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TECHNICAL REPORT

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PC Pro - Noise Testing of Video Projectors

1.0 Summary

Intertek RPT were asked to carry out noise measurements for PC Pro on 10 samples of video projector.

Overall, the following observations have been made:

- The noisiest projector measured overall was the Epson EMP-732, which measured 52.3dBA when measured at its brightest setting, from the front.

- The quietest projector at any instance was the Panasonic LB20NTEA, which measured 35.8dBA from the side, with AI (artificial intelligence) turned off. As this value was within 10dB of the background noise, it was corrected to 35.2dBA.

2.0 Introduction

Sound pressure levels for 10 samples of video projector were measured to see how they compared. The projectors were measured in normal and eco modes (where applicable), both from the front and from the side.

3.0 Measurement Method

The measurements were carried out in the laboratory's listening room, designed according to IEC standard (268-13). This room had a low background noise and represented a domestic listening environment.

The sound levels were measured using the 01dB Symphonie sound measurement system. This was used with a ½ " Bruel and Kjaer microphone and pre-amp, where the microphone was positioned at 0.5m from the edge of the device under test. The microphone was placed at this distance, as it represented how far away the user would be from the machine during typical use, for instance if using for a presentation. The system was calibrated before use.

The projectors were measured in normal and eco modes, where applicable. In most cases the economy mode reduced the power output from the bulb, and also reduced the fan noise. In cases where there was no economy mode, brightness levels where reduced to try and reduce the fan noise and give a comparison.

The sample under test was placed on a table, with a reflecting surface behind. The reflecting surface caused noises that were emitted from the rear of the device to be reflected back again in a random manner. This simulated the projector being positioned close to a wall and meant that the projector only needed to be measured from the front and the side, rather than all four sides of the device.

The recorded measurements were averaged over 10 seconds between the frequencies of 20Hz to 20kHz.

4.0 Results

The results are given in dBA, which means that the A-weighting correction has been applied to the measurement. The A-weighting is designed to simulate the response of the human ear, so gives a more meaningful result in terms of perceived loudness.

The noise results are given in Table 4.1

The Background Noise was measured three times during the measurement period. The results are given in the table below.

BGN1	27.1
BGN2	27.3
BGN3	27.3
Average BGN	**27.2**

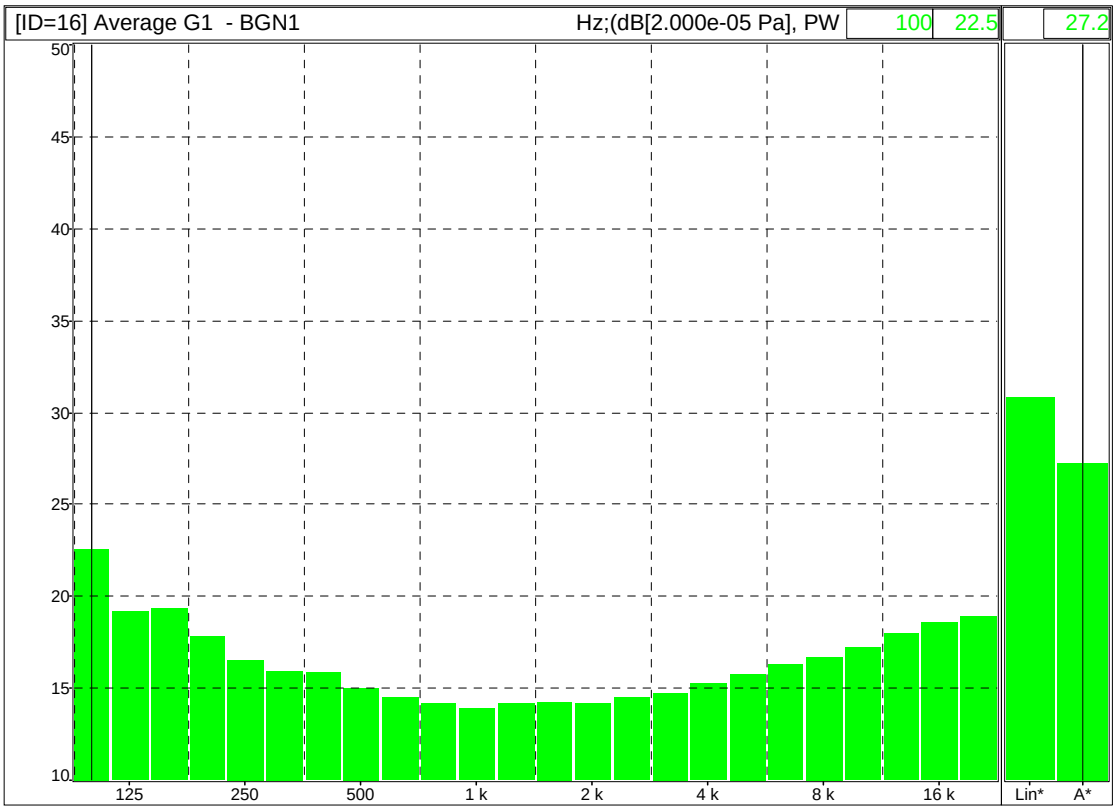
The average background noise level has been used to calculate the correction factors for all the measured results. A correction factor needs to be applied when the measured noise is within 10dB of the background noise level. This correction factor attempts to remove the effects that the background noise has on the result. The results are shown in the following table.

