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Fjardaal Smelter Project

Noise Survey 2005

October 2005

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October 2005

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Approved	

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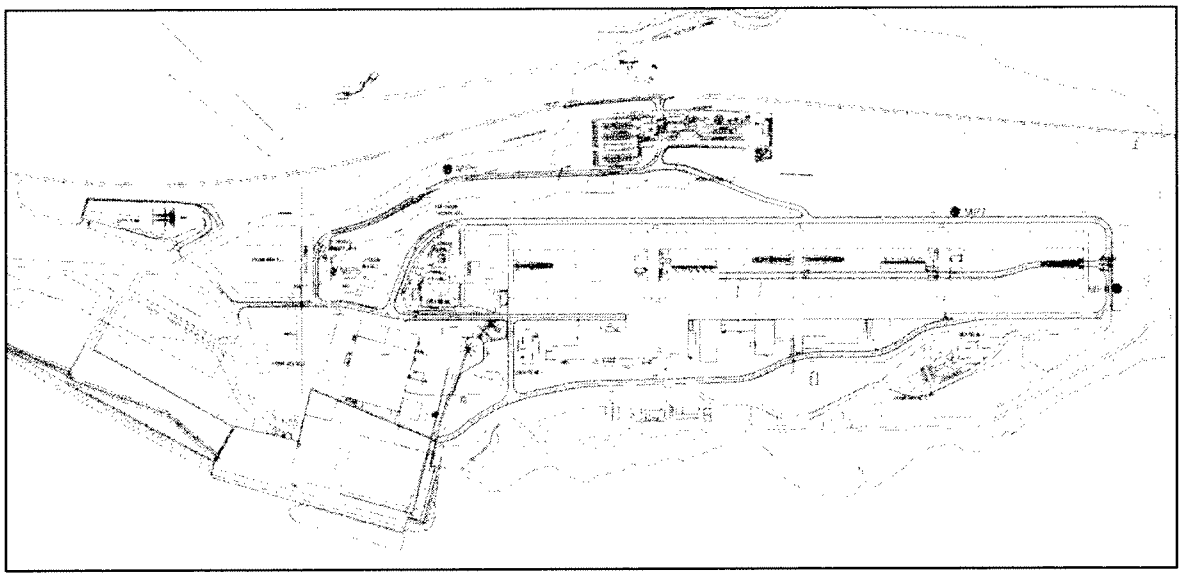
1 Preface

Prior to the construction phase and the later operation of the Fjardaal Smelter a baseline noise survey was carried out in June 2004. This year the first noise survey during the construction phase has been carried out. This year's survey shows the noise levels near the construction site boundary.

The survey was carried out during a period of 3 days in the week 38, 2005 started Monday September 19th and finished Wednesday September 21st. COWI employees Rikke J. Lemberg and Rasmus Krogh were carried out the survey.

2 Measurement positions

The noise measurements were carried out in 4 positions near the site boundary. Each position is shown on the map below with a red dot and described in the table underneath it.



A larger map can be seen in appendix 1.

Measurement position	Coordinates(*)		Description
	LON / westing	LAT / northing	
5	4121.590	2033.360	Western site boundary
6	4340.330	2225.304	Northern site boundary
7	5295.060	2141.850	Northern site boundary
8	5600.150	1995.310	Eastern site boundary

(*) Local Fjardaal datum.

2.1 Specific description

2.1.1 Measurement position 5

Measurement position no. 5 (MP 5) is located near the sites western gate. Significant noises sources during the measurement period near MP 5 are:

- trucks and cars on internal road no. 1
- maintenance area (east of MP 5)
- earthwork

2.1.2 Measurement position 6

Measurement position no. 6 (MP 6) is located near the western diversion channel. Significant noise sources during the measurement period near MP 6 are:

- trucks and cars on internal road no. 1
- laydown area no. 5 (temporary storage area)
- workshop

