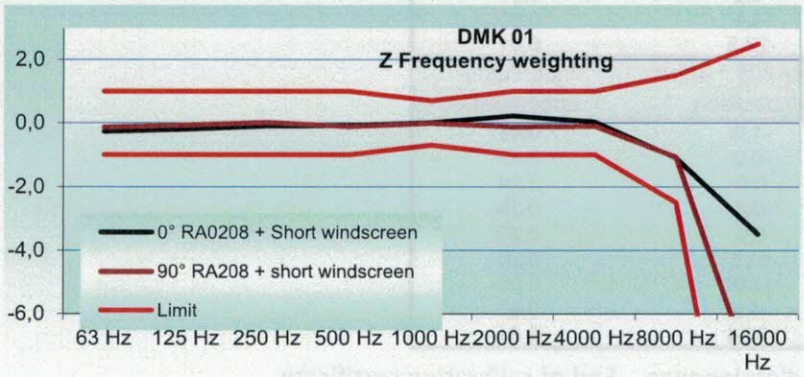
The DMK01's results describes the association of the microphone acoustical response with the tipical DMK01 influence.

Filtre par bande d'octave (DMK 01) *Octave filter (with DMK01)*	Valeur nominale *Nominal value* (dB)	Valeur affichée *Displayed value* (dB)	Incertitudes *Uncertainty* (dB)
Leq 110 dB / 1/1 Octave / 31,5 Hz	110,0	109,9	0,5
Leq 110 dB / 1/1 Octave / 63 Hz	110,0	109,9	0,5
Leq 110 dB / 1/1 Octave / 125 Hz	110,0	109,9	0,5
Leq 110 dB / 1/1 Octave / 250 Hz	110,0	110,0	0,3
Leq 110 dB / 1/1 Octave / 500 Hz	110,0	110,0	0,3
Leq 110 dB / 1/1 Octave / 1000 Hz	110,0	110,0	0,3
Leq 110 dB / 1/1 Octave / 2000 Hz	110,0	110,0	0,4
Leq 110 dB / 1/1 Octave / 4000 Hz	110,0	110,0	0,4
Leq 110 dB / 1/1 Octave / 8000 Hz	110,0	109,9	0,4

Filtre tiers d'octave (DMK 01) *Third octave filter (with DMK01)*	Valeur nominale *Nominal value* (dB)	Valeur affichée *Displayed value* (dB)	Incertitudes *Uncertainty* (dB)
Leq 110 dB / 1/3 Octave / 25 Hz	110,0	109,9	0,5
Leq 110 dB / 1/3 Octave / 31,5 Hz	110,0	109,9	0,5
Leq 110 dB / 1/3 Octave / 40 Hz	110,0	110,0	0,5
Leq 110 dB / 1/3 Octave / 50 Hz	110,0	109,9	0,5
Leq 110 dB / 1/3 Octave / 63 Hz	110,0	109,9	0,5
Leq 110 dB / 1/3 Octave / 80 Hz	110,0	110,0	0,5
Leq 110 dB / 1/3 Octave / 100 Hz	110,0	110,0	0,5
Leq 110 dB / 1/3 Octave / 125 Hz	110,0	110,0	0,5
Leq 110 dB / 1/3 Octave / 160 Hz	110,0	110,0	0,5
Leq 110 dB / 1/3 Octave / 200 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 250 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 315 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 400 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 500 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 630 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 800 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 1000 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 1250 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 1600 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 2000 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 2500 Hz	110,0	110,1	0,4
Leq 110 dB / 1/3 Octave / 3150 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 4000 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 5000 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 6300 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 8000 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 10000 Hz	110,0	109,9	0,6

OPTION DMK 01 (2/3)

Linéatité (avec DMK01) *Linearity (with DMK01)*	Valeur nominale *Nominal value* (dB)	Valeur affichée *Displayed value* (dB)	Incertitudes *Uncertainty* (dB)
Leq 35 dBZ / 8000 Hz	35,0	35,0	0,23
Leq 40 dBZ / 8000 Hz	40,0	40,1	0,23
Leq 50 dBZ / 8000 Hz	50,0	50,0	0,20
Leq 60 dBZ / 8000 Hz	60,0	60,0	0,20
Leq 70 dBZ / 8000 Hz	70,0	70,0	0,20
Leq 80 dBZ / 8000 Hz	80,0	80,0	0,20
Leq 90 dBZ / 8000 Hz	90,0	90,0	0,20
Leq 100 dBZ / 8000 Hz	100,0	100,0	0,20
Leq 110 dBZ / 8000 Hz	110,0	109,8	0,20
Leq 120 dBZ / 8000 Hz	120,0	119,7	0,20
Leq 130 dBZ / 8000 Hz	130,0	129,7	0,20
Leq 134 dBZ / 8000 Hz	134,0	133,7	0,20
Leq 134 dBA / 8000 Hz	134,0	133,7	0,20
Leq 130 dBA / 8000 Hz	130,0	129,8	0,20
Leq 120 dBA / 8000 Hz	120,0	119,7	0,20
Leq 110 dBA / 8000 Hz	110,0	109,9	0,20
Leq 100 dBA / 8000 Hz	100,0	100,0	0,20
Leq 90 dBA / 8000 Hz	90,0	90,0	0,20
Leq 80 dBA / 8000 Hz	80,0	80,0	0,20
Leq 70 dBA / 8000 Hz	70,0	70,0	0,20
Leq 60 dBA / 8000 Hz	60,0	60,0	0,20
Leq 50 dBA / 8000 Hz	50,0	50,0	0,20
Leq 40 dBA / 8000 Hz	40,0	39,9	0,23
Leq 30 dBA / 8000 Hz	30,0	30,1	0,23
Leq 26 dBA / 8000 Hz	26,0	26,1	0,23



OPTION DMK 01 (3/3)

Pondération fréquentielle (avec DMK01) Frequency weighting (with DMK01)			
Z	*0° RA0208 + Short windscreen*	*90° RA208 + short windscreen*	Incertitude uncertainty
63 Hz	-0,3	-0,1	0,45
125 Hz	-0,2	-0,1	0,45
250 Hz	-0,1	0,0	0,29
500 Hz	-0,1	-0,1	0,29
1000 Hz	0,0	0,0	0,29
2000 Hz	0,2	-0,1	0,29
4000 Hz	0,0	-0,1	0,39
8000 Hz	-1,1	-1,1	0,61
16000 Hz	-3,5	-8,5	0,61
A	*0° RA0208 + Short windscreen*	*90° RA208 + short windscreen*	Incertitude uncertainty
63 Hz	-26,6	-26,4	0,45
125 Hz	-16,4	-16,3	0,45
250 Hz	-8,8	-8,7	0,29
500 Hz	-3,3	-3,4	0,29
1000 Hz	0,0	0,0	0,29
2000 Hz	1,4	1,1	0,29
4000 Hz	0,9	0,8	0,39
8000 Hz	-2,7	-2,7	0,61
16000 Hz	-15,5	-20,4	0,61
B	*0° RA0208 + Short windscreen*	*90° RA208 + short windscreen*	Incertitude uncertainty
63 Hz	-9,6	-9,5	0,45
125 Hz	-4,5	-4,3	0,45
250 Hz	-1,5	-1,4	0,29
500 Hz	-0,4	-0,4	0,29
1000 Hz	0,0	0,0	0,29
2000 Hz	0,1	-0,2	0,29
4000 Hz	-0,8	-0,9	0,39
8000 Hz	-4,5	-4,5	0,61
16000 Hz	-17,3	-22,3	0,61
C	*0° RA0208 + Short windscreen*	*90° RA208 + short windscreen*	Incertitude uncertainty
63 Hz	-1,1	-1,0	0,45
125 Hz	-0,4	-0,2	0,45
250 Hz	-0,1	0,0	0,29
500 Hz	-0,1	-0,1	0,29
1000 Hz	0,0	0,0	0,29
2000 Hz	0,1	-0,3	0,29
4000 Hz	-0,9	-1,0	0,39
8000 Hz	-4,6	-4,6	0,61
16000 Hz	-17,4	-22,4	0,61

Fin du certificat d'étalonnage End of calibration certificate

Chapitre 3.
CERTIFICAT DE CONFORMITE
CONFORMITY CERTIFICATE

CC-DTE-L-17-PVE-49602

Nous, fabricant
We, manufacturer

Acoem
200, Chemin des Ormeaux
F 69578 LIMONEST Cedex- FRANCE

déclarons sous notre seule responsabilité que le produit suivant :
declare under our own responsibility that the following equipment:

Désignation :
Designation:
Sonomètre Intégrateur Moyenneur
Integrating-Averaging Sound level meter

Référence :
Reference:
FUSION

Numéro de série :
Serial Number:
11403

est conforme aux dispositions des normes suivantes :
complies with the requirements of the following standards:

	Norme *Standard*	Classe *Class*	Edition du *Edition of*
Sonomètre :	IEC 60651	1	10-2000
Sound level meter :	IEC 60804	1	10-2000
	IEC 61672-1	1	09-2013
	IEC 61260	1	07-1995-2011
	ANSI S1.11	1	2004
	ANSI S1.4	1	1983-1985

et répond en tout point, après vérification et essais, aux exigences spécifiées, aux normes et règlements applicables, sauf exceptions, réserves ou dérogations énumérées dans la présente déclaration de conformité.

After testing and verification, this device satisfies all specified requirements and applicable standards and regulations apart from exceptions, reservations, or exemptions listed in this conformance certificate.

Date
Date
12/06/2017

LE REFERENT METROLOGIE ACOUSTIQUE
PAR DELEGATION
THE REFERENT ACOUSTIC METROLOGY
Bertrand LEROY

[redacted]

Calibration Certificates for Position N7 – June/July 2018 Survey

Certificate of Calibration

Issued by University of Salford (Acoustics Calibration Laboratory)
UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801

APPROVED SIGNATORIES
Claire Lomax [x] Andy Moorhouse [ ]
Gary Phillips [ ] Danny McCaul [ ]

acoustic calibration laboratory
The University of Salford, Salford, Greater Manchester, M5 4WT, UK
http://www.acoustics.salford.ac.uk
t 0161 295 3030/0161 295 3319 f 0161 295 4456 e c.lomax1@salford.ac.uk

UKAS CALIBRATION
0801

University of Salford MANCHESTER

Certificate Number: 03556/1 Date of Issue: 18 December 2017

PERIODIC TEST OF A SOUND LEVEL METER to IEC 61672-3:2006

FOR:	Acoustic 1 The Barns Overdale Manordeilo Llandeilo Carmarthenshire, SA19 7BD
FOR THE ATTENTION OF:	Steve Thomas
PERIODIC TEST DATE:	18/12/2017
TEST PROCEDURE:	CTP12 (Laboratory Manual)

Sound Level Meter Details

Manufacturer	01dB	
Model	CUBE	
Serial number	11118	
Class	1	
Hardware version	LIS001B	Application FW: 2.40 Metrology FW: 2.12

Associated Items	**Microphone**	**Preamplifier**
Manu	GRAS	01dB
Model	40CD	PRE22
Serial Number	260866	1610458

Test Engineer (initial): GP Name: Gary Phillips

Certificate Number: 03556/1 Date of Issue: 18 December 2017

Procedures from IEC 61672-3: 2006 and TPS 49 Edition 2 June 2009 were used to perform the periodic tests.

The manufacturer's instruction manual was marked as follows: DOC1144 June 2014 G - CUBE User Manual GB. Adjustment data used to adjust the sound levels indicated in response to the application of a multi-frequency sound calibrator to sound levels equivalent to those that would be indicated in response to plane, progressive sound waves were obtained from the manufacturer. The sound level meter calibration check frequency is 1000 Hz, the reference sound pressure level is 94 dB. As this instrument only has a single range, this range is the reference level range.

The environmental conditions in the laboratory at the start of the test were:
Static pressure 102.453 kPa ± 0.022 kPa; air temperature 21.8 °C ± 0.3 °C; relative humidity 39.7 % ± 1.8 %.

The initial response of the instrument to application of the suitable laboratory sound calibrator was 93.9 dB (C). The instrument was then adjusted to indicate 93.8 dB (C). This indication was obtained from the calibration certificate of the calibrator and information in the manufacturer's instruction manual specified in this certificate, when the instrument is configured for use with the external input, using the DMK01 weatherproof outdoor microphone unit, supplied RAL135-10M microphone extension cable and the following instrument settings; Microphone input: External, Microphone type: 40CD, Reference direction: 90°, High-pass filter: 10 Hz, Nose cone: Yes.

With the microphone replaced by an electrical input device with a similar capacitance to that of the electrical input device specified in the manufacturer's instruction manual, the levels of self-generated noise were:

A: 10.8 dB*
B: 10.2 dB*
C: 11.5 dB*
Z: 16.8 dB*

* Under-range indicated on instrument display.

The environmental conditions in the laboratory at the end of the test were:
Static pressure 102.566 kPa ± 0.022 kPa; air temperature 21.9 °C ± 0.3 °C; relative humidity 42.3 % ± 1.8 %.

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2002 because evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, and because the periodic tests of IEC 61672-3:2006 cover only a limited subset of the specifications in IEC 61672-1:2002.

Certificate Number: 03556/1 Date of Issue: 18 December 2017

As the actual frequency response of the microphone was unavailable, the typical frequency response for the model of microphone has been used to correct the level differences determined in the electrical signal test of frequency weighting.

The instrument failed to meet the requirements for the test of electrical signal tests of frequency weightings at 250 Hz, 500 Hz and 1 kHz for the A, B, C and Z-weightings, as the uncertainty of measurement exceeded the maximum permitted value due to a significant contribution from data supplied by the manufacturer. If the manufacturer's uncertainty data were not included, the meter would meet the requirements of the Standard.

Instruments used in the verification procedure were traceable to *National Standards*. The multi-frequency calibrator method was employed in the acoustical tests of a frequency weighting.

The uncertainty evaluation has been carried out in accordance with UKAS requirements. All measurement results are retained at the acoustic calibration laboratory for at least four years.

Calibration Certificates for Position N8 – June/July 2018 Survey

Documentation Métrologique
Metrological documentation

CUBE 11165

Date d'émission :
Date of issue : **16/05/2017**

Référence Document : NOT1536
Nom : Documentation métrologique - *Metrological documentation* FRGB

www.acoemgroup.com
support@acoemgroup.com

TABLE DES MATIERES
TABLE OF CONTENT

Chapitre 1.
CONSTAT DE VERIFICATION
VERIFICATION CERTIFICATE

CV-DTE-L-17-PVE-49149

DELIVRE PAR :
ISSUED BY :

ACOEM

Service Métrologie

69760 LIMONEST
France

INSTRUMENT VERIFIE
INSTRUMENT CHECKED

Désignation :
Designation :

Sonomètre Intégrateur-Moyenneur
Integrating-Averaging Sound Level Meter

Constructeur :
Manufacturer :

01dB

Type :
Type :

CUBE

N° de serie :
Serial number :

11165

N° d'identification :
Identification number

Date d'émission :
Date of issue :

16/05/2017

Ce constat comprend 5 pages
This certificate includes 5 pages

LE RESPONSABLE METROLOGIQUE
DU LABORATOIRE
HEAD OF THE METROLOGY LAB

[redacted]

François MAGAND

IDENTIFICATION :

IDENTIFICATION:

	Sonomètre *Sound level meter*	Préamplificateur *Preamplifier*	Microphone *Microphone*
Constructeur : *Manufacturer*	01dB	01dB	GRAS
Type : *Type*	CUBE	PRE22	40CD
Numéro de série : *Serial number*	11165	161406	287995

PROGRAMME DE VERIFICATION :

VERIFICATION PROGRAM:

Ce sonomètre a été vérifié sur les caractéristiques suivantes:

- Réponse en fréquence du sonomètre
- Linéarité
- Pondérations fréquentielles A-B-C-Z
- Bruit de fond
- Filtre 1/1 et 1/3 octave

This sound level meter has been verified on its following characteristics:

- *Frequency response of the sound level meter*
- *Linearity*
- *A-B-C-Z Weighting*
- *Background noise*
- *1/1 and 1/3 Octave filter*

METHODE DE VERIFICATION :

VERIFICATION METHOD:

L'appareil est vérifié dans une salle climatisée. Les caractéristiques sont vérifiées étalonnées avec un multimètre et un générateur étalonnés en amplitude et en fréquence. Des corrections constructeurs sont appliquées pour prendre en compte les effets des accessoires et du boîtier selon la norme IEC 61672-3

The instrument is controlled in an air conditioned room. The other characteristics are verified with multimeter and generator calibrated in amplitude and in frequency. Some manufacturer's corrections have been applied to account the acoustical effect from the case of the sound level meter and his accessories (IEC 61672-3).

CONDITIONS DE VERIFICATION :

VERIFICATION CONDITIONS:

Date de l'étalonnage : *Date of Calibration* (french format)	16/05/2017
Nom de l'opérateur : *Operator Name*	**Didier Lafond**
Instruction d'étalonnage : *Calibration instruction*	**P118-NOT-01**
Pression atmosphérique : *Static pressure*	**99,37 kPa**
Température : *Temperature*	**24,9 °C**
Taux d'humidité relative : *Relative humidity*	**37 %HR**

MOYENS DE MESURE UTILISES POUR LA VERIFICATION :

INSTRUMENTS USED FOR VERIFICATION:

Désignation Designation	Constructeur Manufacturer	Type Type	N° de série Serial number	N° d'identification Identification number
Générateur de fonction / Waveform generator	Helwet-Packard	HP 33120 A	US36028745	APM 1163
Boite à décades / Decade box	01dB-Metravib	OUT1694	1605202	APM 5541

Tous les moyens de mesure utilisés sont raccordés aux étalons de référence de la société Acoem. Les étalons de référence de la société Acoem sont raccordés aux étalons nationaux par un étalonnage COFRAC. La liste de ces étalons est disponible sur simple demande auprès du responsable métrologique du laboratoire.

All the measuring instruments are calibrated using the Acoem reference standards. Acoem reference standards are calibrated with COFRAC certificate of calibration. The reference standard list is available on simple request to the head of the Metrology Lab.

RESULTATS :

RESULTS:

Le jugement de conformité de chaque test est établi suivant les tolérances données dans les normes suivantes : *Conformity decision has been taken with the tolerance descriptions in the following standards:*	IEC 61260 IEC 61672-1 classe	1
	ANSI S1.11 class ANSI S1.4 class	1

Linéarité
Linearity

Description *Description*	Résultat *Result*
Linéarité *Linearity*	Conforme *Compliant*

Pondérations fréquentielles A-B-C-Z
A-B-C-Z Weightings

Description *Description*	Résultat *Result*
Pondération fréquentielle *Frequency weighting*	Conforme *Compliant*

Bruit de fond
Background noise

Description *Description*	Résultat *Result*
Bruit de fond *Noise level*	Conforme *Compliant*

Filtre d'octave
1/1 Octave filter

Description *Description*	Résultat *Result*
Fréquence centrale filtre 1/1 octave *1/1 Octave filter central frequency attenuation*	Conforme *Compliant*

Filtre de 1/3 d'octave
1/3 Octave filter

Description *Description*	Résultat *Result*
Fréquence centrale filtre 1/3 octave *1/3 Octave filter central frequency attenuation*	Conforme *Compliant*

Fin du constat de vérification End of verification certificate

Chapitre 2.

CERTIFICAT D'ETALONNAGE

CALIBRATION CERTIFICATE

CE-DTE-L-17-PVE-49149

DELIVRE PAR :
ISSUED BY :

ACOEM

Service Métrologie

69760 LIMONEST
France

INSTRUMENT ETALONNE
CALIBRATED INSTRUMENT

Désignation :
Designation :

Sonomètre Intégrateur-Moyenneur
Integrating-Averaging Sound Level Meter

Constructeur :
Manufacturer :

01dB

Type :
Type :

CUBE

N° de serie :
Serial number :

11165

N° d'identification :
Identification number

Date d'émission :
Date of issue :

16/05/2017

Ce certificat comprend 6 Pages
This certificate includes *Pages*

LE RESPONSABLE METROLOGIQUE
DU LABORATOIRE
HEAD OF THE METROLOGY LAB

[redacted]

François MAGAND

CE CERTIFICAT EST CONFORME AU FASCICULE DE DOCUMENTATION FD X 07-012.