Graphs 4.1 –4.3 show the frequency content of the measured background noise and the loudest and quietest projectors. The graph of the background noise is very useful when comparing with the graphs of sample measurements as it indicates which frequencies are due to the sample noise and which were already present due to the background noise.

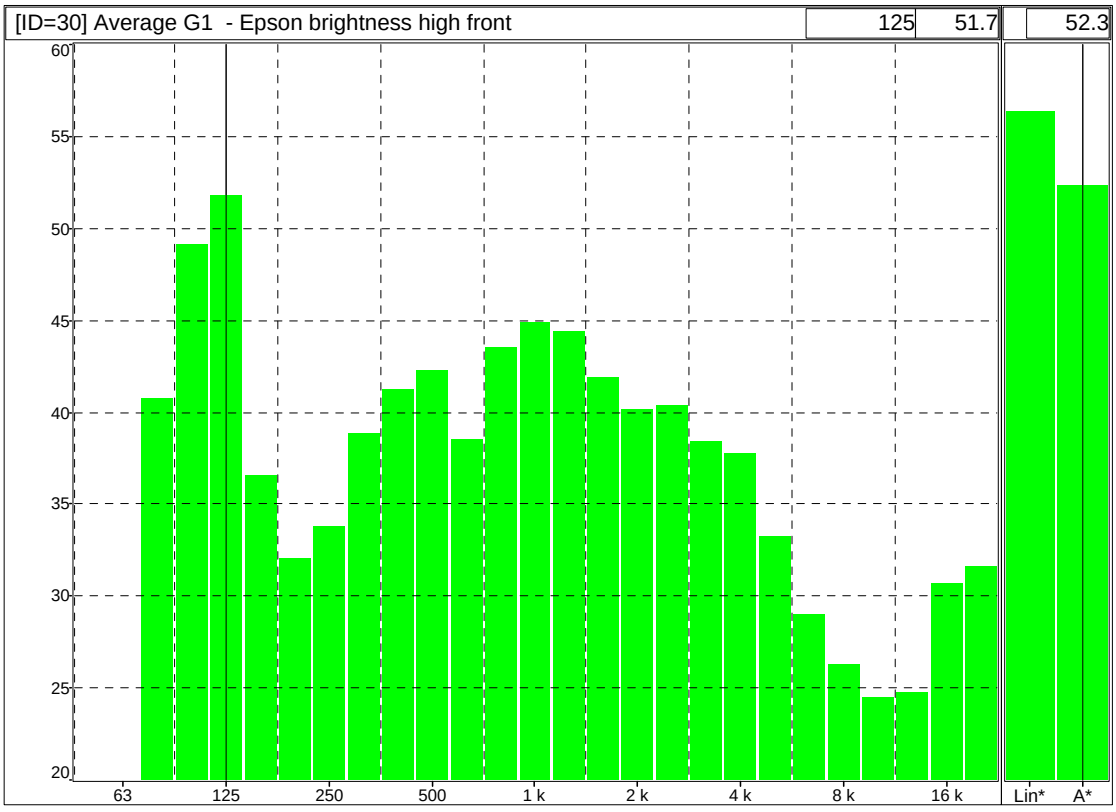
Table 4.1 Measured Noise of Projectors

			Overall Measured Level (dBA)	Corrected level due to BGN (dBA)
BenQ PB2240	Presentation Mode	front	45	45
		side	44.5	44.5
	Eco Mode	front	45.3	45.3
		side	45	45
Canon LV-X4	Brightness full	front	49.4	49.4
		side	47.7	47.7
	Brightness half	front	48.1	48.1
		side	47.5	47.5
Dell 3400MP	Eco off	front	41.9	41.9
		side	41.4	41.4
	Eco on	front	39	39
		side	39.1	39.1
Epson EMP-732	Brightness High	front	52.3	52.3
		side	49.7	49.7
	Brightness Low	front	46.5	46.5
		side	44.1	44.1
hp mp3135	Lampsaver Off	front	39.5	39.5
		side	39.9	39.9
	Lampsaver On	front	37.5	37.5
		side	37.9	37.9
InFocus LP600	Power Normal	front	43.9	43.9
		side	44.7	44.7
	Power Low	front	38.6	38.6
		side	39.3	39.3
Optoma EP739	Eco off	front	41.9	41.9
		side	41.4	41.4
	Eco on	front	39	39
		side	39.1	39.1
Panasonic LB20NTEA	AI on	front	43.5	43.5
		side	45.2	45.2
	AI off	front	37.8	37.8
		side	35.8	35.2