2.1.3 Measurement position 7

Measurement position no. 7 (MP 7) is located near the internal road no. 8. Because of problems with liquid clay in the overburden, the survey team was not allowed to measure closer to the site boundary. Significant noise sources during the measurement period near MP 7 are:

- haul- and dump trucks on internal road no. 6
- earthwork
- stone crusher
- excavators

2.1.4 Measurement position 8

Measurement position no. 8 (MP 8) is located near the eastern part of the pot-line, close to internal road no. 12. Significant noise sources during the measurement period near MP 8 are:

- haul and dump trucks on internal road no. 10 & 13
- earthwork
- stone crushers
- excavators
- roughening of foundations (pneumatic tool)

3 Conditions during the measurement

The noise measurement periods were selected to ensure the appropriate measurement conditions in compliance with the requirements in the Icelandic (and Nordic) standard.

3.1 Meteorological conditions

The meteorological conditions during each of the measurements are listed below. The cloudiness is defined as a fraction where 0/8 means clear sky and 8/8 means completely clouded over. The wind direction is given by direction of the compass.

Meas. pos	Period	Cloudiness	Temperature	Wind speed	Wind direct.
5	Day	6/8	6 °C	3 m/s	V
	Evening	1/8	5 °C	1 m/s	V
	Night	8/8	2 °C	< 1 m/s	Shifting
6	Day	2/8	12 °C	2 m/s	V
	Evening	8/8	6 °C	< 1 m/s	Shifting
	Night	2/8	0 °C	< 1 m/s	Shifting
7	Day	7/8	8 °C	2 m/s	E
	Evening	3/8	5 °C	< 1 m/s	Shifting
	Night	8/8	2 °C	< 1 m/s	Shifting
8	Day	7/8	6 °C	2 m/s	E
	Evening	8/8	3 °C	2 m/s	V
	Night	8/8	2 °C	2 m/s	V

The wind direction does not completely comply with the meteorological window in all of the measurements. The meteorological window says the measurement shall be done with rear-on wind. Because of the relative short measurement distance to the sources and the very low wind speeds it will not have any (or very little) influence on the results.

3.2 Background noise

The only background noise was noise from traffic on the road no. 92 from Reyðarfjörður to Eskifjörður. The background noise levels were not significant and the measurements need not to be adjusted.

3.3 Day and time of measurement

The noise measurements were carried out from Monday September 19th to Wednesday September 21st covering the three time periods; day (07h-18h) , evening (18h-23h) and night (23h-07h).

All activities at the site during the measurements have been considered representative.

3.4 Work in progress during the survey

Major works in progress during the survey period:

- Potline Site Development (earthwork)
- Installation of Concrete Foundations for Potline
- Installation of Precasted Concrete Elements
- Gas Treatment Center and Stack Foundations (Potline)
- Structural Steel Erection

4 Measurements and analyses

The noise measurements were carried out according to the procedures as described in the Nordic standard NT ACOU 080: "Industrial plants: Noise emission".

4.1 Equipment and software

Instrument	Type	Serial number
Microphone	G.R.A.S 40AE	34349
Preamplifier	01dB-Stell Pre 12Hn	11042
Data Acquisition card	01dB Symphonie	01019
Laptop PC	HP/Compac nc6220	CNU509FTGZ
Sound Level Calibrator	Brüel & Kjær - 4230	1440808
Anemometer	Skywatch Eole	-
Acquisition software	01dB - dBTRIG	ver. 4.61
Analysis software	01dB - dBTRAIT	ver. 4.610

4.2 Procedure of the measurements and analyses

The measurements were carried out as supervised, manned measurements. The measurements were taken in a number of selected, representative one hour periods in all three time periods (day, evening and night). All measurements were recorded using a PC-based acquisition system and later analysed in our laboratory. The analyses give; L_{Aeq}, L_{10}, L_{50}, L_{90} and L_{Amax}. L_{10}, L_{50} and L_{90} show the noise level that is exceeded in 10%, 50% and 90% of the measurement time. L_{90} may be considered as the average minimum noise level (often considered as the true background level).