THIS CERTIFICATE IS COMPLIANT WITH THE FD X 07-012 STANDARD DOCUMENTATION

IDENTIFICATION :

IDENTIFICATION:

	Sonomètre *Sound level meter*	Préamplificateur *Preamplifier*	Microphone *Microphone*
Constructeur : *Manufacturer*	01dB	01dB	GRAS
Type : *Type*	CUBE	PRE22	40CD
Numéro de série : *Serial number*	11165	161406	287995

PROGRAMME D'ETALONNAGE :

CALIBRATION PROGRAM:

Ce Sonomètre a été étalonné sur les caractéristiques suivantes :

- Réponse en fréquence du sonomètre en champ libre
- Linéarité
- Pondérations fréquentielles A-B-C-Z

The Sound level meter has been calibrated on the following characteristics:

- *Free field frequency response of the sound level meter*
- *Linearity*
- *A-B-C-Z frequency weightings*

METHODE D'ETALONNAGE :

CALIBRATION METHOD:

L'appareil est étalonné dans une salle climatisée. Les caractéristiques sont étalonnées avec un multimètre et un générateur étalonnés en amplitude et en fréquence. Des corrections constructeurs sont appliquées pour prendre en compte les effets des accessoires et du boîtier selon la norme IEC 61672-3

The instrument is calibrated in an air conditioned room.. The other characteristics are verified with multimeter and generator calibrated in amplitude and in frequency. Some manufacturer's corrections have been applied to account the acoustical effect from the case of the sound level meter and his accessories (IEC 61672-3).

CONDITIONS D'ETALONNAGE :

CALIBRATION CONDITIONS:

Date de l'étalonnage : *Date of Calibration* (french format)	16/05/2017
Nom de l'opérateur : *Operator Name*	**Didier Lafond**
Instruction d'étalonnage : *Calibration instruction*	**P118-NOT-01**
Pression atmosphérique : *Static pressure*	**99,37 kPa**
Température : *Temperature*	**24,9 °C**
Taux d'humidité relative : *Relative humidity*	**37 %HR**

MOYENS DE MESURES UTILISES POUR L'ETALONNAGE :

INSTRUMENTS USED FOR CALIBRATION:

Désignation	Constructeur	Type	N° de série	N° d'identification
Designation	Manufacturer	Type	Serial number	Identification number
Générateur de fonction / Waveform generator	Helwet-Packard	HP 33120 A	US36028745	APM 1163
Boite à décades / Decade box	01dB-Metravib	OUT1694	1605202	APM 5541

Tous les moyens de mesure utilisés sont raccordés aux étalons de référence de la société Acoem . Les étalons de référence de la société Acoem sont raccordés aux étalons nationaux par un étalonnage COFRAC. La liste de ces étalons est disponible sur simple demande auprès du responsable métrologique du laboratoire.

All the measuring instruments are calibrated using the Acoem reference standards. Acoem reference standards are calibrated to national standard with COFRAC certificate of calibration. The reference standards list is available on simple request to the head of the Metrology lab.

RESULTATS :

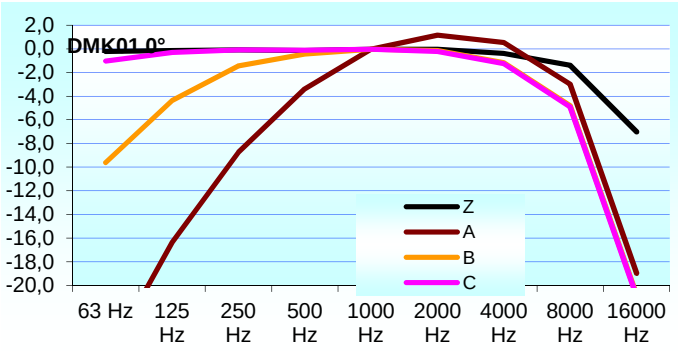
RESULTS:

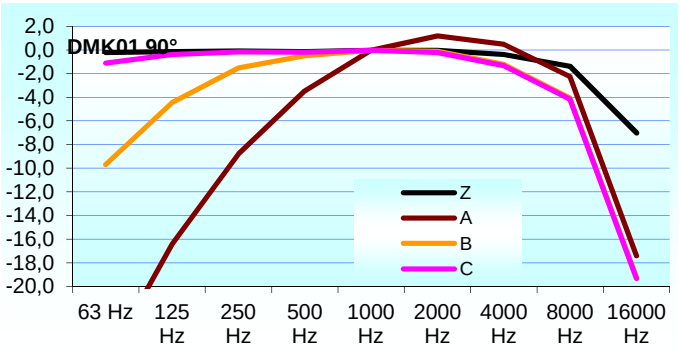
Les incertitudes élargies mentionnées sont celles correspondant à deux incertitudes types (k=2). Les incertitudes types sont calculées en tenant compte des différentes composantes d'incertitudes, étalons de référence, moyens d'étalonnage, conditions d'environnement, contribution de l'instrument étalonné, répétabilité …

Mentioned expanded uncertainties correspond to two standard uncertainty types (k=2). Standard uncertainties are calculated including different uncertainty components, reference standards, instruments used, environmental conditions, calibrated instrument contribution, repeatability…

Pondération fréquentielle
Frequency Weighting

DMK 0°: Pondération fréquentielle ; Frequency weighting					
Fréquence Frequency (Hz)	*Z*	*A*	*B*	*C*	Incertitude uncertainty (dB)
63 Hz	-0,2	-26,5	-9,6	-1,1	0,45
125 Hz	-0,1	*-16,3*	*-4,4*	-0,3	0,45
250 Hz	-0,1	-8,7	-1,5	-0,1	0,29
500 Hz	-0,2	-3,4	-0,4	-0,1	0,29
1000 Hz	0,0	0,0	0,0	0,0	0,29
2000 Hz	0,0	1,2	-0,1	-0,2	0,29
4000 Hz	-0,4	0,5	-1,2	-1,3	0,39
8000 Hz	-1,4	-3,0	-4,8	-4,9	0,61
16000 Hz	-7,0	-19,0	-20,8	-20,9	0,61
DMK 90°: Pondération fréquentielle ; Frequency weighting					
Fréquence Frequency (Hz)	*Z*	*A*	*B*	*C*	Incertitude uncertainty (dB)
63 Hz	-0,3	-26,5	-9,7	-1,1	0,45
125 Hz	-0,2	*-16,4*	*-4,4*	-0,4	0,45
250 Hz	-0,2	-8,8	-1,5	-0,2	0,29
500 Hz	-0,2	-3,5	-0,5	-0,2	0,29
1000 Hz	0,0	0,0	0,0	0,0	0,29
2000 Hz	0,0	1,2	-0,1	-0,2	0,29
4000 Hz	-0,5	0,5	-1,2	-1,3	0,39
8000 Hz	-0,7	-2,3	-4,1	-4,2	0,61
16000 Hz	-5,4	-17,4	-19,2	-19,3	0,61





Linéarité
Linearity

Linéatité (voie principale) *Linearity (Primary channel)*	Valeur nominale *Nominal value* (dB)	Valeur affichée *Displayed value* (dB)	Incertitudes *Uncertainty* (dB)
Leq 35 dBZ / 8000 Hz	35,0	35,1	0,23
Leq 45 dBZ / 8000 Hz	45,0	45,0	0,23
Leq 50 dBZ / 8000 Hz	50,0	50,0	0,20
Leq 70 dBZ / 8000 Hz	70,0	70,0	0,20
Leq 90 dBZ / 8000 Hz	90,0	90,0	0,20
Leq 110 dBZ / 8000 Hz	110,0	109,9	0,20
Leq 130 dBZ / 8000 Hz	130,0	129,7	0,20
Leq 134 dBZ / 8000 Hz	134,0	133,8	0,20
Leq 134 dBA / 8000 Hz	134,0	133,8	0,20
Leq 130 dBA / 8000 Hz	130,0	129,7	0,20
Leq 110 dBA / 8000 Hz	110,0	109,9	0,20
Leq 90 dBA / 8000 Hz	90,0	90,0	0,20
Leq 70 dBA / 8000 Hz	70,0	70,0	0,20
Leq 50 dBA / 8000 Hz	50,0	50,0	0,20
Leq 30 dBA / 8000 Hz	30,0	30,0	0,20
Leq 26 dBA / 8000 Hz	26,0	26,1	0,20

Filtre
Filter

Filtre par bande d'octave (Voie principale) *Octave filter (primary channel)*	Valeur nominale *Nominal value* (dB)	Valeur affichée *Displayed value* (dB)	Incertitudes *Uncertainty* (dB)
Leq 110 dB / 1/1 Octave / 31,5 Hz	110,0	109,9	0,5
Leq 110 dB / 1/1 Octave / 63 Hz	110,0	109,9	0,5
Leq 110 dB / 1/1 Octave / 125 Hz	110,0	110,0	0,5
Leq 110 dB / 1/1 Octave / 250 Hz	110,0	110,0	0,3
Leq 110 dB / 1/1 Octave / 500 Hz	110,0	110,0	0,3
Leq 110 dB / 1/1 Octave / 1000 Hz	110,0	110,0	0,3
Leq 110 dB / 1/1 Octave / 2000 Hz	110,0	110,0	0,4
Leq 110 dB / 1/1 Octave / 4000 Hz	110,0	110,0	0,4
Leq 110 dB / 1/1 Octave / 8000 Hz	110,0	110,0	0,4

Filtre tiers d'octave (Voie principale) *Third octave filter (Primary channel)*	Valeur nominale *Nominal value* (dB)	Valeur affichée *Displayed value* (dB)	Incertitudes *Uncertainty* (dB)
Leq 110 dB / 1/3 Octave / 25 Hz	110,0	109,9	0,5
Leq 110 dB / 1/3 Octave / 31,5 Hz	110,0	109,9	0,5
Leq 110 dB / 1/3 Octave / 40 Hz	110,0	109,9	0,5
Leq 110 dB / 1/3 Octave / 50 Hz	110,0	109,9	0,5
Leq 110 dB / 1/3 Octave / 63 Hz	110,0	109,9	0,5
Leq 110 dB / 1/3 Octave / 80 Hz	110,0	109,9	0,5
Leq 110 dB / 1/3 Octave / 100 Hz	110,0	109,9	0,5
Leq 110 dB / 1/3 Octave / 125 Hz	110,0	109,9	0,5
Leq 110 dB / 1/3 Octave / 160 Hz	110,0	109,9	0,5
Leq 110 dB / 1/3 Octave / 200 Hz	110,0	109,9	0,3
Leq 110 dB / 1/3 Octave / 250 Hz	110,0	109,9	0,3
Leq 110 dB / 1/3 Octave / 315 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 400 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 500 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 630 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 800 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 1000 Hz	110,0	110,0	0,3
Leq 110 dB / 1/3 Octave / 1250 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 1600 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 2000 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 2500 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 3150 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 4000 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 5000 Hz	110,0	110,0	0,4
Leq 110 dB / 1/3 Octave / 6300 Hz	110,0	109,9	0,4
Leq 110 dB / 1/3 Octave / 8000 Hz	110,0	109,9	0,4
Leq 110 dB / 1/3 Octave / 10000 Hz	110,0	109,9	0,6

Fin du certificat d'étalonnage End of calibration certificate

Chapitre 3.

CERTIFICAT DE CONFORMITE

CONFORMITY CERTIFICATE

CC-DTE-L-17-PVE-49149

Nous, fabricant
We, manufacturer

Acoem
200, Chemin des Ormeaux
F 69578 LIMONEST Cedex- FRANCE

déclarons sous notre seule responsabilité que le produit suivant :
declare under our own responsibility that the following equipment:

Désignation :
Designation:
Sonomètre Intégrateur Moyenneur
Integrating-Averaging Sound level meter

Référence :
Reference:
CUBE

Numéro de série :
Serial Number:
11165

est conforme aux dispositions des normes suivantes :
complies with the requirements of the following standards:

	Norme *Standard*	Classe *Class*	Edition du *Edition of*
Sonomètre :	IEC 60651	1	10-2000
Sound level meter :	IEC 60804	1	10-2000
	IEC 61672-1	1	09-2013
	IEC 61260	1	07-1995-2011
	ANSI S1.11	1	2004
	ANSI S1.4	1	1983-1985

et répond en tout point, après vérification et essais, aux exigences spécifiées, aux normes et règlements applicables, sauf exceptions, réserves ou dérogations énumérées dans la présente déclaration de conformité.

After testing and verification, this device satisfies all specified requirements and applicable standards and regulations apart from exceptions, reservations, or exemptions listed in this conformance certificate.

Date
Date
16/05/2017

LE REFERENT METROLOGIE ACOUSTIQUE
PAR DELEGATION
THE REFERENT ACOUSTIC METROLOGY
Bertrand LEROY

[redacted]

Calibration Certificates for Position N9 – June/July 2018 Survey

Certificate of Calibration

Issued by University of Salford (Acoustics Calibration Laboratory)
UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801

APPROVED SIGNATORIES
Claire Lomax [x] Andy Moorhouse [ ]
Gary Phillips [ ] Danny McCaul [ ]

acoustic calibration laboratory
The University of Salford, Salford, Greater Manchester, M5 4WT, UK
http://www.acoustics.salford.ac.uk
t 0161 295 3030/0161 295 3319 f 0161 295 4456 e c.lomax1@salford.ac.uk

UKAS CALIBRATION 0801

University of Salford MANCHESTER

Certificate Number: 03556/3 Date of Issue: 19 December 2017

PERIODIC TEST OF A SOUND LEVEL METER to IEC 61672-3:2006

FOR:	Acoustic 1 The Barns Overdale Manordeilo Llandeilo Carmarthenshire, SA19 7BD
FOR THE ATTENTION OF:	Steve Thomas
PERIODIC TEST DATE:	19/12/2017
TEST PROCEDURE:	CTP12 (Laboratory Manual)

Sound Level Meter Details

Manufacturer	01dB	
Model	CUBE	
Serial number	11110	
Class	1	
Hardware version	LIS001B	Application FW: 2.40. Metrology FW: 2.12

Associated Items	**Microphone**	**Preamplifier**
Manu	GRAS	01dB
Model	40CD	PRE22
Serial Number	260893	1610541

Test Engineer (initial): GP Name: Gary Phillips

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Certificate Number: 03556/3 Date of Issue: 19 December 2017

Procedures from IEC 61672-3: 2006 and TPS 49 Edition 2 June 2009 were used to perform the periodic tests.

The manufacturer's instruction manual was marked as follows: DOC1144 June 2014 G - CUBE User Manual GB. Adjustment data used to adjust the sound levels indicated in response to the application of a multi-frequency sound calibrator to sound levels equivalent to those that would be indicated in response to plane, progressive sound waves were obtained from the manufacturer. The sound level meter calibration check frequency is 1000 Hz, the reference sound pressure level is 94 dB. As this instrument only has a single range, this range is the reference level range.

The environmental conditions in the laboratory at the start of the test were:
Static pressure 102.840 kPa ± 0.022 kPa; air temperature 22.0 °C ± 0.3 °C; relative humidity 36.1 % ± 1.8 %.

The initial response of the instrument to application of the suitable laboratory sound calibrator was 93.8 dB (C). No adjustment of the instrument was required. This indication was obtained from the calibration certificate of the calibrator and information in the manufacturer's instruction manual specified in this certificate, when the instrument is configured for use with the external input, using the DMK01 weatherproof outdoor microphone unit, supplied RAL135-5M microphone extension cable and the following instrument settings; Microphone input: External, Microphone type: 40CD, Reference direction: 90°, High-pass filter: 10 Hz, Nose cone: Yes.

With the microphone replaced by an electrical input device with a similar capacitance to that of the electrical input device specified in the manufacturer's instruction manual, the levels of self-generated noise were:

A: 10.7 dB*
B: 10.0 dB*
C: 11.1 dB*
Z: 16.9 dB*

* Under-range indicated on instrument display.

The environmental conditions in the laboratory at the end of the test were: Static pressure 102.902 kPa ± 0.022 kPa; air temperature 22.5 °C ± 0.3 °C; relative humidity 36.4 % ± 1.8 %.

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2002 because evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, and because the periodic tests of IEC 61672-3:2006 cover only a limited subset of the specifications in IEC 61672-1:2002.

Certificate Number: 03556/3 Date of Issue: 19 December 2017

As the actual frequency response of the microphone was unavailable, the typical frequency response for the model of microphone has been used to correct the level differences determined in the electrical signal test of frequency weighting.

The instrument failed to meet the requirements for the test of electrical signal tests of frequency weightings at 250 Hz, 500 Hz and 1 kHz for the A, B, C and Z-weightings, as the uncertainty of measurement exceeded the maximum permitted value due to a significant contribution from data supplied by the manufacturer. If the manufacturer's uncertainty data were not included, the meter would meet the requirements of the Standard.

Instruments used in the verification procedure were traceable to *National Standards*. The multi-frequency calibrator method was employed in the acoustical tests of a frequency weighting.

The uncertainty evaluation has been carried out in accordance with UKAS requirements. All measurement results are retained at the acoustic calibration laboratory for at least four years.

Calibration Certificates for Position N10 – June/July 2018 Survey

Certificate of Calibration

Issued by University of Salford (Acoustics Calibration Laboratory)
UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801

APPROVED SIGNATORIES
Claire Lomax [x] Andy Moorhouse [ ]
Gary Phillips [ ] Danny McCaul [ ]

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UKAS CALIBRATION 0801

University of Salford MANCHESTER

Certificate Number: 03666/2 Date of Issue: 15 March 2018

PERIODIC TEST OF A SOUND LEVEL METER to IEC 61672-3:2006

FOR:	Acoustic 1 The Barns Overdale Manordeilo Llandeilo Carmarthenshire SA19 7BD
FOR THE ATTENTION OF:	Steve Thomas
PERIODIC TEST DATE:	13/03/2018
TEST PROCEDURE:	CTP12 (Laboratory Manual)

Sound Level Meter Details

Manufacturer	01dB	
Model	DUO	
Serial number	10522	
Class	1	
Hardware version	3F2D3D	Application FW: 2.38. Metrology FW: 2.12

Associated Items	**Microphone**	**Preamplifier**
Manu	GRAS	01dB
Model	40CD	PRE22
Serial Number	154578	10329

Test Engineer (initial): GP Name: Gary Phillips

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to the units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full except with the prior written approval of the issuing laboratory.

Certificate Number: 03666/2 Date of Issue: 15 March 2018

Procedures from IEC 61672-3: 2006 and TPS 49 Edition 2 June 2009 were used to perform the periodic tests. The manufacturer's instruction manual was marked as follows: DOC1112 June 2014 G - DUO User Manual GB. Adjustment data used to adjust the sound levels indicated in response to the application of a multi-frequency sound calibrator to sound levels equivalent to those that would be indicated in response to plane, progressive sound waves were obtained from the manufacturer. The sound level meter calibration check frequency is 1000 Hz; the reference sound pressure level is 94 dB. As this instrument only has a single range, this range is the reference level range.

The environmental conditions in the laboratory at the start of the test were:
Static pressure 100.264 kPa ± 0.022 kPa; air temperature 22.5 °C ± 0.3 °C; relative humidity 38.6 % ± 1.8 %.

