Acoustic Design and Testing of Schools

Noise

Presented by

Russell Richardson

&

Ed Clarke

Noise

- Surveys
- Façades
- Plant
- Performance Standards

Noise

What are we trying to achieve?

- Compliance with BB93?
- Better than BB93 (‘gold’ standard)?
- Compliance with the School Premises Regulations / Independent Schools Standards?
- Compliance with the Building Regulations?
- Compliance with The Equality Act?
- Employer’s Requirements (project-specific contract)?
- Reasonable acoustic environment for learning?

Surveys

Surveys

What are we trying to achieve?

- Environmental noise impact on the school
- School noise impact on the neighbours
- School noise impact on itself

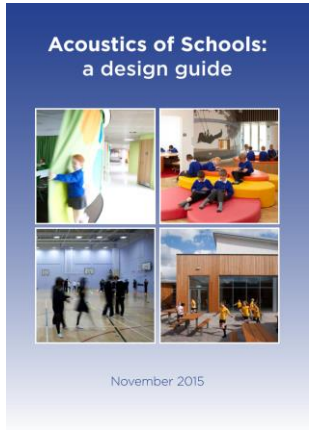
Surveys

What does BB93 say?

The IANL includes noise contributions from:

- external sources outside the school premises (including, but not limited to, noise from road, rail and air traffic, industrial and commercial premises)

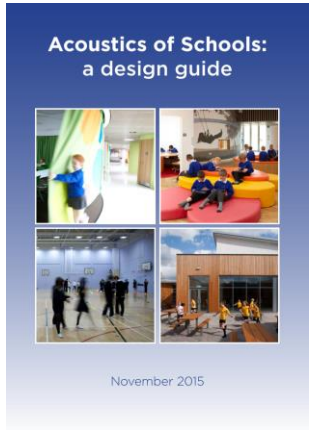
Surveys



Design Guide?

2.3 - The external noise level can be established by carrying out a noise measurement survey. The measurements should be taken during school hours over a suitable time period to be able to quantify the representative A-weighted sound pressure level, $L_{Aeq,30min}$, likely to occur during teaching hours