5 Results

5.1 Equivalent noise and fractiles

The results of the analyses are shown in the table below.

Measurement position no.	Day period	L_{Aeq} [dB(A)]	L_{10} [dB(A)]	L_{50} [dB(A)]	L_{90} [dB(A)]	L_{Amax} [dB(A)]
5	Day	61	64	57	51	81
	Evening	41	44	38	35	63
	Night	53	56	47	40	70
6	Day	62	65	52	43	84
	Evening	61	65	55	39	78
	Night	51	50	41	39	75
7	Day	68	67	60	57	89
	Evening	71	73	61	50	90
	Night	68	70	58	50	89
8	Day	66	67	58	45	94
	Evening	67	65	58	53	92
	Night	65	60	54	48	92

1/3 octave spectrums of each measurement can be seen in appendix 2.

5.2 Noise events

Significant noise events during measurements

MP 5 - Traffic on internal road no. 1, noise from maintenance area (east of MP5) and earthwork (noise from loading of rocks on trucks)

MP 6 - Traffic on internal road no. 1, noise from Sudurwerk workshop (building no. T-303) and noise from activities at laydown area no. 5

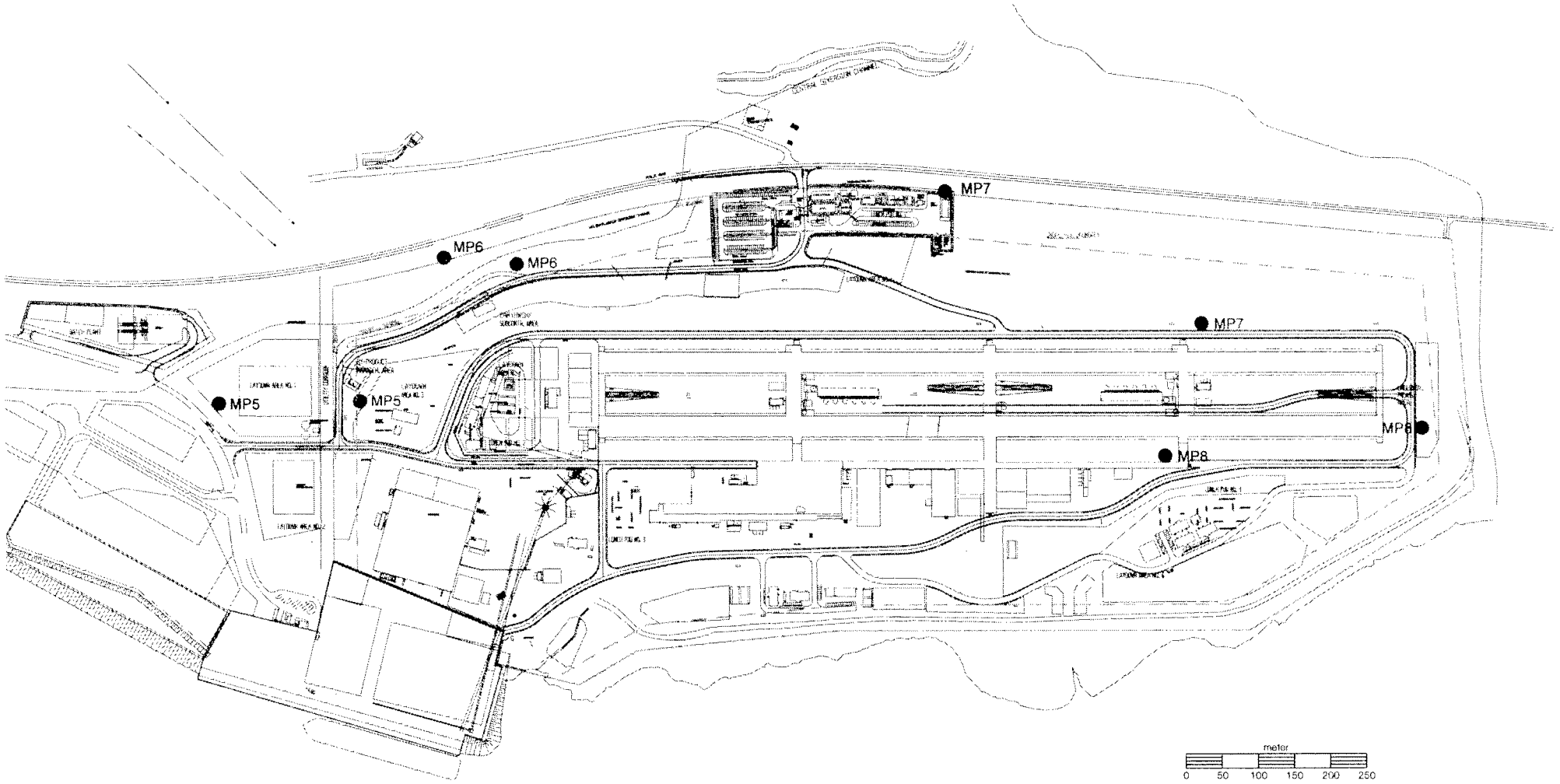
MP 7 - Haul and dump trucks on internal road no. 6, earthwork, stone crushers and excavators