The initial response of the instrument to application of the associated sound calibrator was 93.4 dB (C). The instrument was then adjusted to indicate 93.8 dB (C). This indication was obtained from the calibration certificate of the calibrator and information in the manufacturer's instruction manual specified in this certificate, when the instrument is configured for use with the external input, using the DMK01 weatherproof outdoor microphone unit, supplied RAL135-5M microphone extension cable and the following instrument settings; Microphone input: External, Microphone type: 40CD, Reference direction: 90°, High-pass filter: 10 Hz, Nose cone: Yes.

With the microphone replaced by an electrical input device with a similar capacitance to that of the electrical input device specified by the manufacturer, the levels of self-generated noise were:

A: 12.8 dB*
B: 12.2 dB*
C: 13.4 dB*
Z: 18.9 dB*

* Under-range indicated on instrument display

The environmental conditions in the laboratory at the end of the test were:
Static pressure 100.271 kPa ± 0.022 kPa; air temperature 23.1 °C ± 0.3 °C; relative humidity 34.7 % ± 1.8 %.

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organization responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Certificate Number: 03666/2 Date of Issue: 15 March 2018

The instrument failed to meet the requirements for the test of electrical signal tests of frequency weightings at 250 Hz, 500 Hz and 1 kHz for the A, B, C and Z-weightings, as the uncertainty of measurement exceeded the maximum permitted value due to a significant contribution from data supplied by the manufacturer. If the manufacturer's uncertainty data were not included, the meter would meet the requirements of the Standard.

As the actual frequency response of the microphone was unavailable, the typical frequency response for the model of microphone has been used to correct the level differences determined in the electrical signal test of frequency weighting.

Instruments used in the verification procedure were traceable to *National Standards*. The multi-frequency calibrator method was employed in the acoustical tests of a frequency weighting.

The uncertainty evaluation has been carried out in accordance with UKAS requirements. All measurement results are retained at the acoustic calibration laboratory for at least four years.

Calibration Certificates for Position N11 – June/July 2018 Survey

Certificate of Calibration

Issued by University of Salford (Acoustics Calibration Laboratory)
UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801

APPROVED SIGNATORIES
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UKAS CALIBRATION
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University of Salford MANCHESTER

Certificate Number: 03224/1 Date of Issue: 3 May 2017

PERIODIC TEST OF A SOUND LEVEL METER to IEC 61672-3:2006

FOR:	Acoustic 1 The Barns Overdale Manordeilo Llandeilo Carmarthenshire SA19 7BD
FOR THE ATTENTION OF:	Steve Thomas
PERIODIC TEST DATE:	03/05/2017
TEST PROCEDURE:	CTP12 (Laboratory Manual)

Sound Level Meter Details

Manufacturer	01dB	
Model	CUBE	
Serial number	10694	
Class	1	
Hardware version	LIS001B	Application FW: 2.34. Metrology FW: 2.10

Associated Items	**Microphone**	**Preamplifier**
Manu	GRAS	01dB
Model	40CD	PRE22
Serial Number	224223	11118

Test Engineer (initial): GP Name: Gary Phillips

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to the units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full except with the prior written approval of the issuing laboratory.

Certificate Number: 03224/1 Date of Issue: 3 May 2017

Procedures from IEC 61672-3: 2006 and TPS 49 Edition 2 June 2009 were used to perform the periodic tests. The manufacturer's instruction manual was marked as follows: DOC1144 June 2014 G - CUBE User Manual GB. Adjustment data used to adjust the sound levels indicated in response to the application of a multi-frequency sound calibrator to sound levels equivalent to those that would be indicated in response to plane, progressive sound waves were obtained from the manufacturer. The sound level meter calibration check frequency is 1000 Hz, the reference sound pressure level is 94 dB. As this instrument only has a single range, this range is the reference level range.

The environmental conditions in the laboratory at the start of the test were:
Static pressure 102.124 kPa ± 0.017 kPa, air temperature 21.5 °C ± 0.3 °C, relative humidity 42.4 % ± 1.9%.

The initial response of the instrument to application of the suitable laboratory sound calibrator was 93.8 dB (C). The instrument was then adjusted to indicate 93.7 dB (C). This indication was obtained from the calibration certificate of the calibrator and information in the manufacturer's instruction manual specified in this certificate, when the instrument is configured for use with the external input, using the DMK01 weatherproof outdoor microphone unit, supplied RAL135-10m microphone extension cable and the following instrument settings; Microphone input: External, Microphone type: 40CD, Reference direction: 90°, High-pass filter: 10 Hz, Nose cone: Yes.

With the microphone replaced by an electrical input device with a similar capacitance to that of the electrical input device specified in the manufacturer's instruction manual, the levels of self-generated noise were:

A: 11.2 dB*
B: 10.8 dB*
C: 12.1 dB*
Z: 17.3 dB*

* Under-range indicated on instrument display.

The environmental conditions in the laboratory at the end of the test were:
Static pressure 102.056 kPa ± 0.017 kPa, air temperature 24.0 °C ± 0.3 °C, relative humidity 38.1 % ± 1.9%.

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2002 because evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, and because the periodic tests of IEC 61672-3:2006 cover only a limited subset of the specifications in IEC 61672-1:2002.

Certificate Number: 03224/1 Date of Issue: 3 May 2017

The instrument failed to meet the requirements for the test of electrical signal tests of frequency weightings at 250 Hz, 500 Hz and 1 kHz for the A, B, C and Z-weightings, as the uncertainty of measurement exceeded the maximum permitted value due to a significant contribution from data supplied by the manufacturer. If the manufacturer's uncertainty data were not included, the meter would meet the requirements of the Standard.

The microphone corrections applied as specified in 12.6 of IEC 61672-3:2006 were obtained from a frequency response measured by this Laboratory using the electrostatic actuator method. This response in isolation is not covered by our UKAS accreditation.

As the actual frequency response of the microphone was unavailable, the typical frequency response for the model of microphone has been used to correct the level differences determined in the electrical signal test of frequency weighting.

Instruments used in the verification procedure were traceable to *National Standards*. The multi-frequency calibrator method was employed in the acoustical tests of a frequency weighting.

The uncertainty evaluation has been carried out in accordance with UKAS requirements. All measurement results are retained at the acoustic calibration laboratory for at least four years.

Calibration Certificates for Position N12 – June/July 2018 Survey

Certificate of Calibration

Issued by University of Salford (Acoustics Calibration Laboratory)
UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801

APPROVED SIGNATORIES
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Gary Phillips [ ] Danny McCaul [ ]

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University of Salford MANCHESTER

Certificate Number: 03112/6 Date of Issue: 27 March 2017

PERIODIC TEST OF A SOUND LEVEL METER to IEC 61672-3:2006

FOR:	Acoustic 1 The Barns Overdale Manordeilo Llandeilo Carmarthenshire SA19 7BD
FOR THE ATTENTION OF:	Steve Thomas
PERIODIC TEST DATE:	24th and 27th March 2017
TEST PROCEDURE:	CTP12 (Laboratory Manual)

Sound Level Meter Details

Manufacturer	01dB	
Model	CUBE	
Serial number	10619	
Class	1	
Hardware version	LIS001A	Application FW: 2.35. Metrology FW: 2.12

Associated Items	**Microphone**	**Preamplifier**
Manu	GRAS	01dB
Model	40CD	PRE22
Serial Number	207246	10730

Test Engineer (initial): GP Name: Gary Phillips

Certificate Number: 03112/6 Date of Issue: 27 March 2017

Procedures from IEC 61672-3: 2006 and TPS 49 Edition 2 June 2009 were used to perform the periodic tests.

The manufacturer's instruction manual was marked as follows: DOC1144 June 2014 G - CUBE User Manual GB. Adjustment data used to adjust the sound levels indicated in response to the application of a multi-frequency sound calibrator to sound levels equivalent to those that would be indicated in response to plane, progressive sound waves were obtained from the manufacturer. The sound level meter calibration check frequency is 1000 Hz, the reference sound pressure level is 94 dB. As this instrument only has a single range, this range is the reference level range.

The environmental conditions in the laboratory at the start of the test were:
Static pressure 102.712 kPa ± 0.017 kPa, air temperature 22.3 °C ± 0.3 °C, relative humidity 37.6 % ± 1.9%.

The initial response of the instrument to application of the suitable laboratory sound calibrator was 93.9 dB (C). The instrument was then adjusted to indicate 93.7 dB (C). This indication was obtained from the calibration certificate of the calibrator and information in the manufacturer's instruction manual specified in this certificate, when the instrument is configured for use with the external input, using the DMK01 weatherproof outdoor microphone unit, supplied RAL135-10m microphone extension cable and the following instrument settings; Microphone input: External, Microphone type: 40CD, Reference direction: 90°, High-pass filter: 10 Hz, Nose cone: Yes.

With the microphone replaced by an electrical input device with a similar capacitance to that of the electrical input device specified in the manufacturer's instruction manual, the levels of self-generated noise were:

A: 11.6 dB*
B: 11.0 dB*
C: 12.3 dB*
Z: 17.7 dB*

* Under-range indicated on instrument display.

The environmental conditions in the laboratory at the end of the test were:
Static pressure 101.920 kPa ± 0.017 kPa, air temperature 22.7 °C ± 0.3 °C, relative humidity 38.6 % ± 1.9%.

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2002 because evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, and because the periodic tests of IEC 61672-3:2006 cover only a limited subset of the specifications in IEC 61672-1:2002.

Certificate Number: 03112/6 Date of Issue: 27 March 2017

As the actual frequency response of the microphone was unavailable, the typical frequency response for the model of microphone has been used to correct the level differences determined in the electrical signal test of frequency weighting.

The instrument failed to meet the requirements for the test of electrical signal tests of frequency weightings at 250 Hz, 500 Hz and 1 kHz for the A, B, C and Z-weightings, as the uncertainty of measurement exceeded the maximum permitted value due to a significant contribution from data supplied by the manufacturer. If the manufacturer's uncertainty data were not included, the meter would meet the requirements of the Standard.

Instruments used in the verification procedure were traceable to *National Standards*. The multi-frequency calibrator method was employed in the acoustical tests of a frequency weighting.

The uncertainty evaluation has been carried out in accordance with UKAS requirements. All measurement results are retained at the acoustic calibration laboratory for at least four years.

Calibration Certificate for Calibrator used at N1, N2, N4, N6, N7, N8 and N12 – June/July 2018 Survey

Certificate of Calibration

Issued by University of Salford (Acoustics Calibration Laboratory)
UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801

Page 1 of 2

APPROVED SIGNATORIES
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UKAS CALIBRATION 0801

University of Salford MANCHESTER

Certificate Number: 03725/1 Date of Issue: 20 April 2018

CALIBRATION OF A SOUND CALIBRATOR

FOR:	Acoustic 1 The Barns Overdale Manordeilo Llandeilo Carmarthenshire SA19 7BD
FOR THE ATTENTION OF:	Steve Thomas
DESCRIPTION:	Calibrator with housing for one-inch microphones and adaptor type BAC21 for half-inch microphones.
MANUFACTURER:	01 dB
TYPE:	CAL21
SERIAL NUMBER:	35054818 (2015)
DATE OF CALIBRATION:	17/04/2018
TEST PROCEDURE:	CTP06 (Laboratory Manual)

Test Engineer (initial): CL Name: Claire Lomax

Certificate Number: 03725/1 Date of Issue: 20 April 2018

MEASUREMENTS

The sound pressure level generated by the calibrator was measured using a calibrated, WS2P condenser microphone specified in this certificate. The calibration was carried out with the calibrator in the half-inch configuration.

Five determinations of the sound pressure level, frequency and total distortion were made.

The manufacturer states that automatic compensation is applied for the effects of changes in atmospheric pressure.

Consult the manufacturer's instruction manual for any corrections, due to slight differences in microphone load volumes, to the stated level which may be required when using this sound calibrator with other microphone models.

RESULTS

Coupler configuration:	Half-inch
Microphone type:	GRAS 40AG
Output level (dB re 20μPa):	94.16 dB ± 0.11 dB
Frequency (Hz):	1001.40 Hz ± 0.01 %
Total Distortion (%):	1.57 % ± 0.39 %

Average environmental conditions at the time of measurement were:

Pressure:	100.966 kPa ± 0.023 kPa
Temperature:	22.4 °C ± 0.4 °C
Relative humidity:	43.5 % ± 1.8 %

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

All measurement results are retained at the acoustic calibration laboratory for at least four years.

Calibration Certificate for Calibrator used at N8, N9, N10, N11 – June/July 2018 Survey

Certificate of Calibration

Issued by University of Salford (Acoustics Calibration Laboratory)
UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801

APPROVED SIGNATORIES
Claire Lomax [ ] Andy Moorhouse [ ]
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UKAS CALIBRATION 0801

University of Salford MANCHESTER

Certificate Number: 03759/1 Date of Issue: 3 May 2018

CALIBRATION OF A SOUND CALIBRATOR

FOR:	Resound Acoustics Limited 13 Rother Street Stratford-upon-Avon Warwickshire CV37 6LU
FOR THE ATTENTION OF:	Mike Brownstone
DESCRIPTION:	Calibrator with housing for one-inch microphones and adaptor type BAC21 for half-inch microphones.
MANUFACTURER:	01 dB
TYPE:	CAL21
SERIAL NUMBER:	34134139 (2013)
DATE OF CALIBRATION:	01/05/2018
TEST PROCEDURE:	CTP06 (Laboratory Manual)

Test Engineer (initial): CL Name: Claire Lomax

Certificate Number: 03759/1 Date of Issue: 3 May 2018

MEASUREMENTS

The sound pressure level generated by the calibrator was measured using a calibrated WS2P condenser microphone as specified in this certificate. The calibration was carried out with the calibrator in the half-inch configuration.

Five determinations of the sound pressure level, frequency and total distortion were made.

The manufacturer states that automatic compensation is applied for the effects of changes in atmospheric pressure.

RESULTS

Coupler configuration:	Half-inch
Microphone type:	GRAS 40AG
Output level (dB re 20μPa):	94.03 dB ± 0.11 dB
Frequency (Hz):	1002.60 Hz ± 0.01 %
Total Distortion (%):	1.60 % ± 0.39 %

Average environmental conditions at the time of measurement were:

Pressure:	99.903 kPa ± 0.023 kPa
Temperature:	22.3 °C ± 0.4 °C
Relative humidity:	37.8 % ± 1.8 %

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

All measurement results are retained at the acoustic calibration laboratory for at least four years.