Surveys

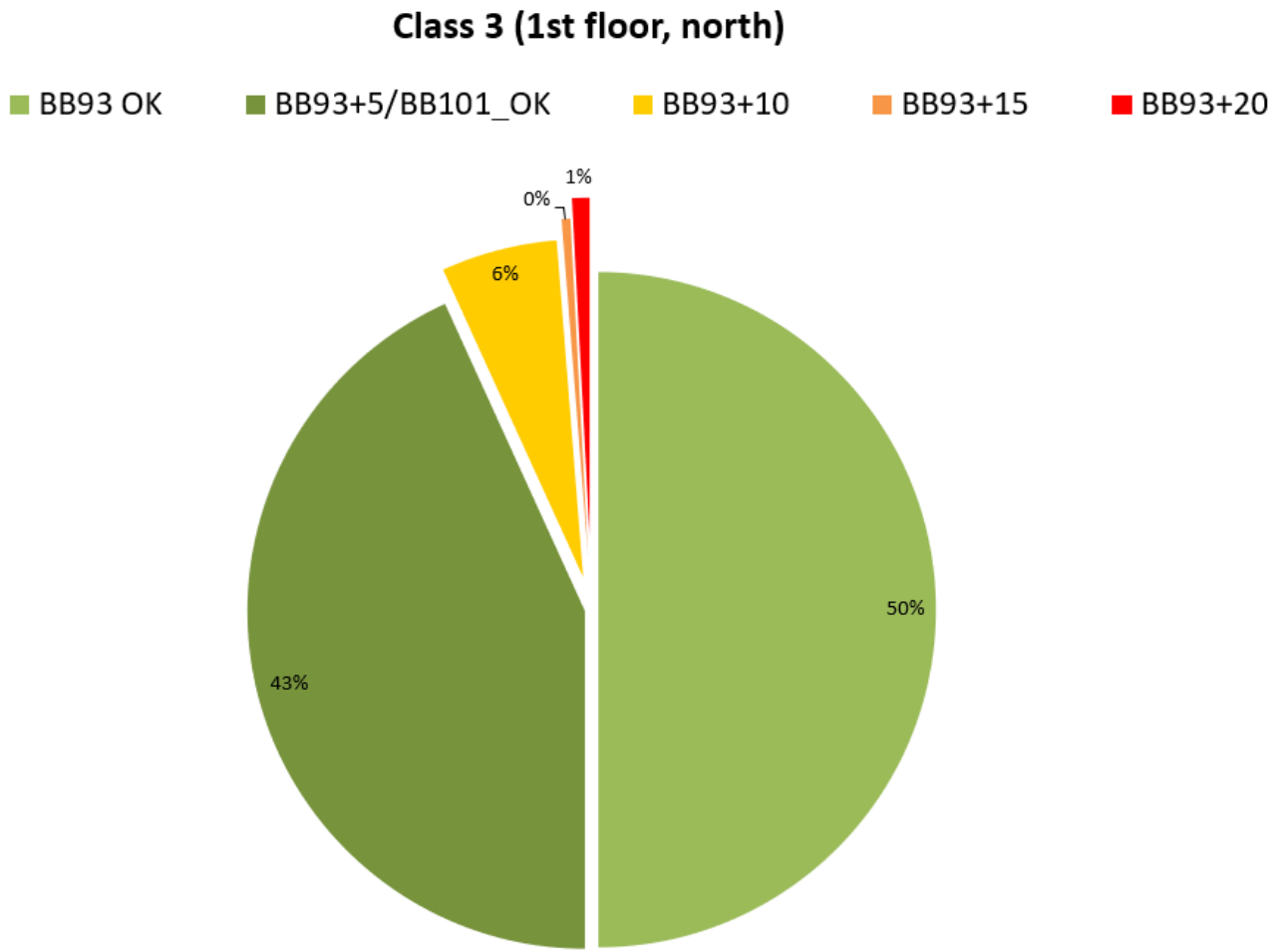


Design Guide?

2.3 - The external noise level can be established by carrying out a noise measurement survey. The measurements should be taken during school hours over a suitable time period to be able to quantify the representative A-weighted sound pressure level, $L_{Aeq,30min}$, likely to occur during teaching hours

Variable Soundscapes Examples

Noise Exposure Chart: Typical Example

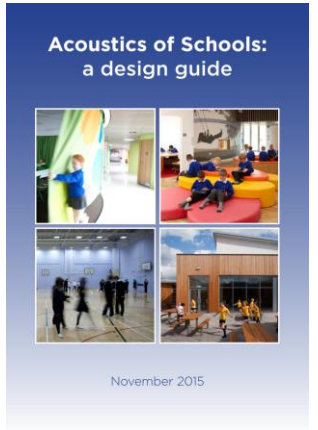


Surveys

What are we trying to achieve?

- Representative data
- Is the noise steady?
- Is the noise climate likely to change throughout the year?
- Will school activities change with the seasons?

Surveys



School Noise Impact

- Playgrounds
- Playing fields
- Music rooms
- Halls
- Traffic (parents/staff/deliveries)
- Plant

Façades
(Noise break-in/out)

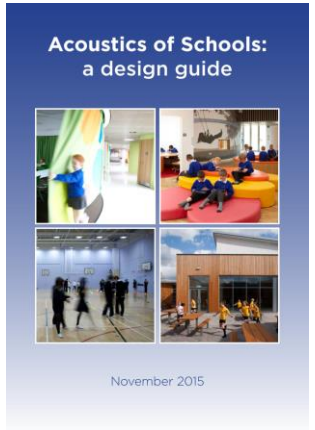
Façades

What does BB93 say?

The IANL includes noise contributions from:

- external sources outside the school premises (including, but not limited to, noise from road, rail and air traffic, industrial and commercial premises)

Façades



Design Guide

- Guidance on factors to consider for closed windows
- Some guidance on secondary glazing with staggered openings
- Consideration of the variation of noise on different façades
- Self-screening

Façades

Other Aspects to Consider

- Different internal ambient noise levels depending on ventilation strategy
- Is it okay for IANLs to be 5dB higher when the windows are open?
- When does maximising daylighting trump overheating and acoustics?