MP 8 - Haul and dump trucks on internal road no. 10 & 13, earthwork, stone crushers, excavators and roughening of foundations (with pneumatic tool)

5.3 Accuracy

The accuracy of the analysed noise levels as presented in section 5.1 is depending on both the accuracy of the measuring chain (± 2dB) and the fluctuations of the noise during the three time periods (day, evening and night). The overall accuracy of the results is estimated to be better than ± 4dB.

Appendix 1 - Measurement positions



Measurement positions

- Survey 2004
- Survey 2005
- Site boundary
- Industrial boundary

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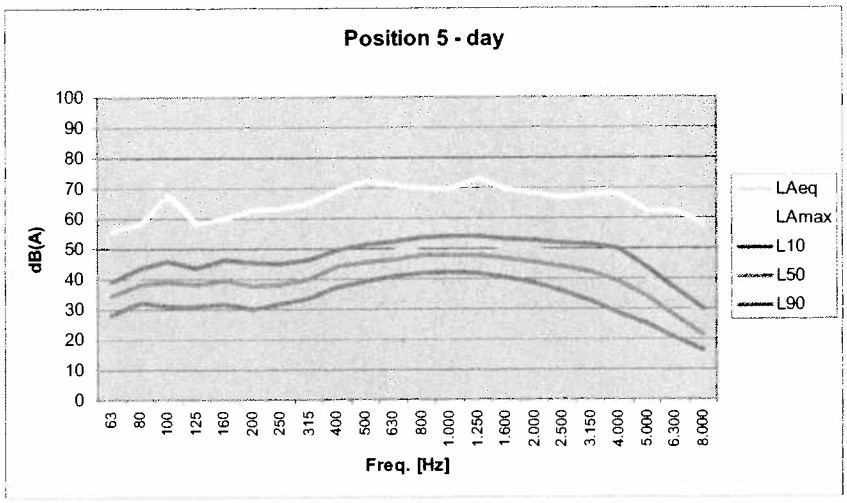
Noise Survey 2005
Measurement positions