Figure A13A.3.56: Full survey results, August 2016, Position N1

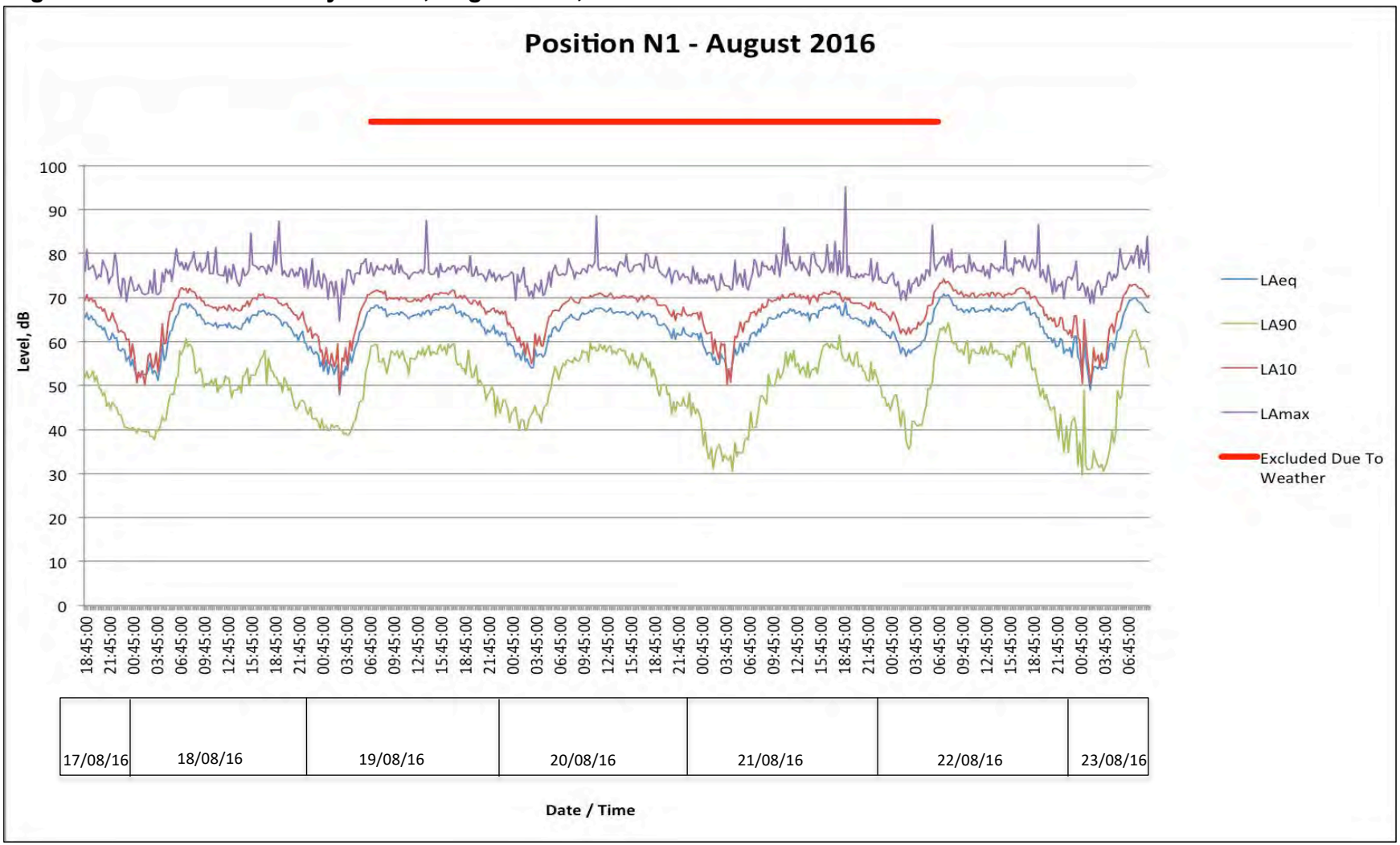


Figure A13A.3.57: Full survey results, August 2016, Position N2

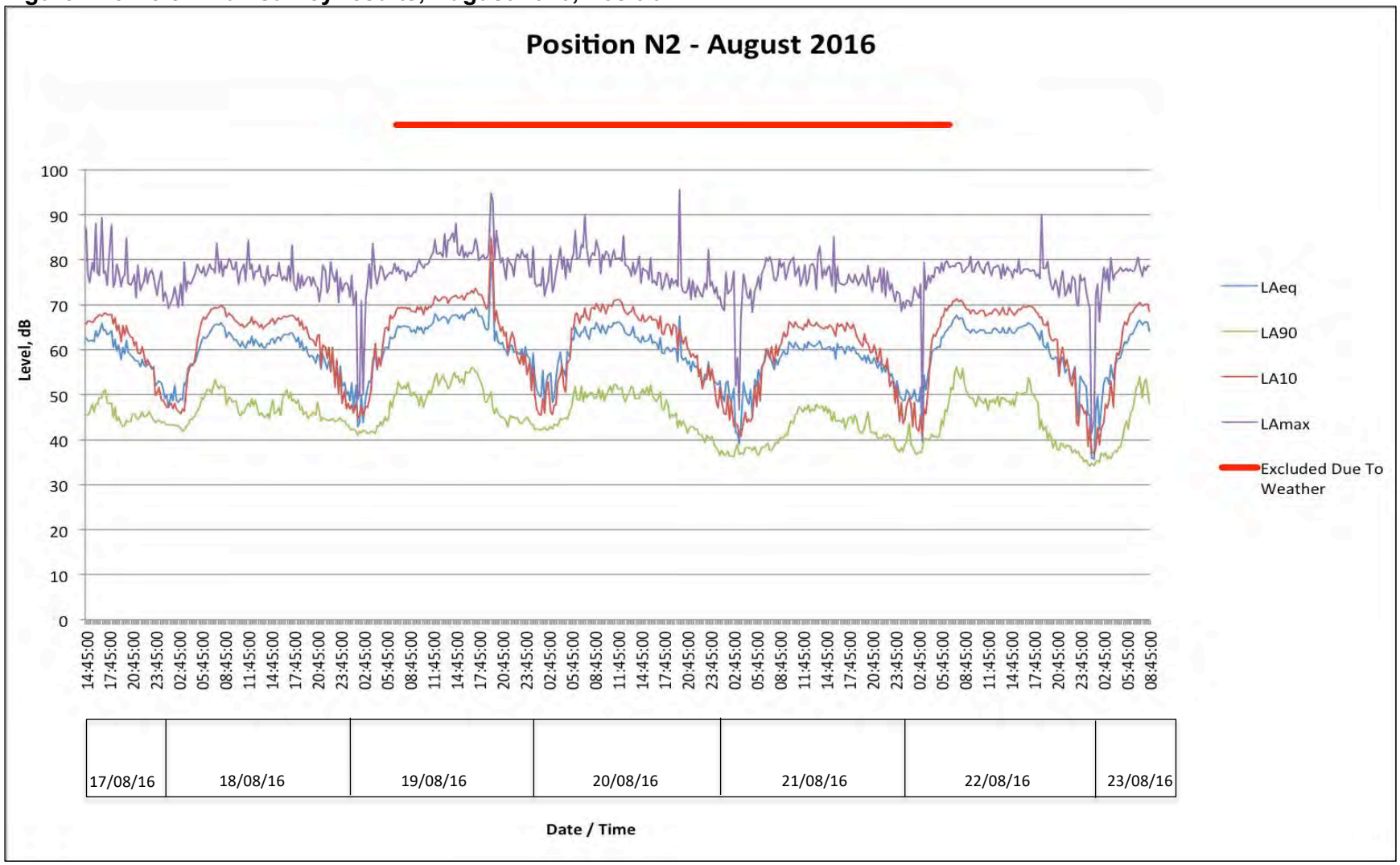


Figure A13A.3.58: Full survey results, August 2016, Position N3

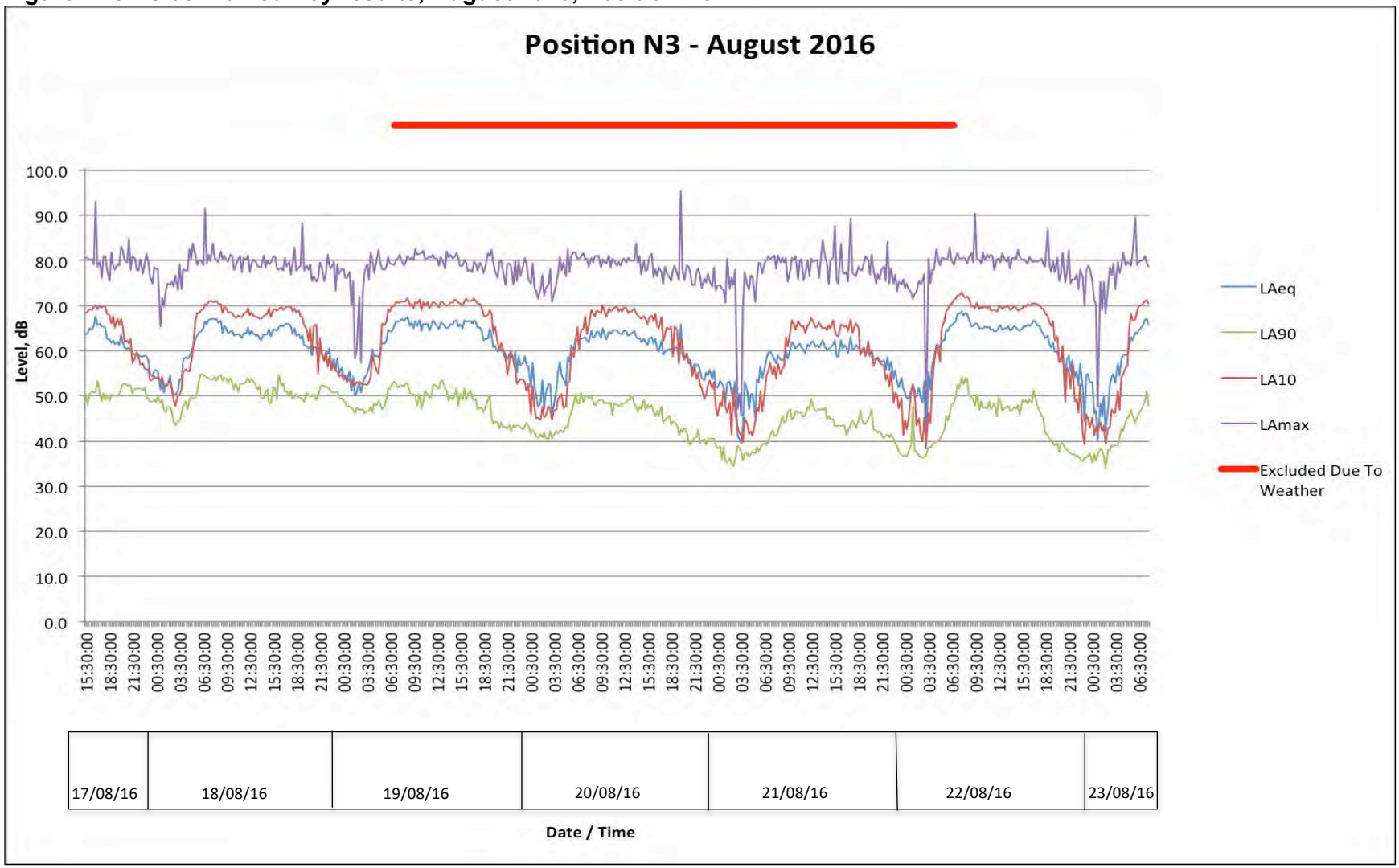


Figure A13A.3.59: Full survey results, August 2016, Position N5

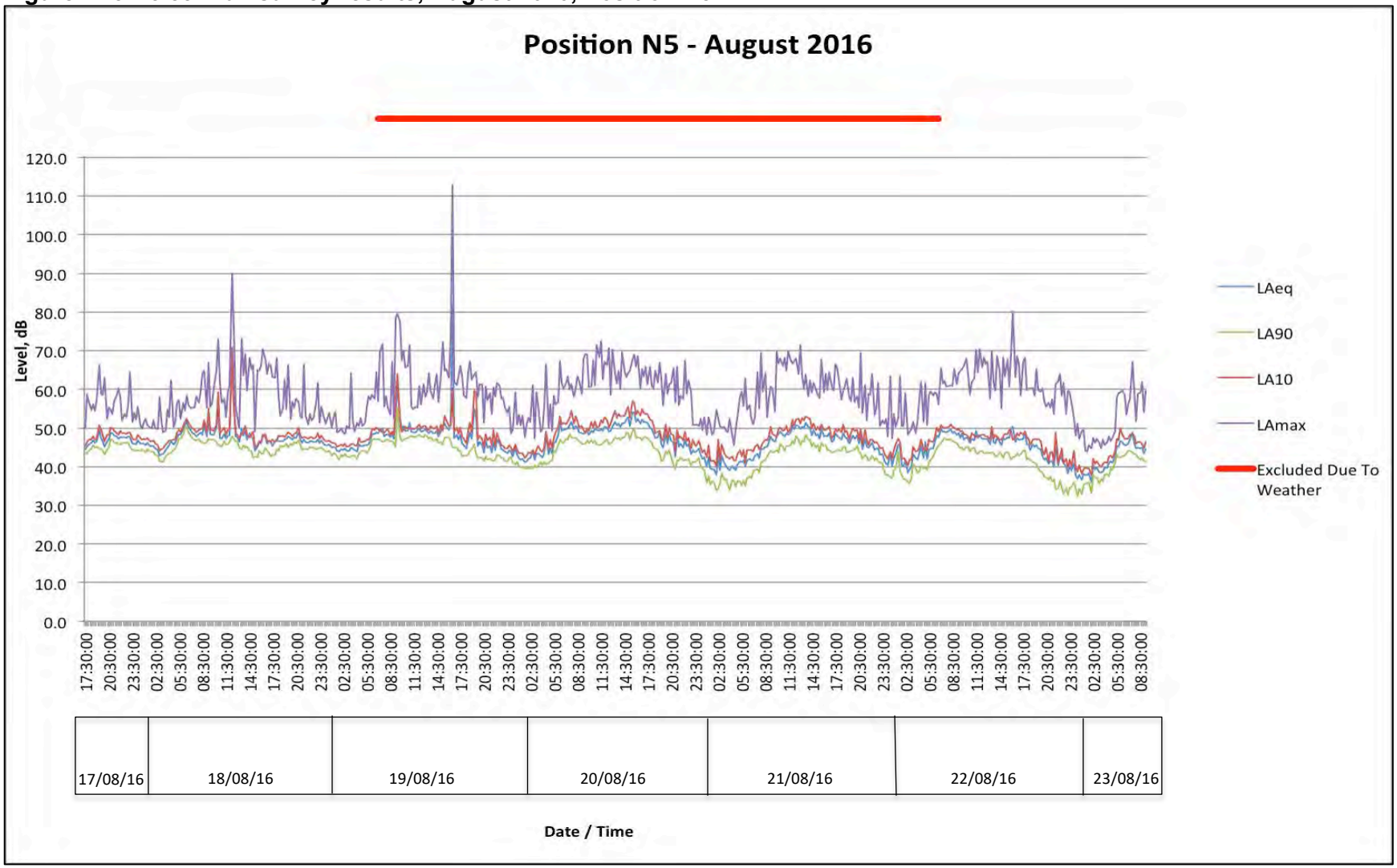


Figure A13A.3.60: Full survey results, October 2016, Position N6

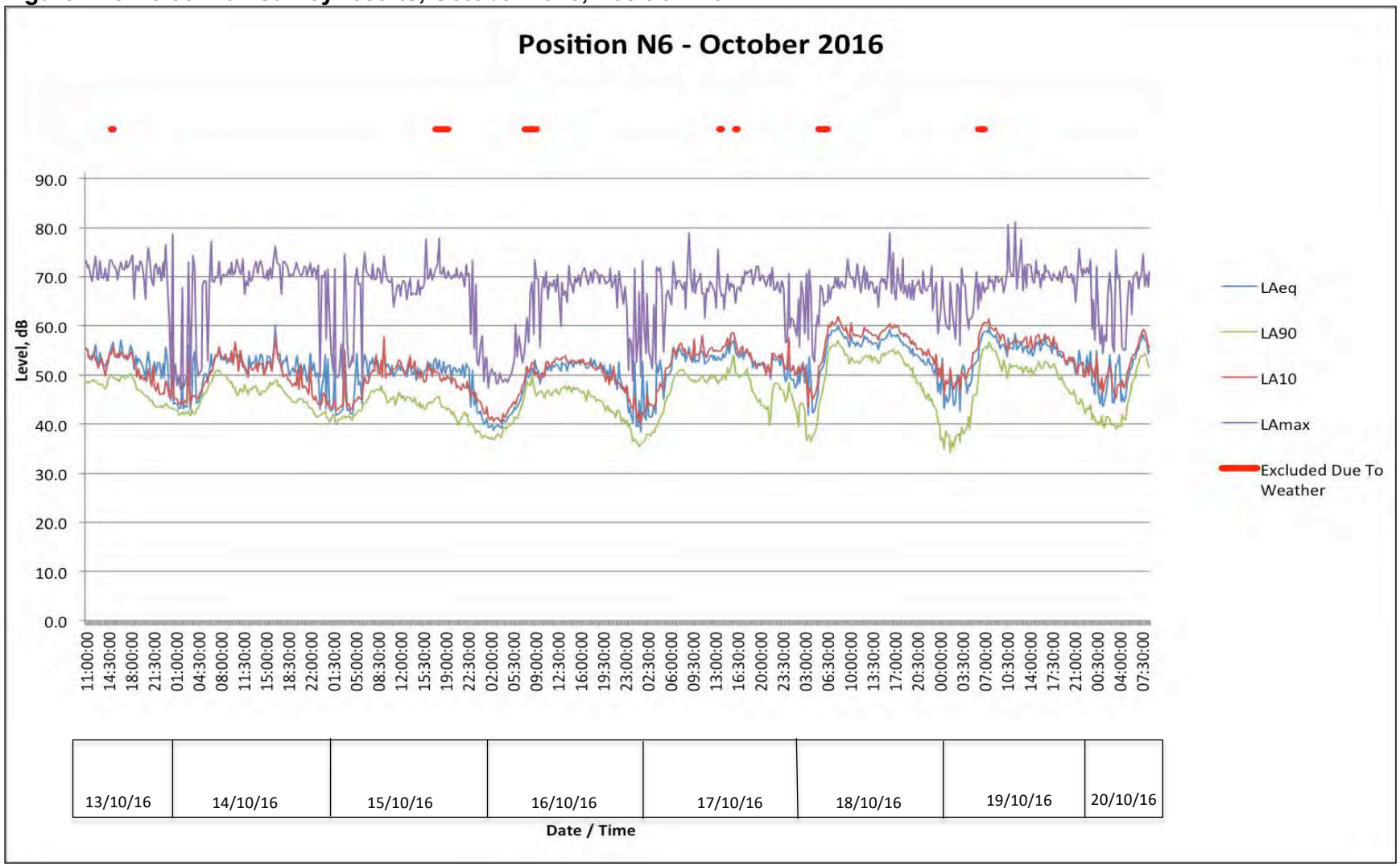


Figure A13A.3.61: Full survey results, August 2016, Position N7

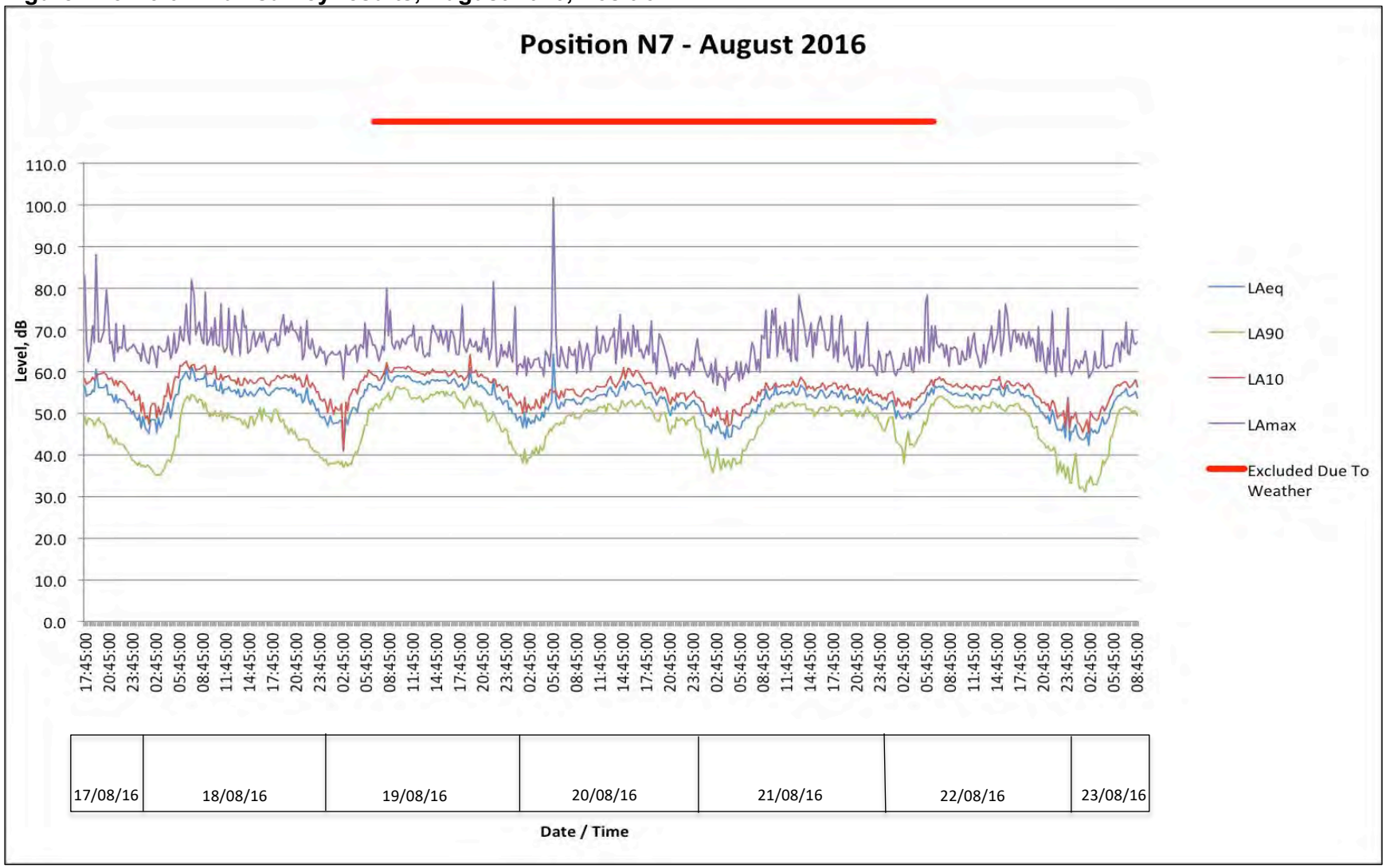


Figure A13A.3.62: Full survey results, August 2016, Position N8

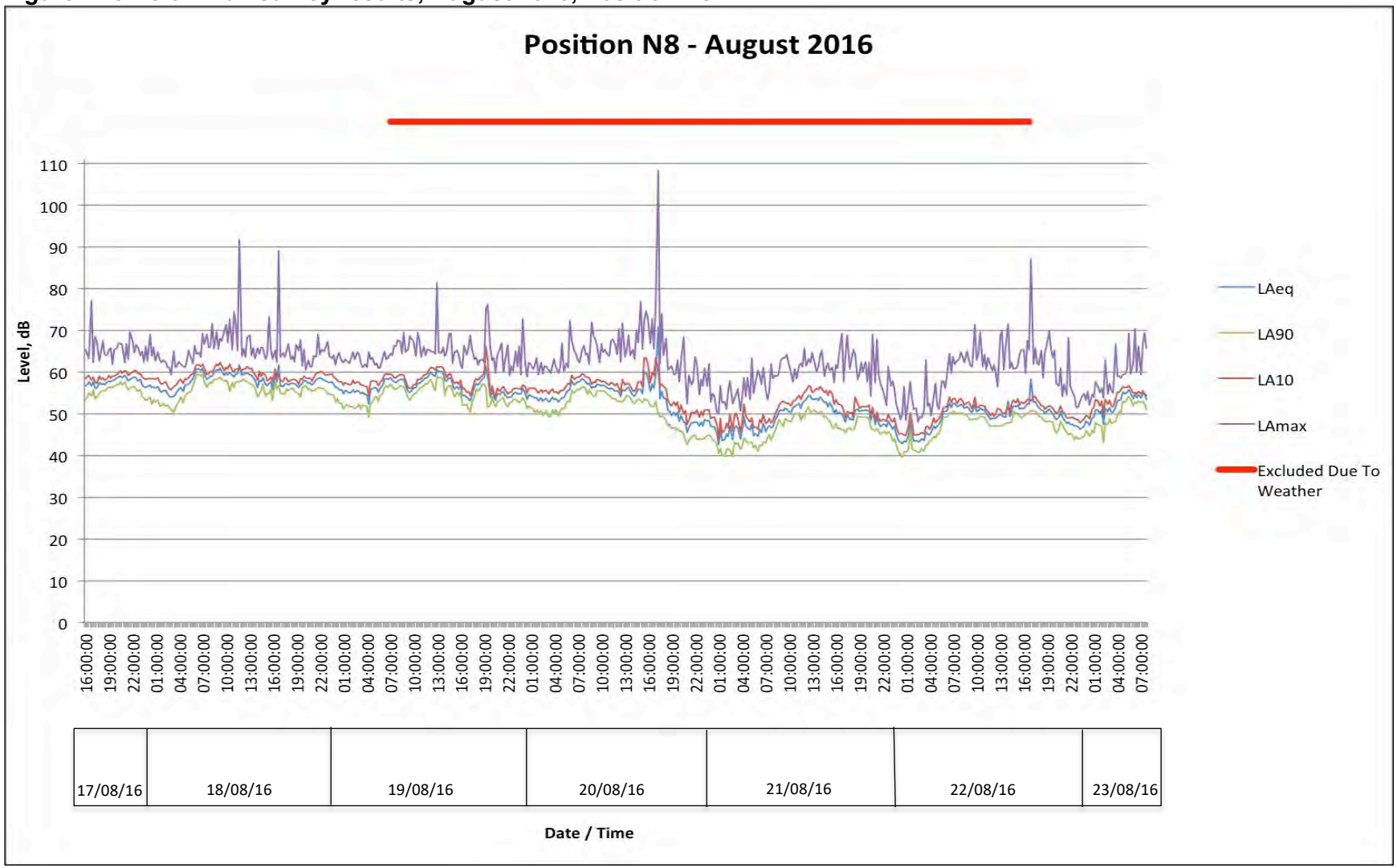


Figure A13A.3.63: Full survey results, August 2016, Position N9

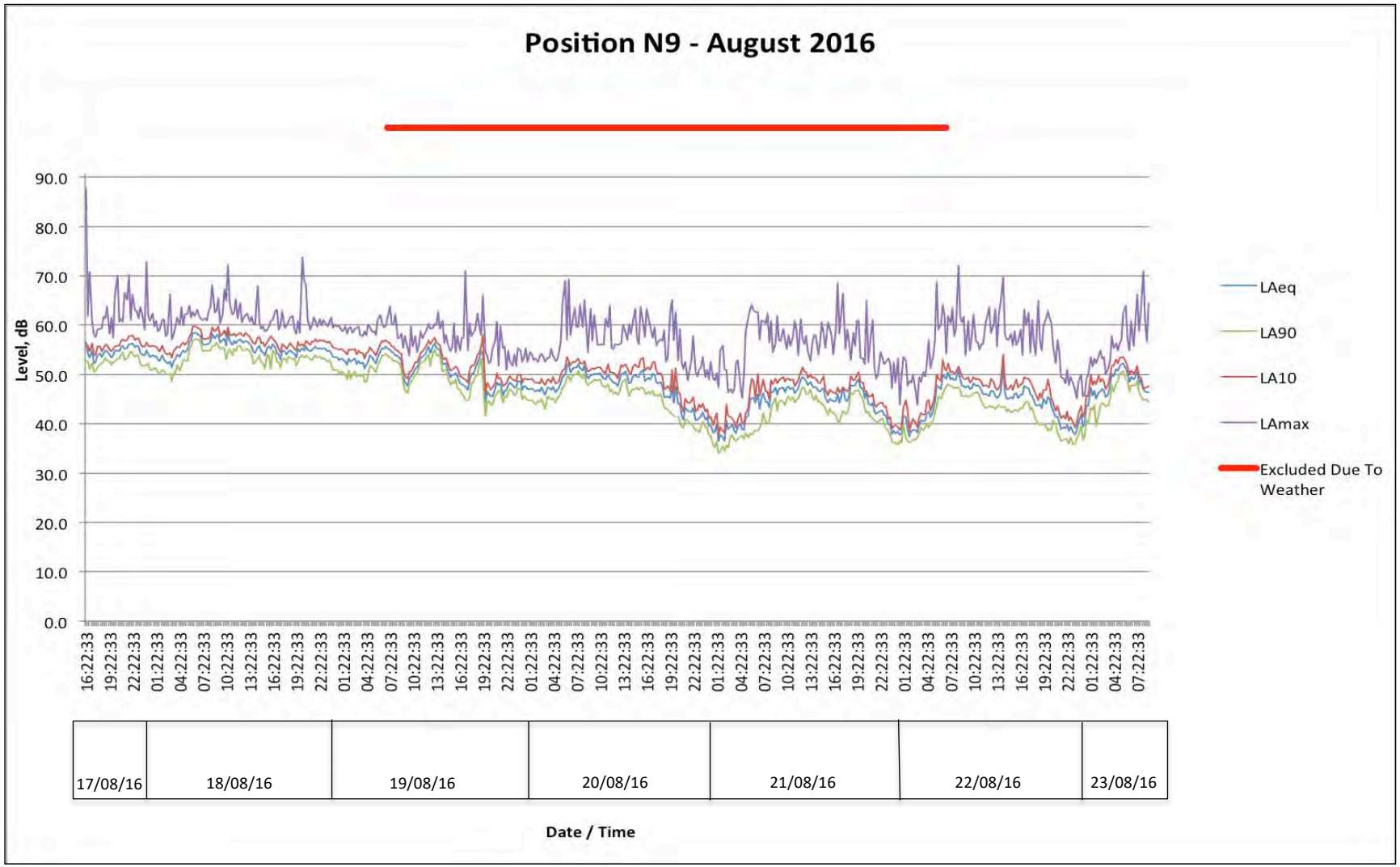


Figure A13A.3.64: Full survey results, January 2017, Position N1

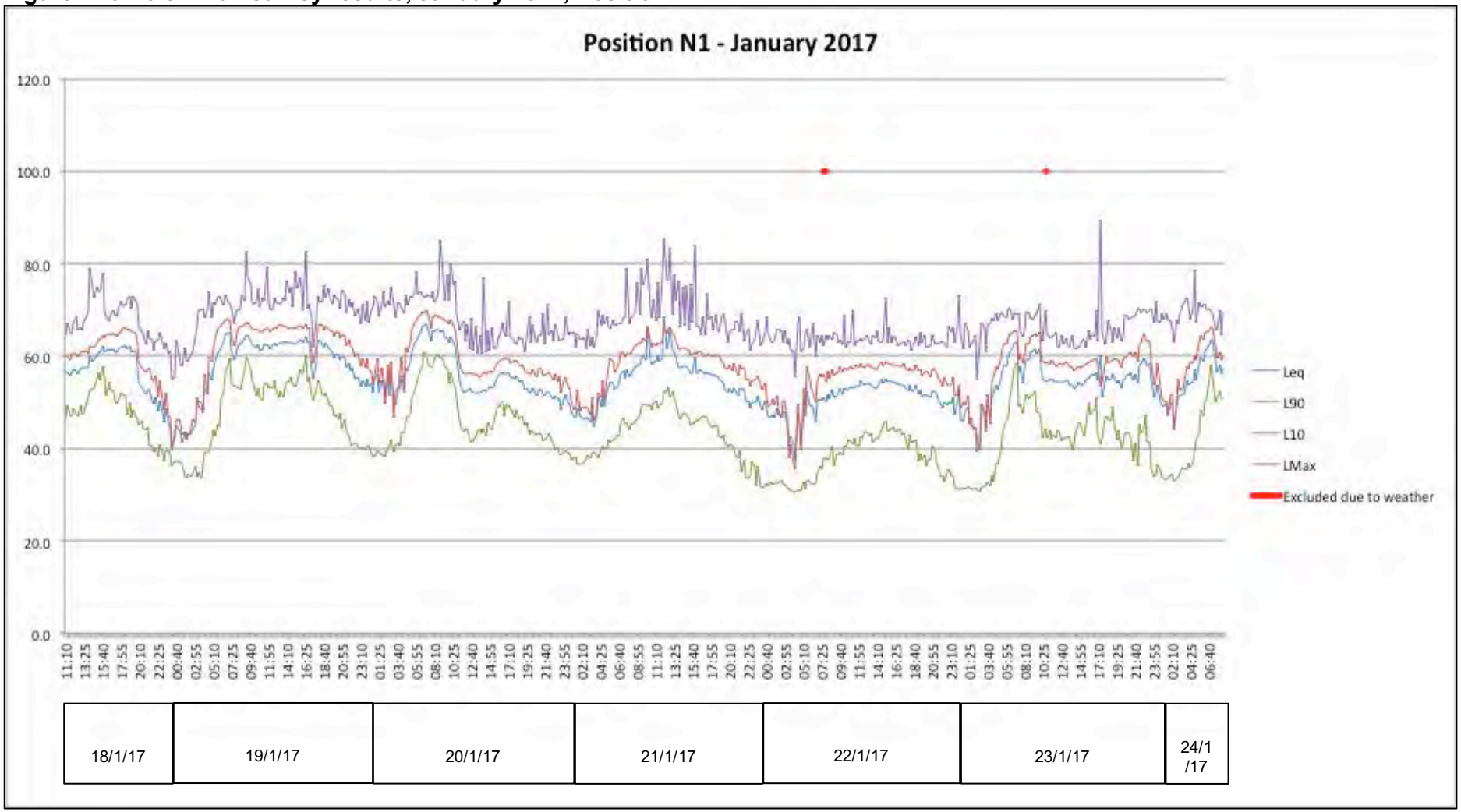


Figure A13A.3.65: Full survey results, January 2017, Position N2

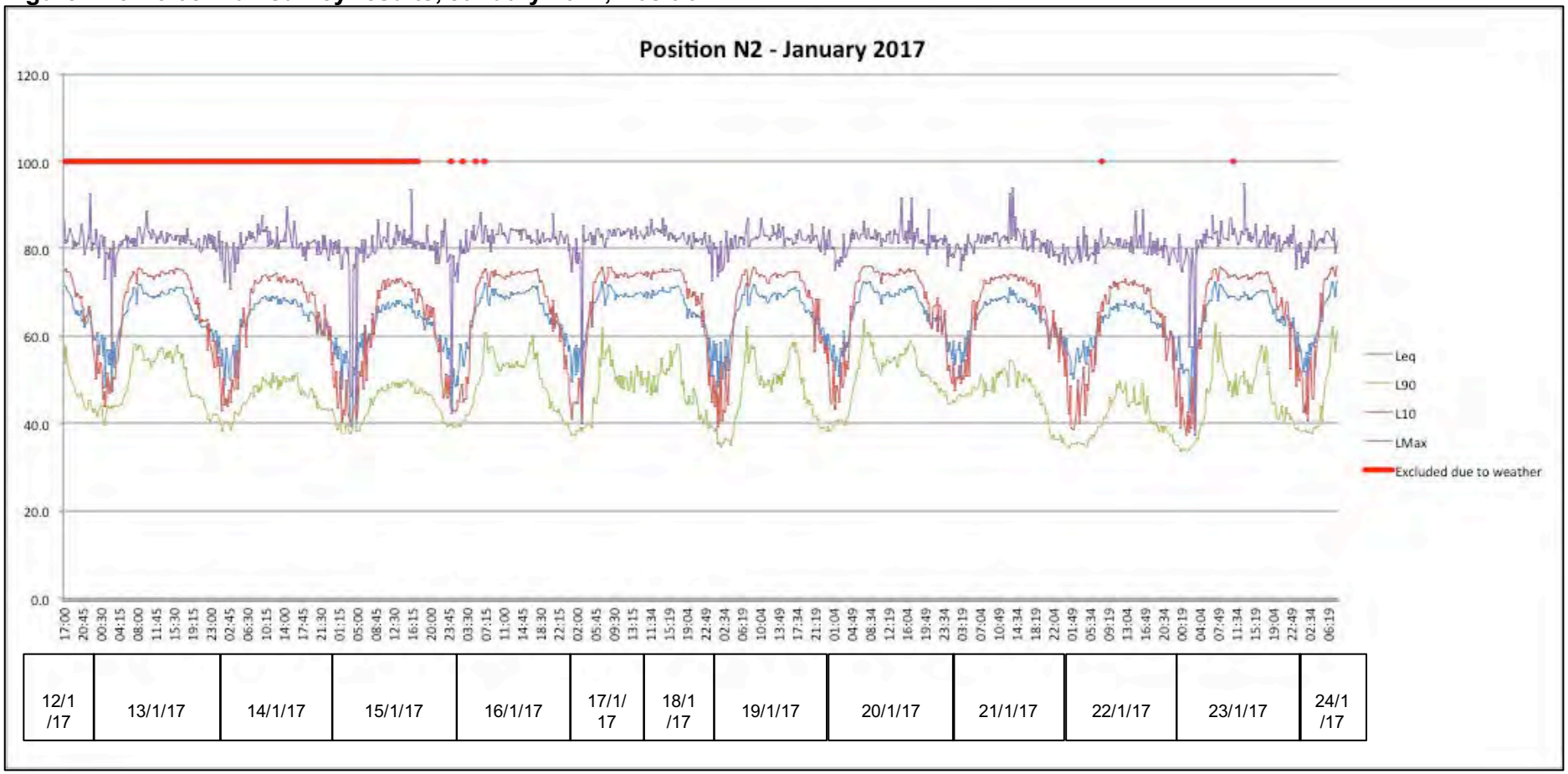


Figure A13A.3.66: Full survey results, January 2017, Position N4

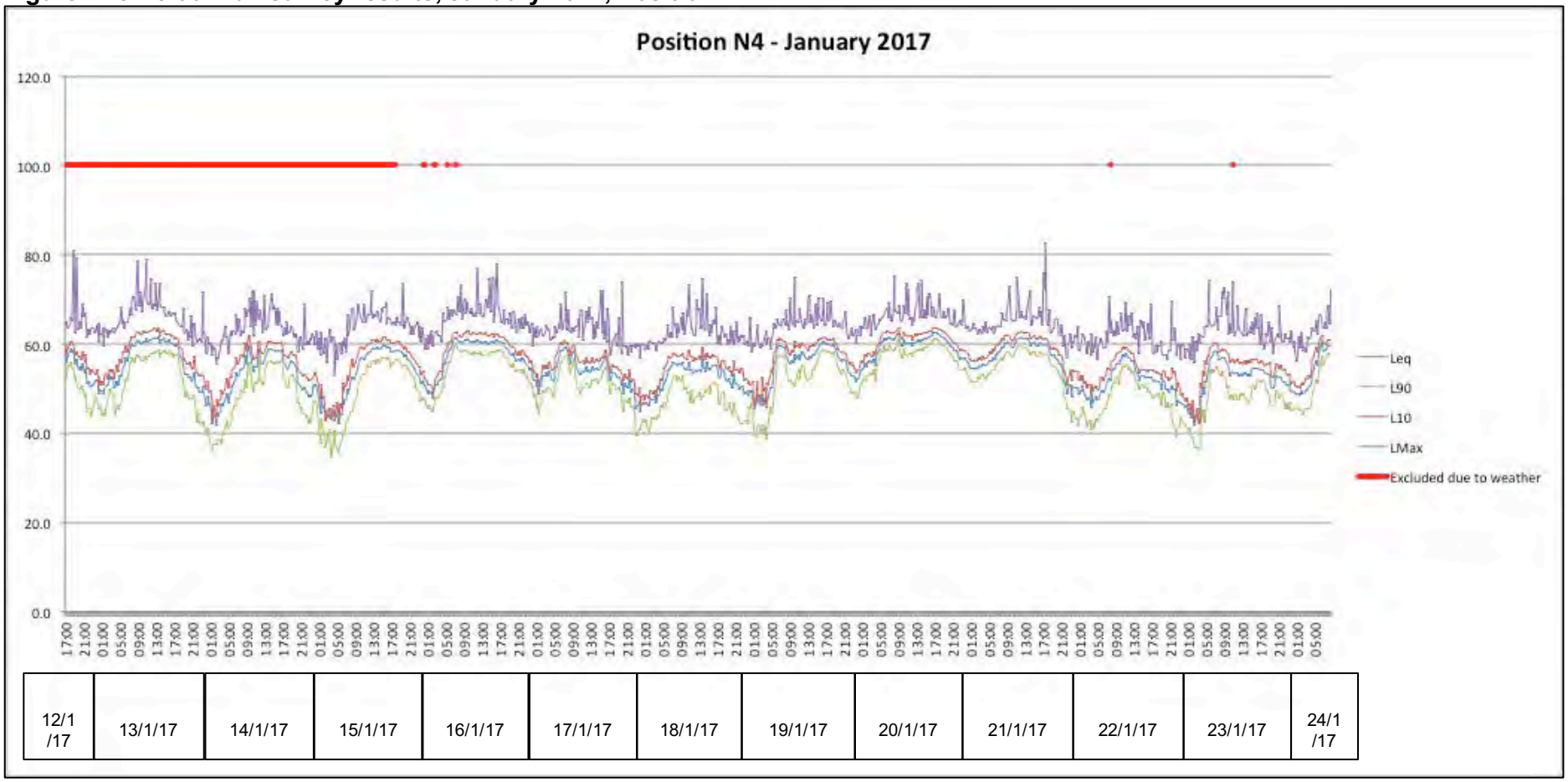


Figure A13A.3.67: Full survey results, January 2017, Position N5

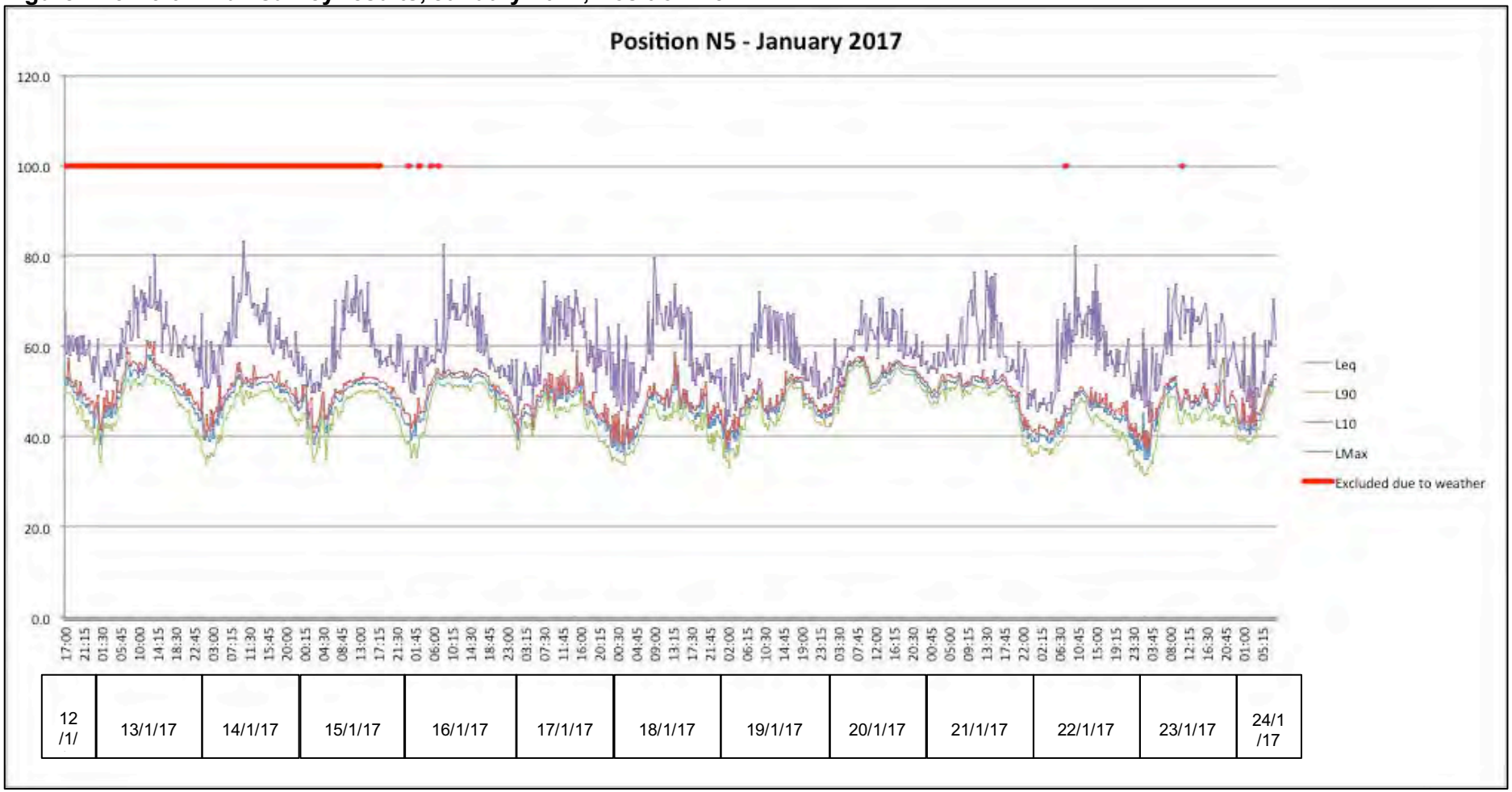