Façades

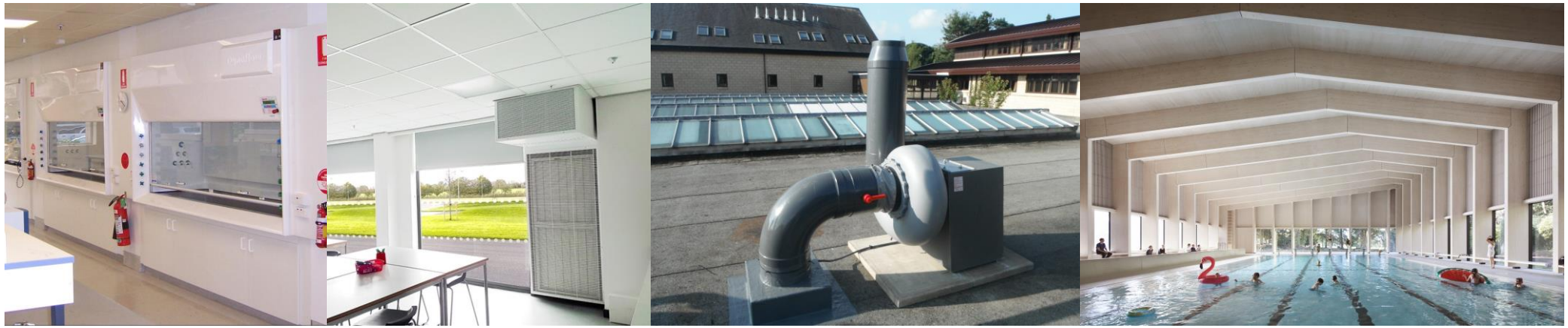
School noise impact

- Impact on ventilation strategy
- Workshops
- Music
- Sports

Building Services Noise

Building Services Noise

- Internal levels based on a maximum level
- External levels covered by planning
- Is it about controlling plant noise, or controlling whether you have plant?