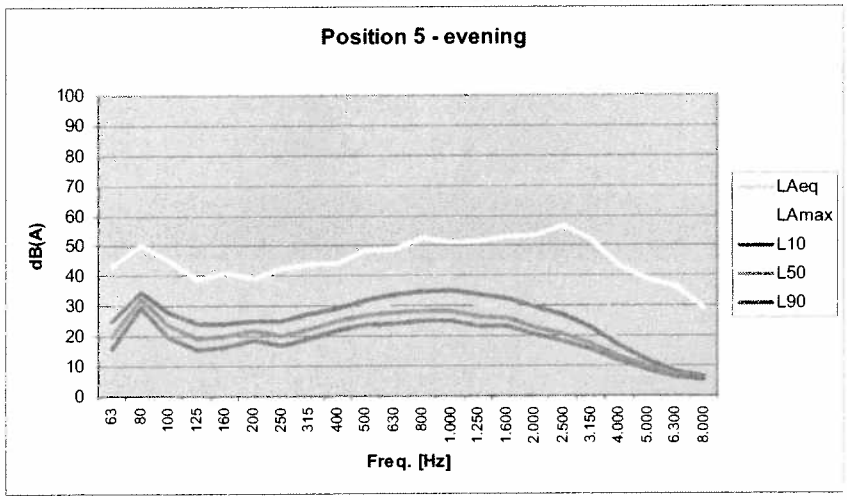
Prepared	Checked	Approved	Date	Scale	Dokument no	Rev
RSK PJN		RSK	01.nov.2005	1:7500	60024-A-1	

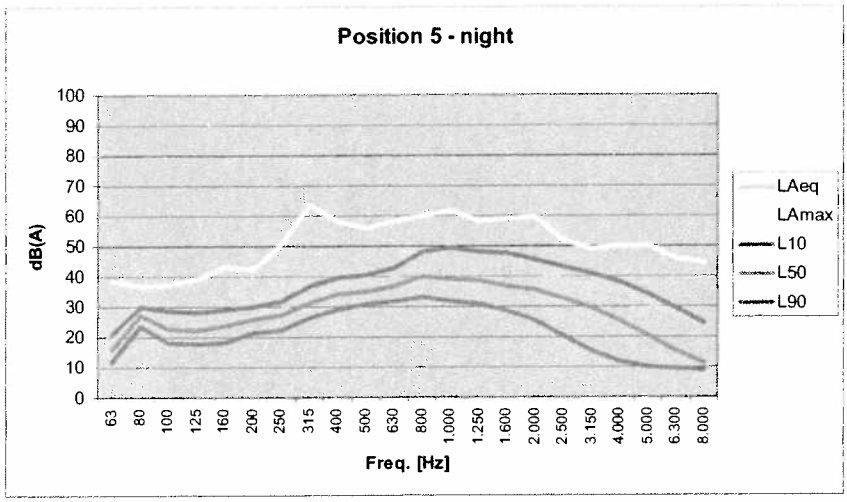
PJN 01-NOV-2005 14:01 p:\60024A\3_Pdoc\CAD\survey 2005\omrade_2005_2D.dgn