Figure A13A.3.68: Full survey results, January 2017, Position N6

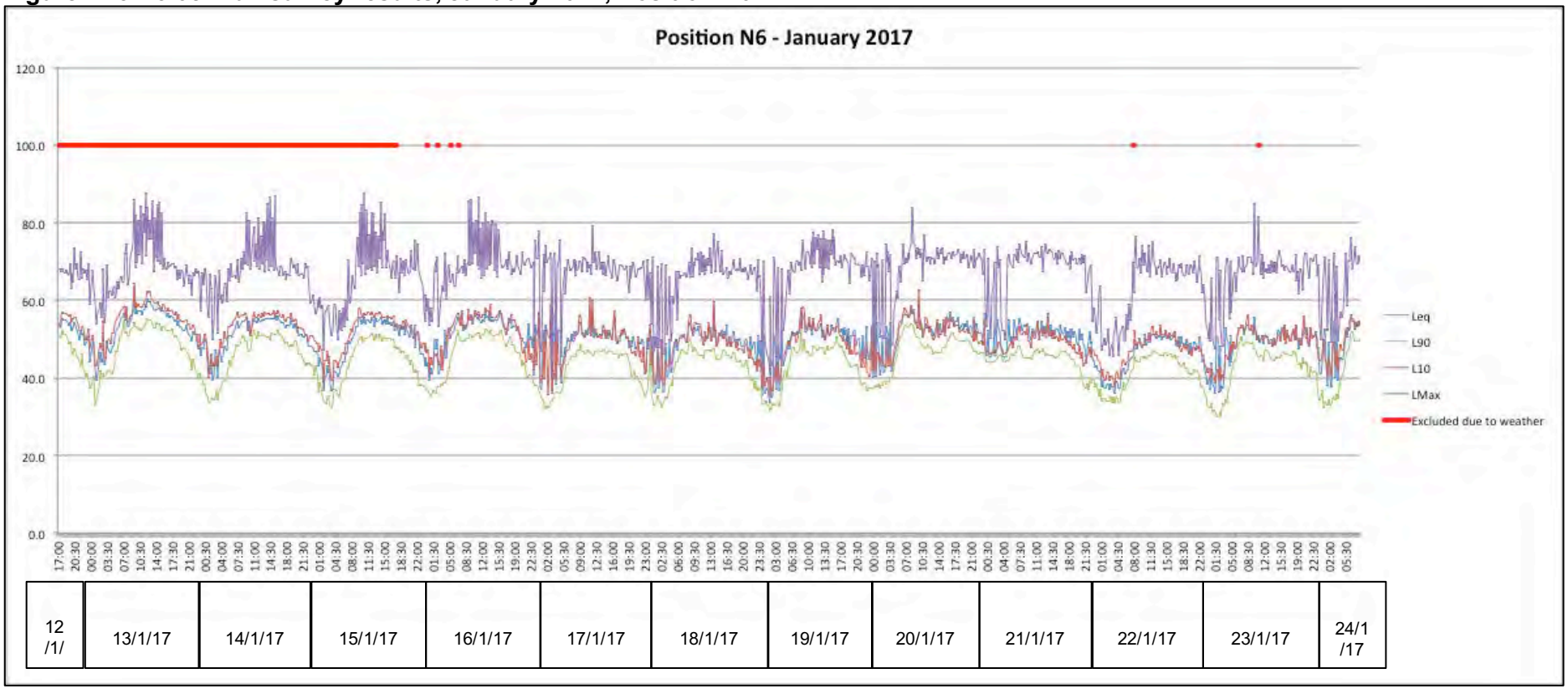


Figure A13A.3.69: Full survey results, January 2017, Position N7

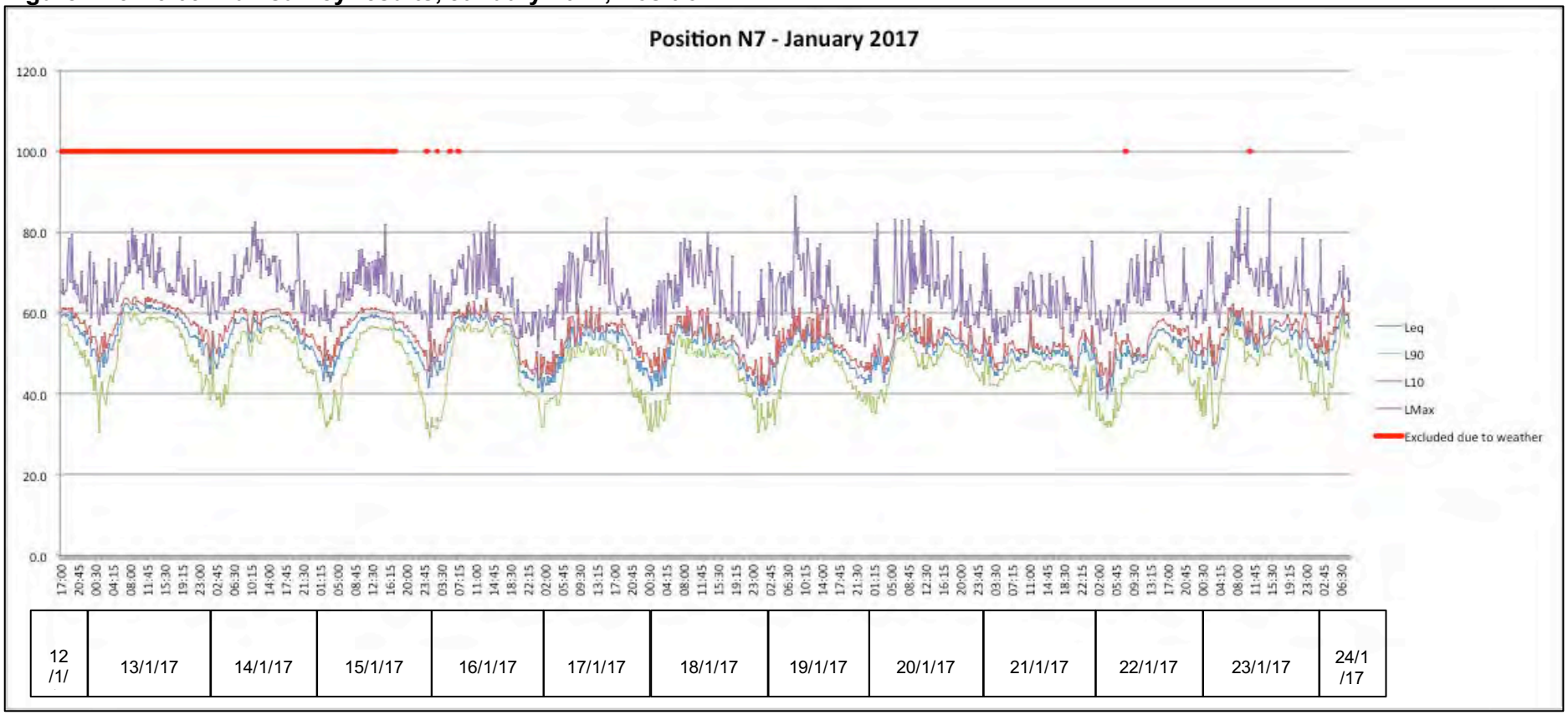


Figure A13A.3.70: Full survey results, January 2017, Position N8

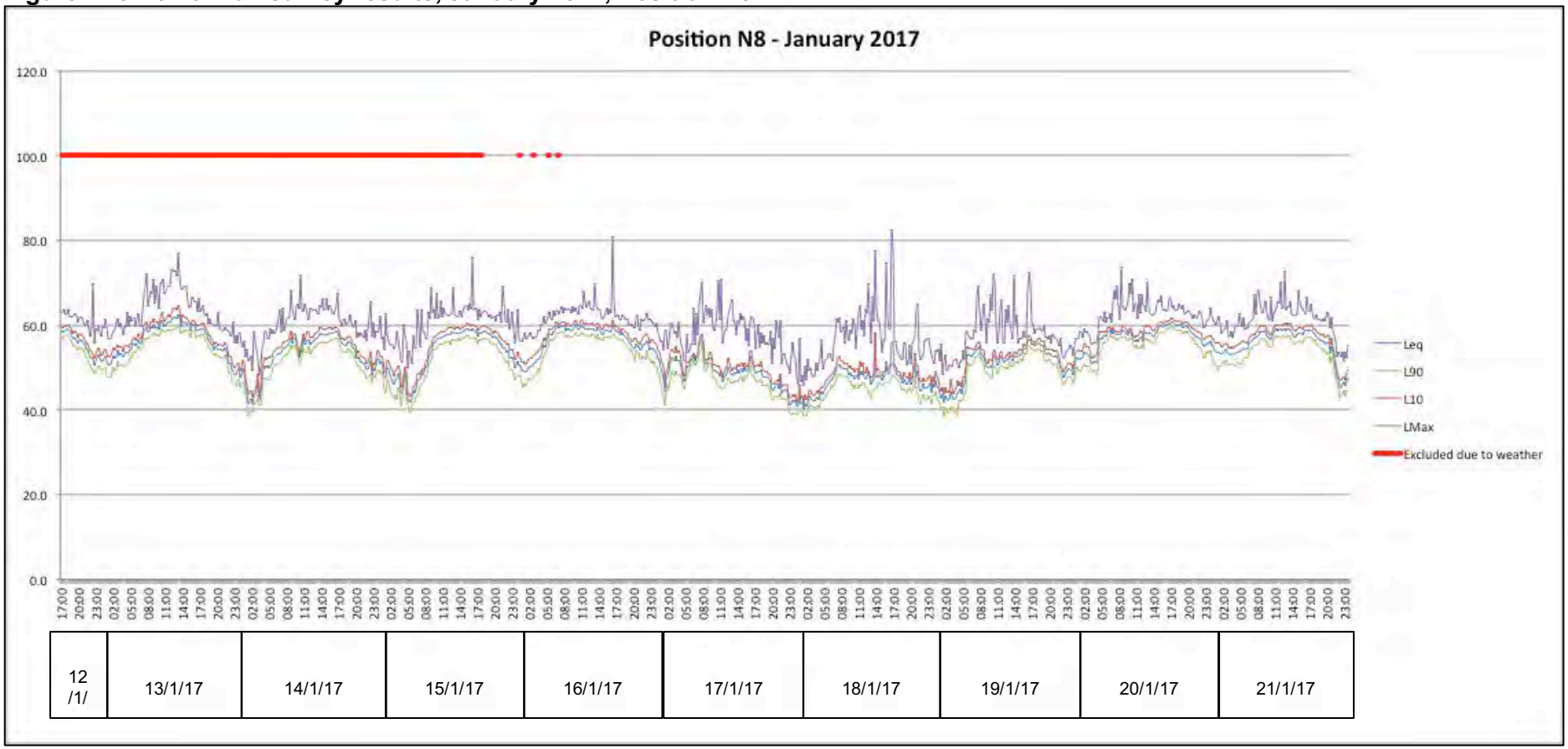
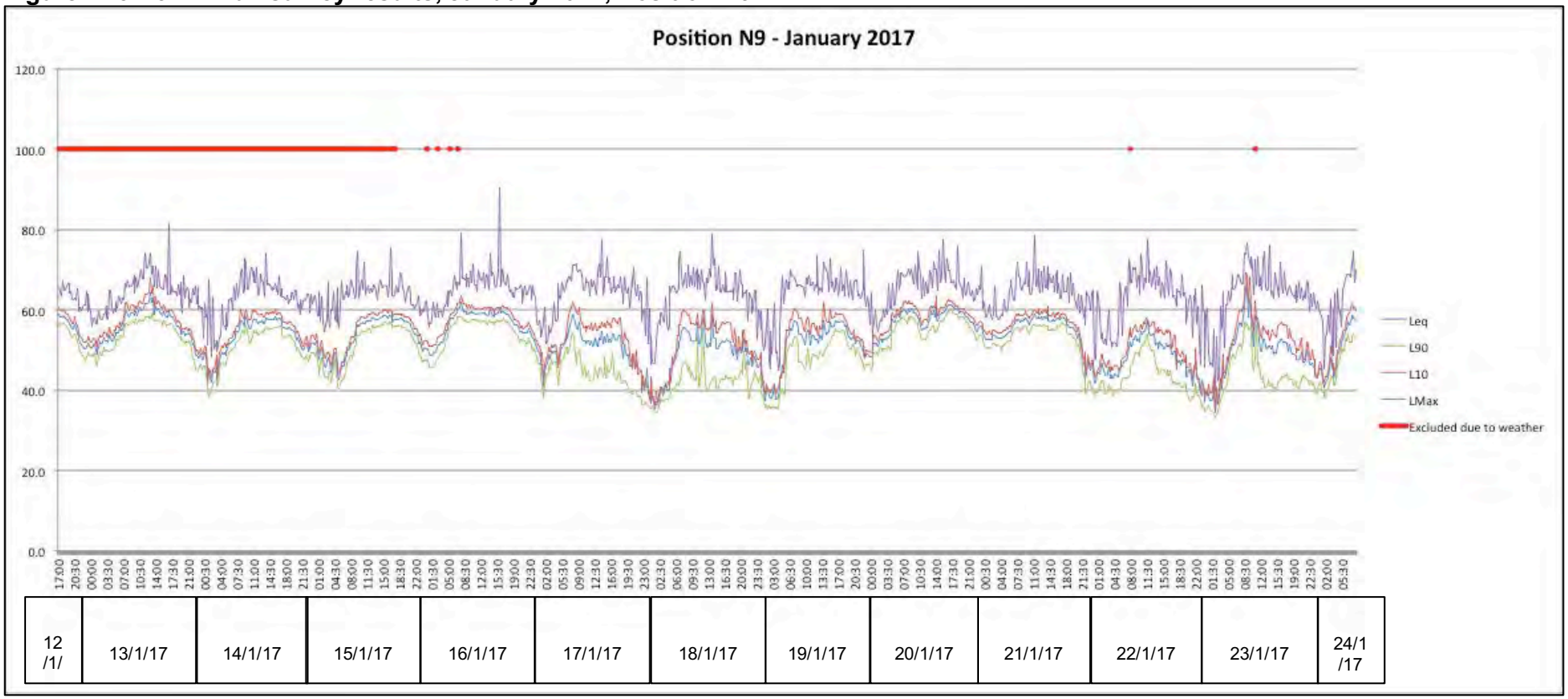


Figure A13A.3.71: Full survey results, January 2017, Position N9



Calibration Certificates for Position N1 – August 2016 Survey

CERTIFICATE OF CALIBRATION

ISSUED BY: **CALIBRATION MAINTENANCE & REPAIR LTD**

DATE OF ISSUE: 2 June 2016 CERTIFICATE NUMBER: **160922**

BS EN ISO 9001:2008 APPROVED BY **LRQA**

CERT No 953910

Home Farm Industrial Park
Norwich Road
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NR10 5PQ
Tel: +44 1603 279557
Fax: +44 1603 278008

Approved Signatory

Electronically Authorised Document

- ☐ P K CLARK
- ☐ R J WADE
- ☒ M A FROST
- ☐ M S PARDOE

Customer	**TECL LIMITED** **O/B OF SPL ACOUSTICS LTD**
Order No	**TECL/P00064/010616**
Equipment Description	**SOUND LEVEL METER**
Manufacturer	**LARSON DAVIS**
Model	**820**
Serial No	**1350**
Ident No	**SPL A**
Date Of Calibration	**2 JUNE 2016**

INSTRUMENT CONDITION	
Adjustments Made	**YES**
Repairs Made	**NO**

ENVIRONMENT

The instrument was placed in the laboratory environment for a minimum period of 4 hours and was operated prior to calibration.

Measurements were made in ambient conditions of 22°C ± 3°C and 45% ± 15% RH.

PROCEDURE

Measurements were performed in accordance with the in house laboratory procedure 0265
All equipment used has been calibrated/verified against measurement standards or reference equipment traceable to International or National Measurement Standards as specified in our control procedure WI64
The results attached to this certificate refer to measurements made at the time of test and not to the instrument's ability to maintain calibration.
The attached results are a true record of the levels required to return the instrument to the original stated manufacturer's specification and accuracy where known.

CERTIFICATE OF CALIBRATION

ISSUED BY: **CALIBRATION MAINTENANCE & REPAIR LTD**

BS EN ISO 9001:2008 APPROVAL CERTIFICATE No. 953910

CERTIFICATE NUMBER
160922

INSTRUMENTS USED

EQUIPMENT	SERIAL No	CERTIFICATE No	CAL DUE
Bruel & Kjaer 4226	2952856	U19912	26 Oct 2016

Notes:

MEASUREMENT UNCERTAINTIES

The expanded uncertainty quoted refers to the measured values only, with no account being taken of the instruments ability to maintain its calibration. The expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%.