(Alternative)
Performance Standards

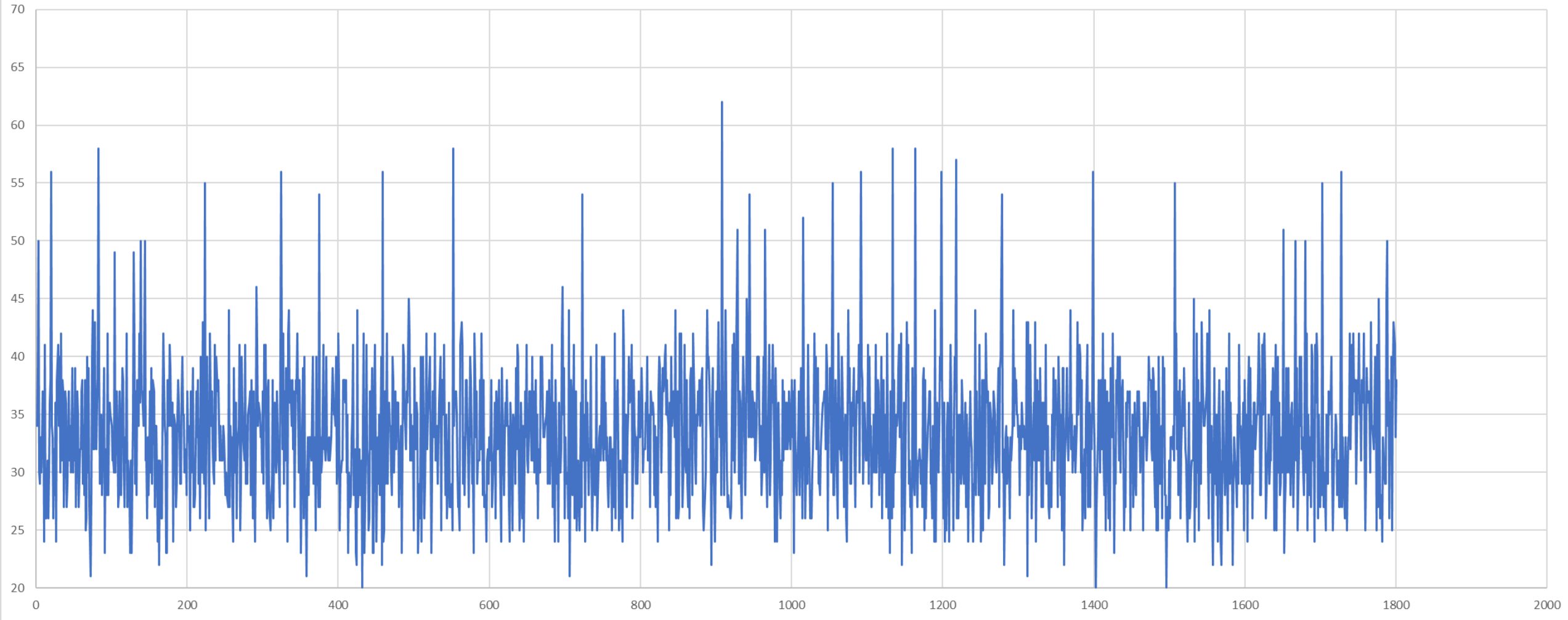
Performance Standards

- What did we say we were trying to achieve?
- No fixed standard is correct all the time
- ‘BB93’ is a starting point, not the end
- Are all alternative standards a relaxation?
- Should more guidance be provided for ‘non-typical’ teaching areas?
- When is it appropriate to consider alternative standards?