Appendix 2 - 1/3 octave spectrum

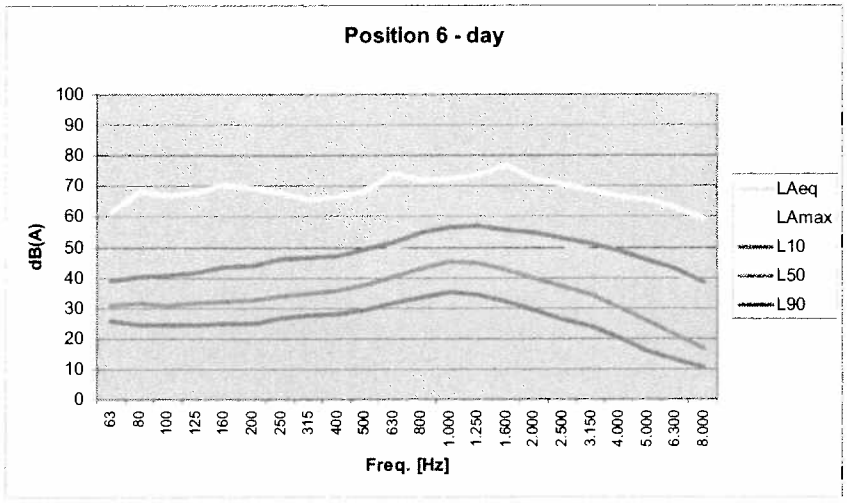
Measurement position 5

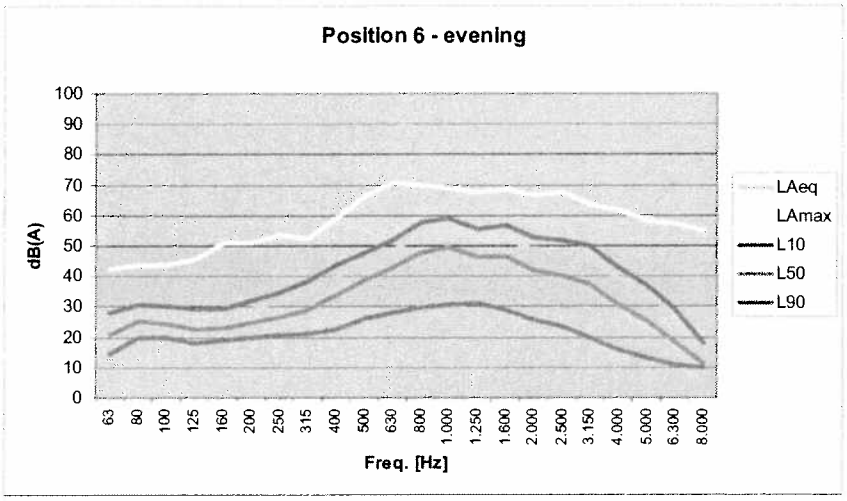


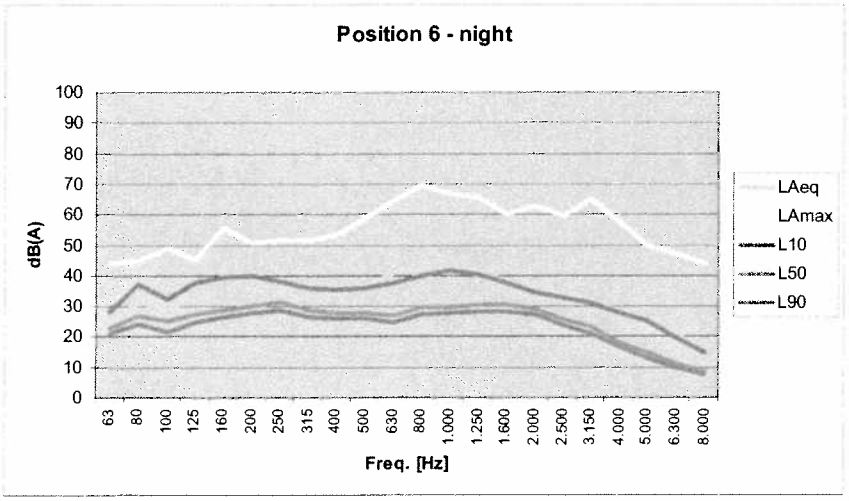