PARAMETER	RANGE	EXPANDED UNCERTAINTY
d.c. Resistance	0.01Ω - 400MΩ	± 409ppm
	400MΩ - 1TΩ	± 1%
d.c. Voltage	0V – 1kV	± 79ppm
d.c. Voltage	1.01kV-15kV	± 2.2%
d.c. Current	0mA – 20A	± 437ppm
a.c. Voltage	0mV – 1.05kV	± 1.2%
a.c. Current	0mA – 20A	± 0.5%
Frequency	0.5Hz – 20GHz	± 0.1ppm
Capacitance	0.5nF – 40mF	± 1.1%
Time	0 - 1 Hour	± 1s
Distortion	10mV - 100V	± 1.4mV
Temperature (Dry Block)	-30°C - 350°C	± 1%
Temperature (Simulation)	-270°C - 1800°C	± 0.57%
Pressure	10mBar - 35Bar	± 0.04%
Torque	0.1 - 1100Nm	± 0.5%
Weight	2g - 157kg	± 0.03%
Humidity	0% - 90%	± 1%
Shock & Impulse Hammers		± 4%
Spring Hammers		± 0.015J
Sound	Frequency	± 0.06%
Sound	Level	± 0.16dB
Tachometers	60rpm - 96000rpm	± 0.1%
Anemometers	2.5m/s to 15m/s	± 2.0%
Vibration Meters	10Hz - 1kHz	± 5%
Vibration Calibrators		± 3%
Mechanical Measurement	<200mm	± 0.0003mm
	>200mm	± 0.002mm
Inductance		± 0.1%
Power (VA)		± 1%
Power (RF)		± 0.5dB

CERTIFICATE OF CALIBRATION

ISSUED BY: **CALIBRATION MAINTENANCE & REPAIR LTD**

BS EN ISO 9001:2008 APPROVAL CERTIFICATE No. 953910

CERTIFICATE NUMBER

160922

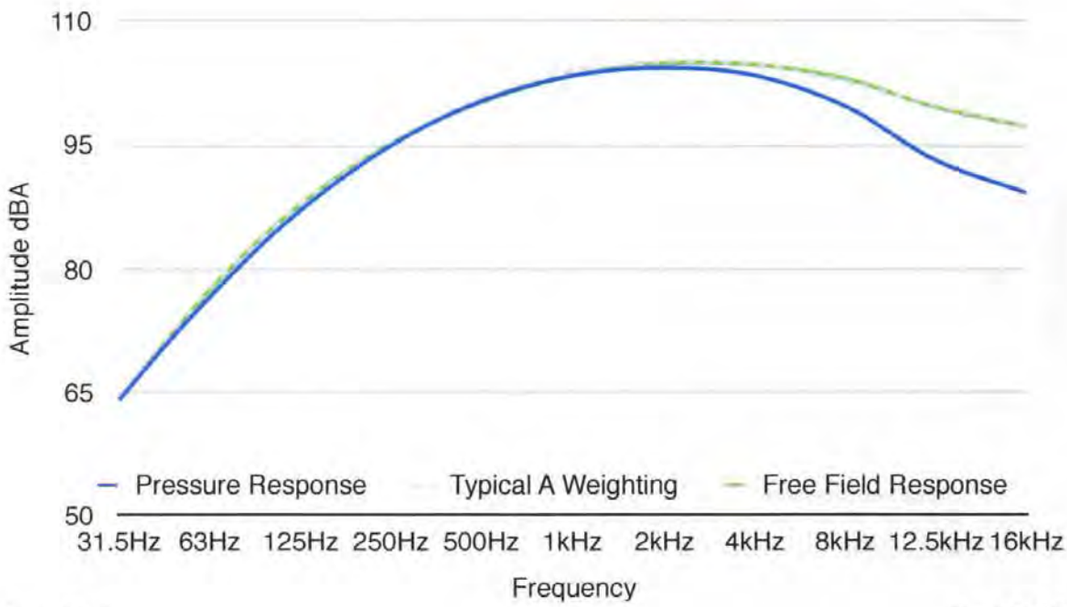
RESULT SHEET 0265 - 820 SOUND LEVEL METER

AS FOUND

1) FREQUENCY RESPONSE

A Weighted

Applied Freq	Applied Level	A Weighting Typical	Indicated Pressure Response	Free Field Response	Units	Error % Pressure	Error % FFR
31.5Hz	104.0	64.471	64.0	64.0	dBA	-0.73	-0.73
63Hz	104.0	77.777	77.4	77.4	dBA	-0.48	-0.48
125Hz	104.0	87.811	87.7	87.7	dBA	-0.13	-0.13
250Hz	104.0	95.325	95.2	95.2	dBA	-0.13	-0.13
500Hz	104.0	100.752	100.5	100.5	dBA	-0.25	-0.25
1kHz	104.0	104.000	103.5	103.7	dBA	-0.48	-0.31
2kHz	104.0	105.202	104.4	104.9	dBA	-0.76	-0.33
4kHz	104.0	104.964	103.5	104.6	dBA	-1.39	-0.35
8kHz	104.0	102.855	99.8	103.1	dBA	-2.97	0.21
12.5kHz	104.0	99.750	93.2	99.6	dBA	-6.57	-0.13
16kHz	104.0	97.300	89.2	97.2	dBA	-8.32	-0.08



CERTIFICATE OF CALIBRATION

ISSUED BY: **CALIBRATION MAINTENANCE & REPAIR LTD**

BS EN ISO 9001:2008 APPROVAL CERTIFICATE No. 953910

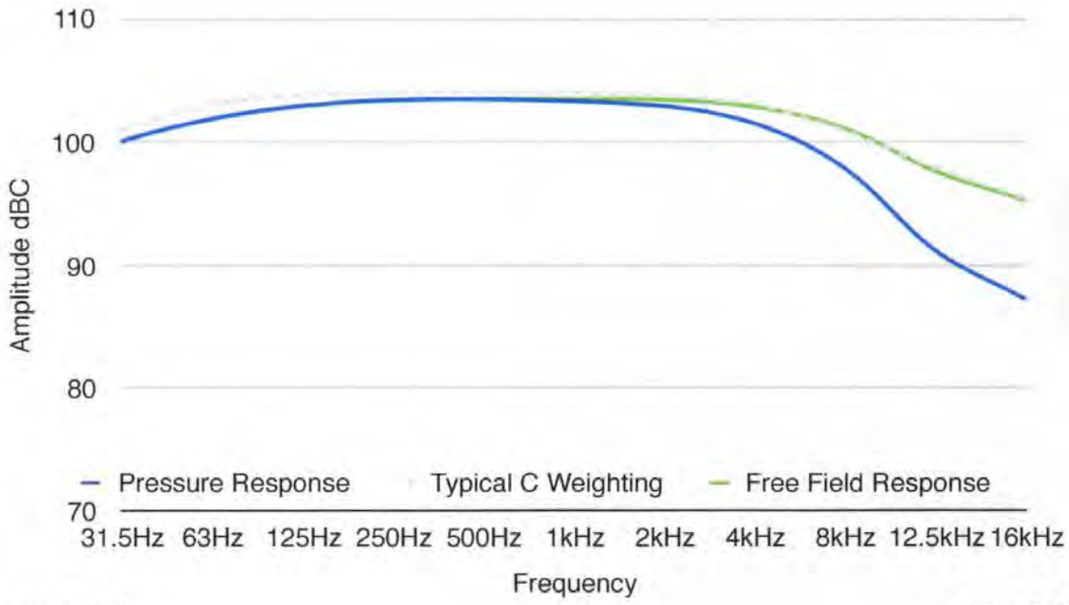
CERTIFICATE NUMBER

160922

RESULT SHEET 0265 - 820 SOUND LEVEL METER

1) FREQUENCY RESPONSE (Continued)
C Weighted

Applied Freq	Applied Level	C Weighting Typical	Indicated Pressure Response	Free Field Response	Units	Error % Pressure	Error % FFR
31.5Hz	104.0	100.969	100.0	100.0	dBA	-0.96	-0.96
63Hz	104.0	103.179	102.3	102.3	dBA	-0.85	-0.85
125Hz	104.0	103.828	103.1	103.1	dBA	-0.70	-0.70
250Hz	104.0	103.999	103.3	103.3	dBA	-0.67	-0.67
500Hz	104.0	104.033	103.5	103.5	dBA	-0.51	-0.51
1kHz	104.0	104.000	103.3	103.5	dBA	-0.67	-0.50
2kHz	104.0	103.830	103.0	103.5	dBA	-0.80	-0.36
4kHz	104.0	103.175	101.7	102.8	dBA	-1.43	-0.36
8kHz	104.0	100.955	97.8	101.1	dBA	-3.13	0.11
12.5kHz	104.0	97.828	91.2	97.6	dBA	-6.78	-0.21
16kHz	104.0	95.371	87.2	95.2	dBA	-8.57	-0.16



CERTIFICATE OF CALIBRATION

ISSUED BY: **CALIBRATION MAINTENANCE & REPAIR LTD**

BS EN ISO 9001:2008 APPROVAL CERTIFICATE No. 953910

CERTIFICATE NUMBER

160922

RESULT SHEET 0265 - 820 SOUND LEVEL METER

2) ACOUSTIC LEVEL
Lzf

Applied Freq	Applied Level	Limits	Indicated	Units	Error %
1kHz	94.0	±2%	93.5	dB	-0.53
1kHz	104.0	±2%	103.3	dB	-0.67
1kHz	114.0	±2%	113.5	dB	-0.44

CERTIFICATE OF CALIBRATION

ISSUED BY: **CALIBRATION MAINTENANCE & REPAIR LTD**

BS EN ISO 9001:2008 APPROVAL CERTIFICATE No. 953910

CERTIFICATE NUMBER

160922

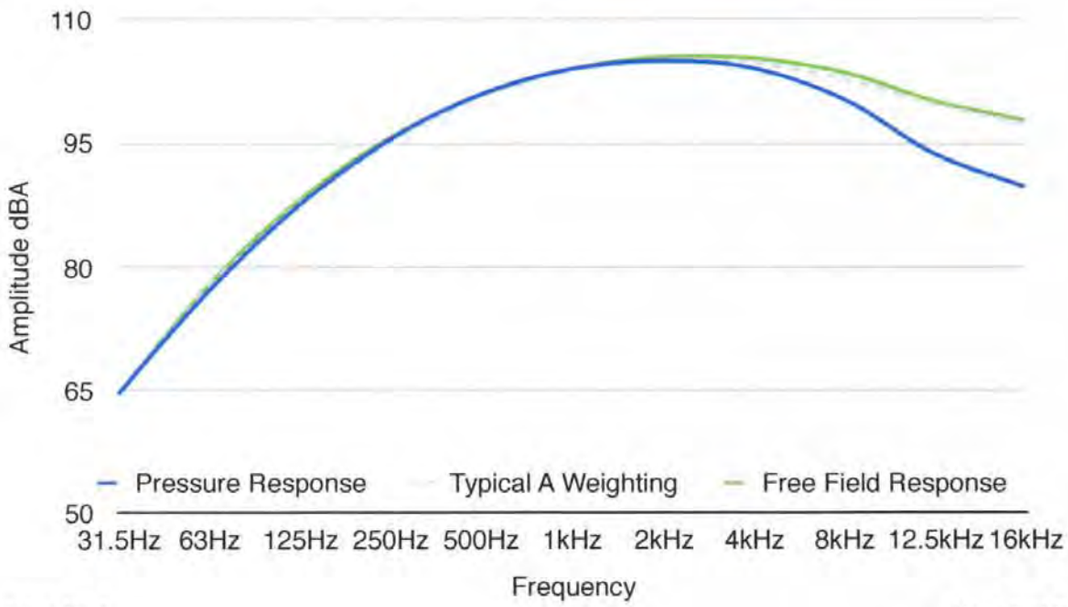
RESULT SHEET 0265 - 820 SOUND LEVEL METER

POST ADJUSTMENT

1) FREQUENCY RESPONSE

A Weighted

Applied Freq	Applied Level	A Weighting Typical	Indicated Pressure Response	Free Field Response	Units	Error % Pressure	Error % FFR
31.5Hz	104.0	64.471	64.5	64.5	dBA	0.04	0.04
63Hz	104.0	77.777	77.8	77.8	dBA	0.03	0.03
125Hz	104.0	87.811	88.1	88.1	dBA	0.33	0.33
250Hz	104.0	95.325	95.7	95.7	dBA	0.39	0.39
500Hz	104.0	100.752	101.1	101.1	dBA	0.35	0.35
1kHz	104.0	104.000	104.0	104.2	dBA	0.00	0.17
2kHz	104.0	105.202	105.0	105.5	dBA	-0.19	0.25
4kHz	104.0	104.964	104.1	105.2	dBA	-0.82	0.22
8kHz	104.0	102.855	100.3	103.6	dBA	-2.48	0.70
12.5kHz	104.0	99.750	93.7	100.1	dBA	-6.07	0.37
16kHz	104.0	97.300	89.7	97.7	dBA	-7.81	0.43



CERTIFICATE OF CALIBRATION

ISSUED BY: **CALIBRATION MAINTENANCE & REPAIR LTD**

BS EN ISO 9001:2008 APPROVAL CERTIFICATE No. 953910

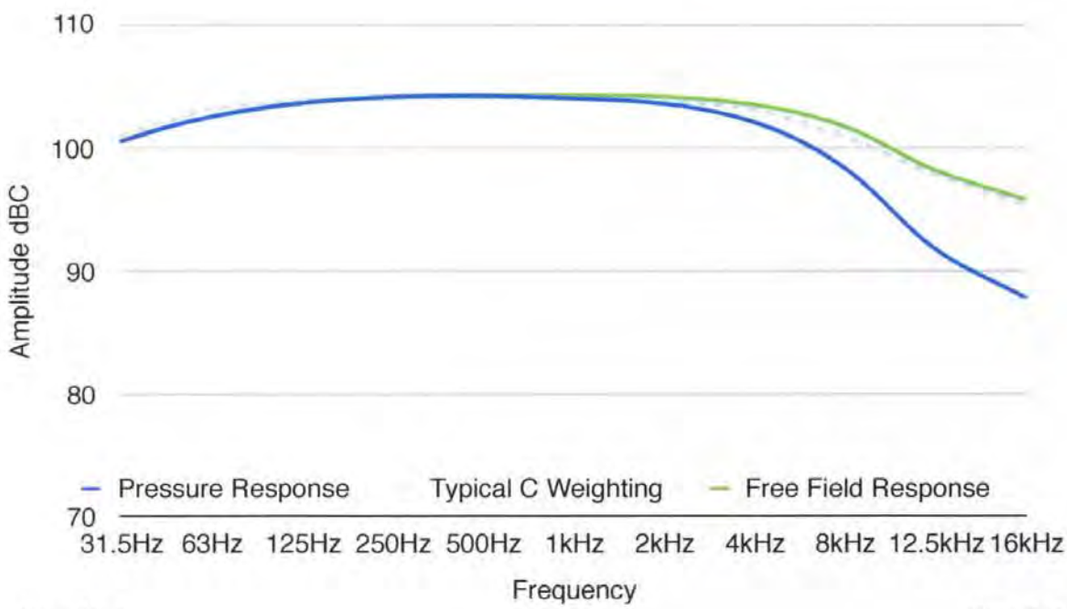
CERTIFICATE NUMBER

160922

RESULT SHEET 0265 - 820 SOUND LEVEL METER

1) FREQUENCY RESPONSE (Continued)
C Weighted

Applied Freq	Applied Level	C Weighting Typical	Indicated Pressure Response	Free Field Response	Units	Error % Pressure	Error % FFR
31.5Hz	104.0	100.969	100.5	100.5	dBA	-0.46	-0.46
63Hz	104.0	103.179	103.0	103.0	dBA	-0.17	-0.17
125Hz	104.0	103.828	103.7	103.7	dBA	-0.12	-0.12
250Hz	104.0	103.999	103.9	103.9	dBA	-0.10	-0.10
500Hz	104.0	104.033	104.0	104.0	dBA	-0.03	-0.03
1kHz	104.0	104.000	104.0	104.2	dBA	0.00	0.17
2kHz	104.0	103.830	103.5	104.0	dBA	-0.32	0.13
4kHz	104.0	103.175	102.3	103.4	dBA	-0.85	0.22
8kHz	104.0	100.955	98.4	101.7	dBA	-2.53	0.71
12.5kHz	104.0	97.828	91.8	98.2	dBA	-6.16	0.40
16kHz	104.0	95.371	87.8	95.8	dBA	-7.94	0.47



CERTIFICATE OF CALIBRATION

ISSUED BY: **CALIBRATION MAINTENANCE & REPAIR LTD**

BS EN ISO 9001:2008 APPROVAL CERTIFICATE No. 953910

CERTIFICATE NUMBER

160922

RESULT SHEET 0265 - 820 SOUND LEVEL METER

2) ACOUSTIC LEVEL
Lzf

Applied Freq	Applied Level	Limits	Indicated	Units	Error %
1kHz	94.0	±2%	94.0	dB	0.00
1kHz	104.0	±2%	104.0	dB	0.00
1kHz	114.0	±2%	114.0	dB	0.00

BATTERIES REPLACED **NO**

	Model	Serial Number
Sound Level Meter	820	1350
Pre-Amplifier	PRM828	1568
Microphone	40AE	37024

COMMENTS
Calibration carried out in accordance with BS7580 part 1 1997, section 5.6.1.

TEST ENGINEER **M A FROST** **DATE 02 JUNE 2016**

Calibration Certificates for Position N2 – August 2016 Survey

CERTIFICATE OF CALIBRATION

ISSUED BY: **CALIBRATION MAINTENANCE & REPAIR LTD**

DATE OF ISSUE: 4 August 2016 CERTIFICATE NUMBER: **162034**

BS EN ISO 9001:2008 APPROVED BY **LRQA**

CERT No 953910

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NR10 5PQ
Tel: +44 1603 279557
Fax: +44 1603 278008

Approved Signatory

Electronically Authorised Document

- ☐ P K CLARK
- ☐ R J WADE
- ☐ M A FROST
- ☒ M S PARDOE

Customer	**SPL ACOUSTICS LTD**
Order No	**EQP/CAL/2016-0802**
Equipment Description	**SOUND LEVEL METER**
Manufacturer	**LARSON DAVIS**
Model	**824**
Serial No	**824A1419**
Ident No	**SPL A**
Date Of Calibration	**4 AUGUST 2016**

INSTRUMENT CONDITION

Adjustments Made	**NO**
Repairs Made	**YES**

ENVIRONMENT

The instrument was placed in the laboratory environment for a minimum period of 4 hours and was operated prior to calibration.

Measurements were made in ambient conditions of 22ºC ± 3ºC and 45% ± 15% RH.

PROCEDURE

Measurements were performed in accordance with the in house laboratory procedure 0266
All equipment used has been calibrated/verified against measurement standards or reference equipment traceable to International or National Measurement Standards as specified in our control procedure WI64
The results attached to this certificate refer to measurements made at the time of test and not to the instrument's ability to maintain calibration.
The attached results are a true record of the levels required to return the instrument to the original stated manufacturer's specification and accuracy where known.

CERTIFICATE OF CALIBRATION

ISSUED BY: **CALIBRATION MAINTENANCE & REPAIR LTD**

BS EN ISO 9001:2008 APPROVAL CERTIFICATE No. 953910

CERTIFICATE NUMBER
162034

INSTRUMENTS USED

EQUIPMENT	SERIAL No	CERTIFICATE No	CAL DUE
Bruel & Kjaer 4226	2952856	U19912	26 Oct 2016

Notes:

MEASUREMENT UNCERTAINTIES

The expanded uncertainty quoted refers to the measured values only, with no account being taken of the instruments ability to maintain its calibration. The expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor *k* = 2, providing a level of confidence of approximately 95%.