Sharp Notevision XR-1X	Eco off	front	47.7	47.7
		side	49.1	49.1
	Eco on	front	45.6	45.6
		side	45.8	45.8
ViewSonic PJ255D	Brightness Full	front	45.2	45.2
		side	42.7	42.7
	Brightness Normal	front	44.4	44.4
		side	42.8	42.8

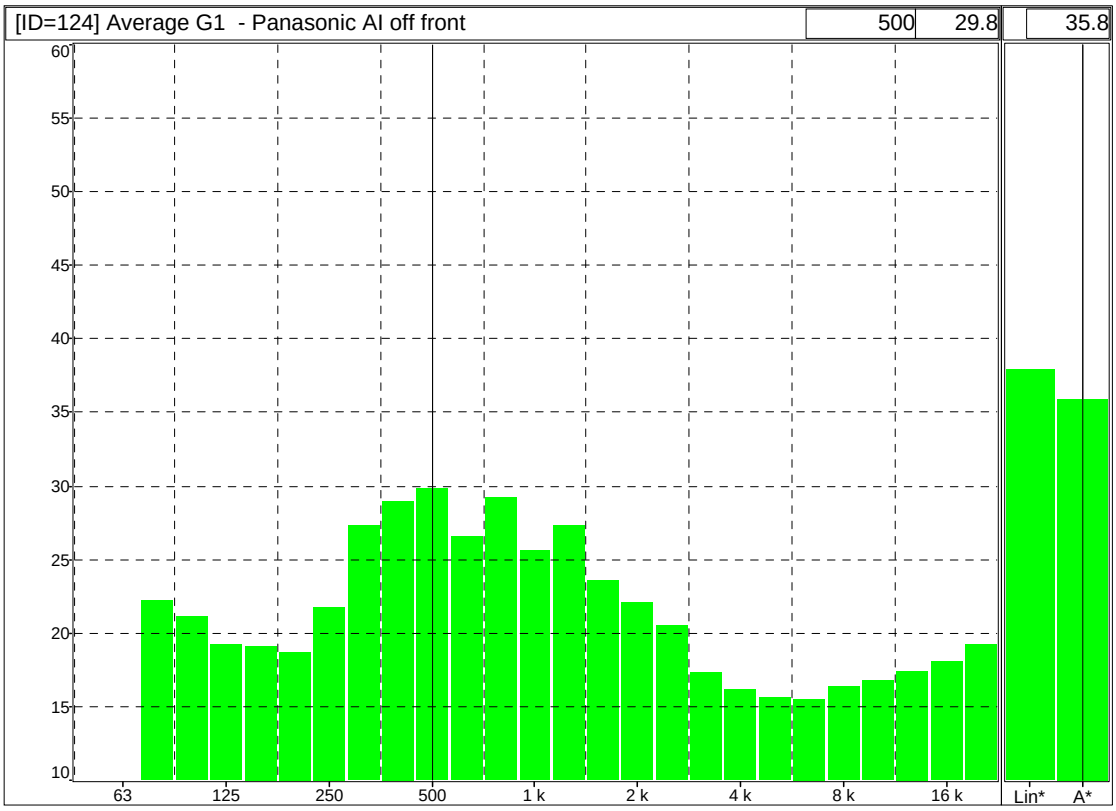
Graph 4.1 Background Noise Measurement



Graph 4.2 Loudest Projector Measured



Graph 4.3 Quietest Projector Measured



5.0 Conclusions

The Epson EMP-732 was the loudest projector on test, measuring 52.3dBA from the front, with its brightness set to high.

The quietest projector overall was the Panasonic, calculated as 35.2dBA once background noise had been accounted for. This result is within 10dB of the background noise, but clearly audible and subjectively still fairly loud. As this particular device was suitable for permanent ceiling mounting, the noise level in this situation may not be a problem.

The overall noise level of the device may not actually indicate how annoying that noise is. For example the noise from a large fan is constant and typically of a low frequency so may be less annoying than the noise from small fans. The ‘annoyance’ factor can only really be found from subjective assessment, though the frequency graphs of the measured noise may help to pinpoint the annoying part of the noise.