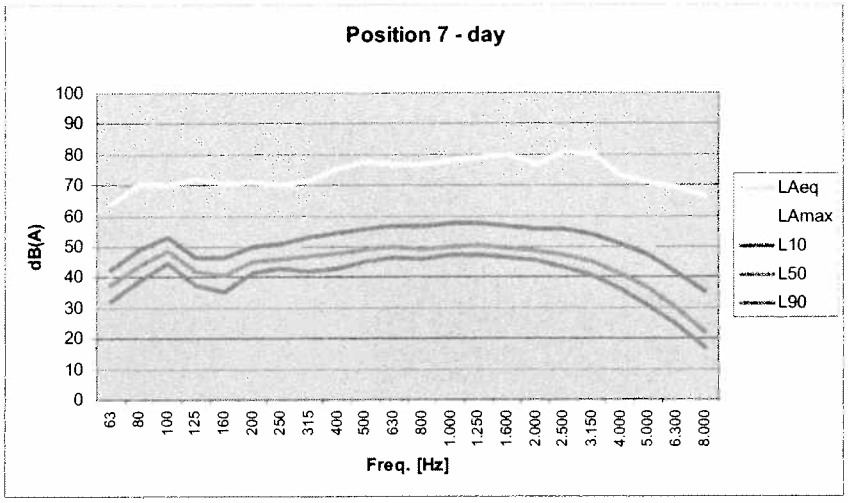
Measurement position 6

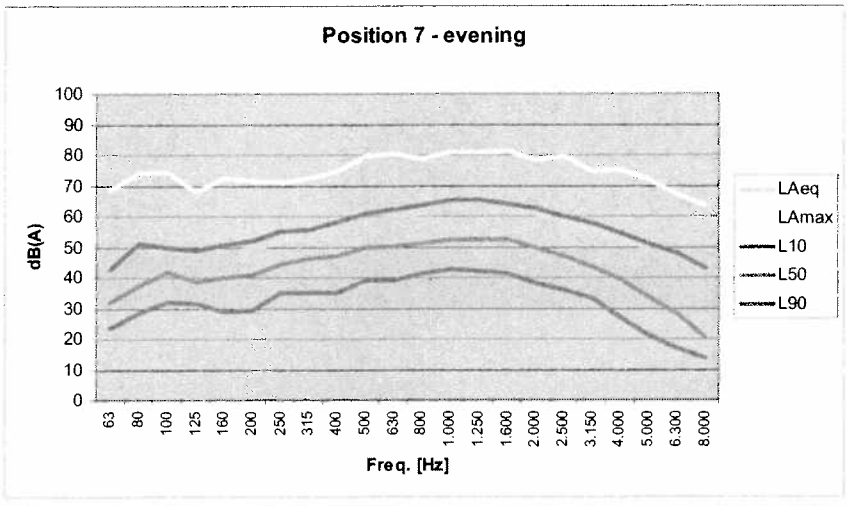


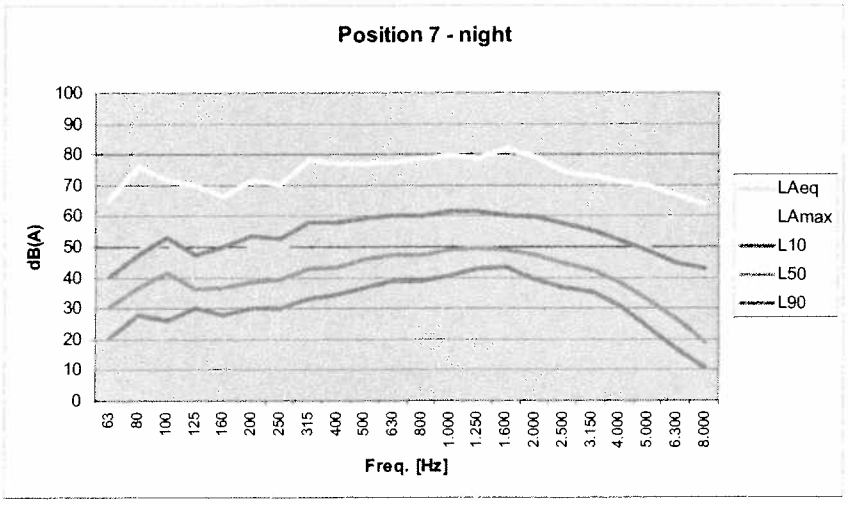




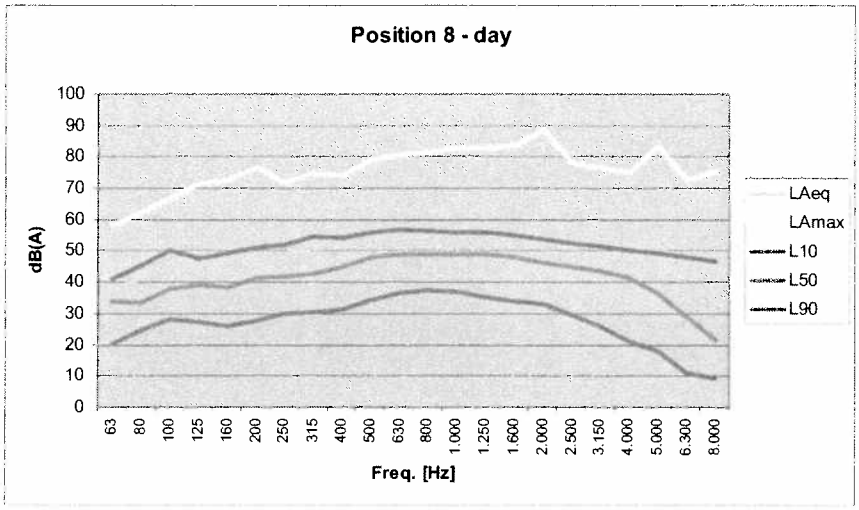