PARAMETER	RANGE	EXPANDED UNCERTAINTY
d.c. Resistance	0.01Ω - 400MΩ	± 409ppm
	400MΩ - 1TΩ	± 1%
d.c. Voltage	0V – 1kV	± 79ppm
d.c. Voltage	1.01kV-15kV	± 2.2%
d.c. Current	0mA – 20A	± 437ppm
a.c. Voltage	0mV – 1.05kV	± 1.2%
a.c. Current	0mA – 20A	± 0.5%
Frequency	0.5Hz – 20GHz	± 0.1ppm
Capacitance	0.5nF – 40mF	± 1.1%
Time	0 - 1 Hour	± 1s
Distortion	10mV - 100V	± 1.4mV
Temperature (Dry Block)	-30ºC - 350ºC	± 1%
Temperature (Simulation)	-270ºC - 1800ºC	± 0.57%
Pressure	10mBar - 35Bar	± 0.04%
Torque	0.1 - 1100Nm	± 0.5%
Weight	2g - 157kg	± 0.03%
Humidity	0% - 90%	± 1%
Shock & Impulse Hammers		± 4%
Spring Hammers		± 0.015J
Sound	Frequency	± 0.06%
Sound	Level	± 0.16dB
Tachometers	60rpm - 96000rpm	± 0.1%
Anemometers	2.5m/s to 15m/s	± 2.0%
Vibration Meters	10Hz - 1kHz	± 5%
Vibration Calibrators		± 3%
Mechanical Measurement	<200mm	± 0.0003mm
	>200mm	± 0.002mm
Inductance		± 0.1%
Power (VA)		± 1%
Power (RF)		± 0.5dB

CERTIFICATE OF CALIBRATION

ISSUED BY: **CALIBRATION MAINTENANCE & REPAIR LTD**

BS EN ISO 9001:2008 APPROVAL CERTIFICATE No. 953910

CERTIFICATE NUMBER

162034

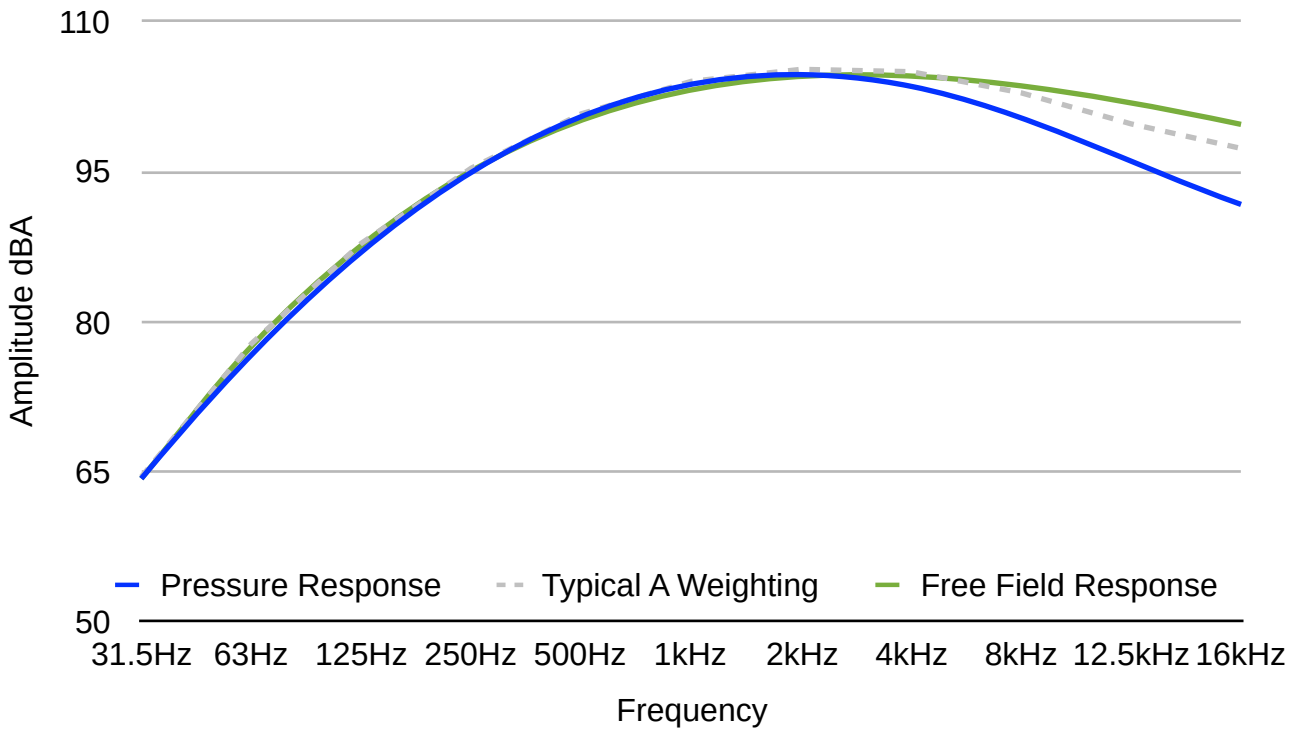
RESULT SHEET 0265 - 820 SOUND LEVEL METER

AS FOUND

1) FREQUENCY RESPONSE - UPDATE FFR VALUES - Currently GRAS 40AE

A Weighted

Applied Freq	Applied Level	A Weighting Typical	Indicated Pressure Response	Free Field Response	Units	Error % Pressure	Error % FFR
31.5Hz	104.0	64.471	64.3	64.3	dBA	-0.27	-0.27
63Hz	104.0	77.777	77.5	77.5	dBA	-0.36	-0.36
125Hz	104.0	87.811	87.6	87.6	dBA	-0.24	-0.24
250Hz	104.0	95.325	95.0	95.0	dBA	-0.34	-0.34
500Hz	104.0	100.752	100.4	100.4	dBA	-0.35	-0.35
1kHz	104.0	104.000	103.6	103.8	dBA	-0.38	-0.21
2kHz	104.0	105.202	104.4	104.9	dBA	-0.76	-0.33
4kHz	104.0	104.964	103.5	104.6	dBA	-1.39	-0.35
8kHz	104.0	102.855	100.0	103.3	dBA	-2.78	0.40
12.5kHz	104.0	99.750	95.6	102.0	dBA	-4.16	2.28
16kHz	104.0	97.300	91.7	99.7	dBA	-5.76	2.49



CERTIFICATE OF CALIBRATION

ISSUED BY: **CALIBRATION MAINTENANCE & REPAIR LTD**

BS EN ISO 9001:2008 APPROVAL CERTIFICATE No. 953910

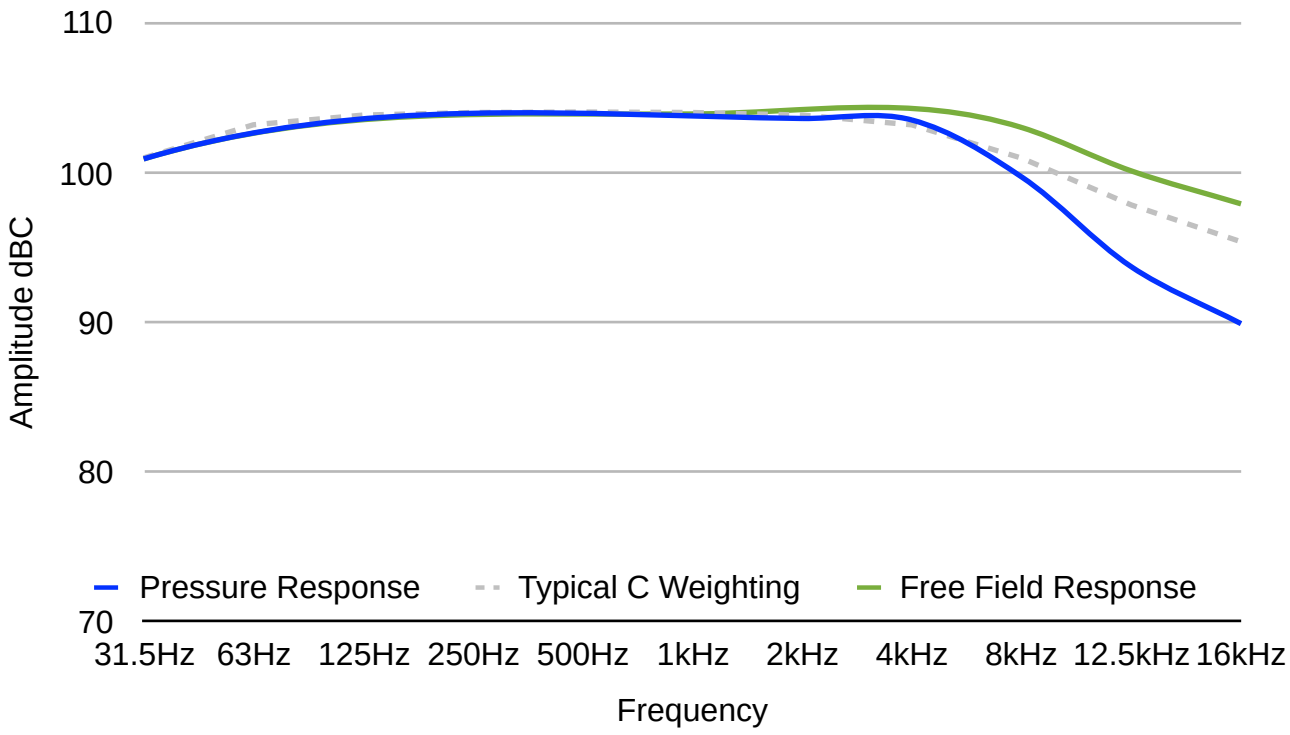
CERTIFICATE NUMBER

162034

RESULT SHEET 0265 - 820 SOUND LEVEL METER

1) FREQUENCY RESPONSE (Continued)
C Weighted

Applied Freq	Applied Level	C Weighting Typical	Indicated Pressure Response	Free Field Response	Units	Error % Pressure	Error % FFR
31.5Hz	104.0	100.969	100.9	100.9	dBA	-0.07	-0.07
63Hz	104.0	103.179	103.1	103.1	dBA	-0.08	-0.08
125Hz	104.0	103.828	103.8	103.8	dBA	-0.03	-0.03
250Hz	104.0	103.999	103.9	103.9	dBA	-0.10	-0.10
500Hz	104.0	104.033	104.0	104.0	dBA	-0.03	-0.03
1kHz	104.0	104.000	103.7	103.9	dBA	-0.29	-0.12
2kHz	104.0	103.830	103.6	104.1	dBA	-0.22	0.22
4kHz	104.0	103.175	103.5	104.6	dBA	0.31	1.38
8kHz	104.0	100.955	99.7	103.0	dBA	-1.24	2.00
12.5kHz	104.0	97.828	93.7	100.1	dBA	-4.22	2.34
16kHz	104.0	95.371	89.9	97.9	dBA	-5.74	2.67



CERTIFICATE OF CALIBRATION

ISSUED BY: **CALIBRATION MAINTENANCE & REPAIR LTD**

BS EN ISO 9001:2008 APPROVAL CERTIFICATE No. 953910

CERTIFICATE NUMBER

162034

RESULT SHEET 0265 - 820 SOUND LEVEL METER

2) ACOUSTIC LEVEL
Lzf

Applied Freq	Applied Level	Limits	Indicated	Units	Error %
1kHz	94.0	±2%	94.0	dB	0.00
1kHz	104.0	±2%	104.0	dB	0.00
1kHz	114.0	±2%	114.1	dB	0.09

BATTERIES REPLACED **YES**

	Model	Serial Number
Sound Level Meter	824	824A1419
Pre-Amplifier	PRM902	2732
Microphone	40AE	31817

COMMENTS
Calibration carried out in accordance with BS7580 part 1 1997, section 5.6.1.

TEST ENGINEER **R J WADE** **DATE 04 AUGUST 2016**

FAULT REPORT

ISSUED BY: **CALIBRATION MAINTENANCE & REPAIR LTD**

BS EN ISO 9001:2008 APPROVAL CERTIFICATE No. 953910

CERTIFICATE NUMBER
162034

Customer	SPL ACOUSTICS LTD
Order No	EQP/CAL/2016-0802
Equipment Description	SOUND LEVEL METER
Manufacturer	LARSON DAVIS
Model	824
Serial No	824A1419
Ident No	SPL A

DETAILS

Battery terminals were so corroded that the unit would not switch on.
Terminals were cleaned as best as possible.
Unit now functions correctly.

TEST ENGINEER **R J WADE** **DATE** **4 AUGUST 2016**

Calibration Certificates for Position N3 – August 2016 Survey

Chapitre 1.

CONSTAT DE VERIFICATION
VERIFICATION CERTIFICATE

CV-DTE-L-15-PVE-32321

DELIVRE PAR :
ISSUED BY :

ACOEM
Service Métrologie

69760 LIMONEST
France

INSTRUMENT VERIFIE
INSTRUMENT CHECKED

Désignation :
Designation :
Sonomètre Intégrateur-Moyenneur
Integrating-Averaging Sound Level Meter

Constructeur :
Manufacturer :
01dB

Type :
Type :
CUBE

N° de serie :
Serial number :
10692

N° d'identification :
Identification number

Date d'émission :
Date of issue :
18/02/15

Ce constat comprend 5 pages
This certificate includes *pages*

LE RESPONSABLE METROLOGIQUE
DU LABORATOIRE
HEAD OF THE METROLOGY LAB

[redacted]

Jean-Claude Périchon

Calibration Certificates for Position N5 – August 2016 Survey

Certificate of Calibration

Issued by University of Salford (Acoustics Calibration Laboratory)
UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801

Page 1 of 2

APPROVED SIGNATORIES
Claire Lomax [x] Andy Moorhouse [ ]
Gary Phillips [ ] Danny McCaul [ ]

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UKAS CALIBRATION 0801

University of Salford MANCHESTER

Certificate Number: 02678/2 Date of Issue: 28 April 2016

VERIFICATION OF A TYPE 1 SOUND LEVEL METER to BS7580 Part 1

FOR:	Resound Acoustics Limited 13 Rother Street Stratford-upon-Avon Warwickshire CV37 6LU
FOR THE ATTENTION OF:	Mike Brownstone
CALIBRATION DATE:	27th and 28th April 2016
TEST PROCEDURE:	CTP08 (Laboratory Manual)

Sound Level Meter						
Manu:	01dB	Model:	Solo	Serial No:	65682	
Microphone						
Manu:	01dB	Model:	MCE212	Serial No:	153491	
Preamp						
Manu:	01dB	Model:	PRE 21 S	Serial No:	16310	
Associated Calibrator						
Manu:	01 dB	Model:	CAL 21	Serial No:	34134139 (2013)	Adaptor: BAC21

Test Engineer (initial): GP Name: Gary Phillips

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to the units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full except with the prior written approval of the issuing laboratory.

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SET-UP INFORMATION

The instrument version was Master 01 V1.405. The reference range, reference SPL, primary indicator range, pulse range and linearity range as specified by the manufacturer have been used. The instrument was adjusted to read 93.9 dB (A) in response to the associated calibrator. This reading was obtained from the calibration certificate of the calibrator, 02678/1 and information in the manufacturer's instruction manual. The instrument was calibrated without a windshield. Consult manufacturer's instructions if using a windshield.

MEASUREMENTS

The levels of self-generated noise were:

A:	**11.7 dB***
B:	**10.9 dB***
C:	**13.4 dB***
Z:	**17.2 dB***

*Under-range indicated on instrument display.

At the end of the tests the indication of the sound level meter in response to the associated sound calibrator was 94.0 dB (A) which corresponds to the following level at 101.325 kPa:

Sound Pressure Level 94.0 dB (A)
This reading should be used henceforth to set up the sound level meter for field use.

THE SOUND LEVEL METER WAS VERIFIED ACCORDING TO THE PROCEDURE GIVEN IN BS7580: Part 1 1997 WITH THE FOLLOWING EXCEPTIONS:

The microphone corrections applied as specified in BS 7580: Part 1: 1997 were obtained from a frequency response measurement by this Laboratory using the electrostatic actuator method. The response in isolation is not covered by our UKAS accreditation.

A stricter test than that specified in 5.5.10 and 5.5.11 of BS 7580 has been used by not applying the low level signal.

STATEMENT OF RESULT:

THE SOUND LEVEL METER CONFORMS TO THE TYPE 1 REQUIREMENTS OF BS7580: PART1 1997.

Instruments used in the verification procedure were traceable to National Standards. The method of acoustic calibration employed a standard sound pressure calibrator for the 1 kHz test whilst the tests at 125 Hz and 8 kHz were performed by the electrostatic actuator method. The uncertainty of the Laboratory's 1 kHz calibrator was ±0.10 dB. The uncertainty of the standard calibrator is not included in the applied tolerances. It is assumed that the sound level meter was manufactured in accordance with BSEN60651: 1994 Type 1, and BSEN60804: 1994 Type 1.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements. All measurement results are retained at the acoustic calibration laboratory for at least four years.

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APPROVED SIGNATORIES
Claire Lomax [ ] Andy Moorhouse [ ]
Gary Phillips [x] Danny McCaul [ ]

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UKAS CALIBRATION 0801

University of Salford MANCHESTER

Certificate Number: 02678/3 Date of Issue: 28 April 2016

VERIFICATION OF A SOUND LEVEL METER / ANALYSER 1/3 OCTAVE FILTER SET MANUFACTURED TO BS EN 61260: 1996
RELATIVE ATTENUATION

FOR: Resound Acoustics Limited
13 Rother Street
Stratford-upon-Avon
Warwickshire
CV37 6LU

FOR ATTENTION OF: Mike Brownstone

DESCRIPTION: Sound level meter/analyser version, Master 01 V1.405 with 1/3 octave filter set manufactured to BS EN 61260: 1996.

DATE OF CALIBRATION: 27/04/2016

TEST PROCEDURE: CTP19 (Laboratory Manual)

Sound Level Meter/Analyser details
Manu: 01dB Model: Solo Serial No: 65682

Filter details

Filter Base: 2 **Filter Class: 1**

Test Engineer (initial): CL Name: Claire Lomax

Certificate Number: 02678/3 Date of Issue: 28 April 2016

INSTRUMENT SET UP

The instrument was adjusted to read 93.9 dB (A) in response to the associated calibrator. This reading was obtained from the calibration certificate of the calibrator, 02678/1 and information in the manufacturer's instruction manual. The instrument was calibrated without a windshield. Consult manufacturer's instructions if using a windshield. The instrument was set to measure SPL on the Z-weighting in each of the tested frequency bands. Exact base 2 frequencies have been applied in all of the tests. All tests were performed on the reference level range. The manufacturer's instruction manual available did not specify the upper limit of the Linear Operating range, so an upper limit of 130 dB has been assumed and signals applied at a level 1 dB below the assumed upper limit. The test signals were applied to the preamplifier of the instrument, a PRE 21 S, serial number 16310, via an appropriate input adaptor.

RELATIVE ATTENUATION TESTS

The Relative Attenuation of the combination of filter set and sound level meter was tested over the following frequency ranges:-
1/3 octave filter bands from 20 Hz to 20 kHz

RELATIVE ATTENUATION TEST RESULTS

Class 1 tolerances: Table1 of BS EN 61260:1996
Results: 20 Hz to 12.5 kHz Pass.

NOTE: The 16 kHz and 20 kHz filter bands both failed the Relative Attenuation test at a single test point. See results on page 3 of this certificate for the actual results. However, this failure is in line with the manufacturer expectations given in Chapter 2, Page 12 of the manufacturer instruction manual, reference: DOC1110 December 2012 C - SOLO Black Edition Technical Manual GB.

Uncertainty of measurement within filter pass-band: 0.19 dB coverage factor k=2
Uncertainty of measurement outside filter pass-band: 0.21 dB coverage factor k=2

NOTE:
These results apply only to the tested filter bands and do not imply that any untested filter bands would also pass the reported test. The results are only valid for the combination of filter set and sound level meter / analyser tested.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

All measurement results are retained at the acoustic calibration laboratory for at least four years.

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Certificate Number: 02678/3 Date of Issue: 28 April 2016

16 kHz and 20 kHz Relative Attenuation test results.

Test 1/3 octave filter X= 12 fexact=16000.0 Hz class 1

Nominal f[Hz]	Measured L[dB]	LoLim [dB]	HiLim [dB]	Result [Pass/Fail]
2944.02	41.1	0	59	Pass
5212.5	55.3	0	68	Pass
8479.3	75.8	0	87	Pass
12349	104.2	0	111.5	Pass
14254.4	125.4	124	127	Pass
14709.1	128.2	127.7	129.3	Pass
15152.4	128.8	128.4	129.3	Pass
15583	128.8	128.6	129.3	Pass
16000	128.9	128.7	129.3	Pass
16428.1	128.9	128.6	129.3	Pass
16895	128.9	128.4	129.3	Pass
17404.2	128.8	127.7	129.3	Pass
17959.4	126.1	124	127	Pass
20730.4	88.2	0	111.5	Pass
30191.2	0	0	87	Pass
49112.7	3.8	0	68	Pass
86955.9	**64.9**	**0**	**59**	**FAIL**

Test 1/3 octave filter X= 13 fexact=20158.7 Hz class 1

Nominal f[Hz]	Measured L[dB]	LoLim [dB]	HiLim [dB]	Result [Pass/Fail]
3709.24	45.4	0	59	Pass
6567.33	60.9	0	68	Pass
10683.2	82.2	0	87	Pass
15558.8	108.4	0	111.5	Pass
17959.4	125.8	124	127	Pass
18532.3	128.2	127.7	129.3	Pass
19090.8	128.9	128.4	129.3	Pass
19633.4	129	128.6	129.3	Pass
20158.7	129.1	128.7	129.3	Pass
20698.2	129.1	128.6	129.3	Pass
21286.4	129	128.4	129.3	Pass
21927.9	129	127.7	129.3	Pass
22627.4	126.2	124	127	Pass
26118.7	11.6	0	111.5	Pass
38038.5	11	0	87	Pass
61878.2	19.9	0	68	Pass
109558	**61.8**	**0**	**59**	**FAIL**