Measurement position 7

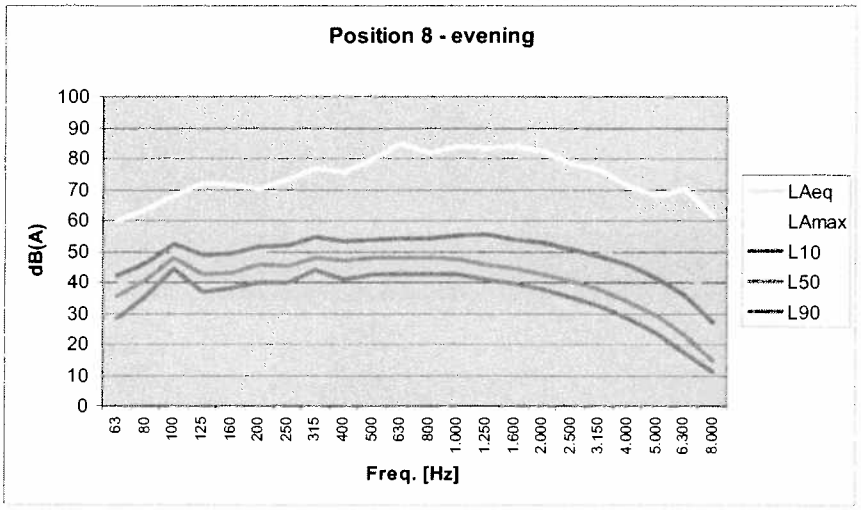


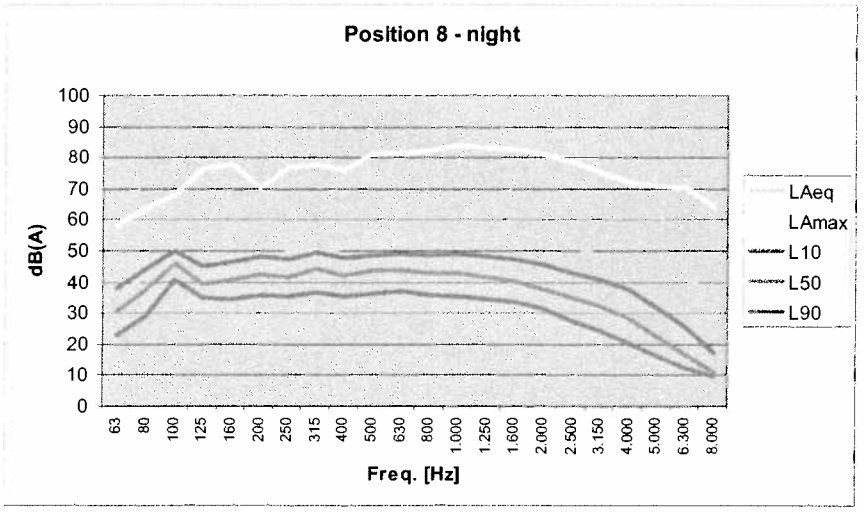




Measurement position 8







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