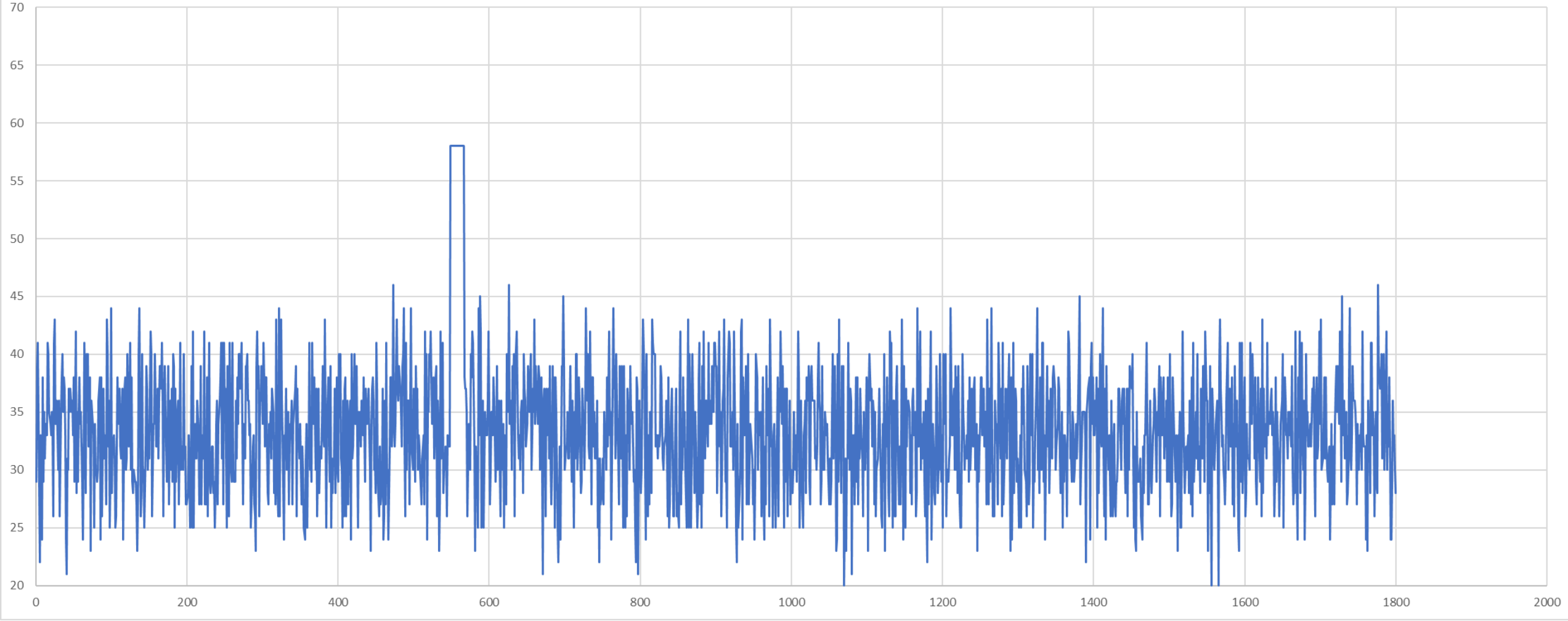
Performance Standards: The L1 conundrum


So what does the LA01 tell us?
30 minutes x 60 seconds = 1800 seconds
1% = 1800 x 0.01 = 18 seconds
L_{A01} exceeded for 18 seconds in each ½ hr

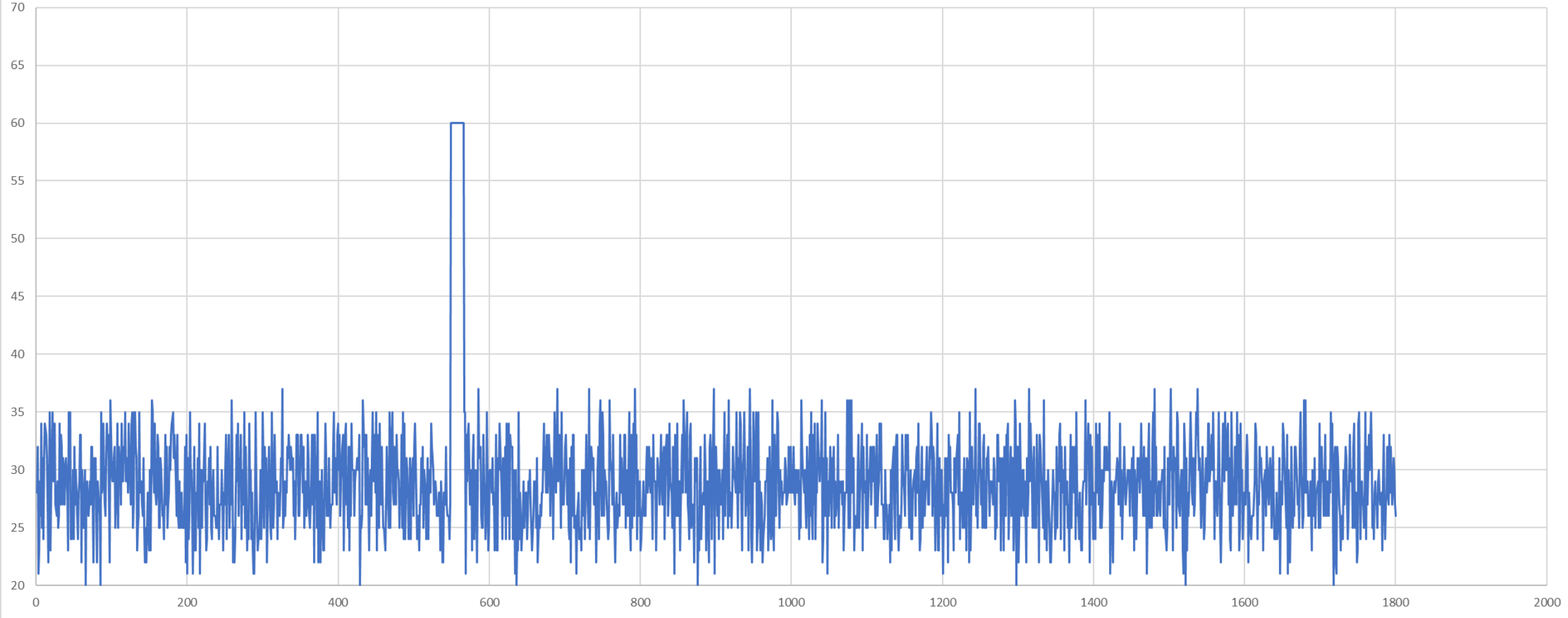
LAeq,30min = 40dB
LA01,30min = 54dB

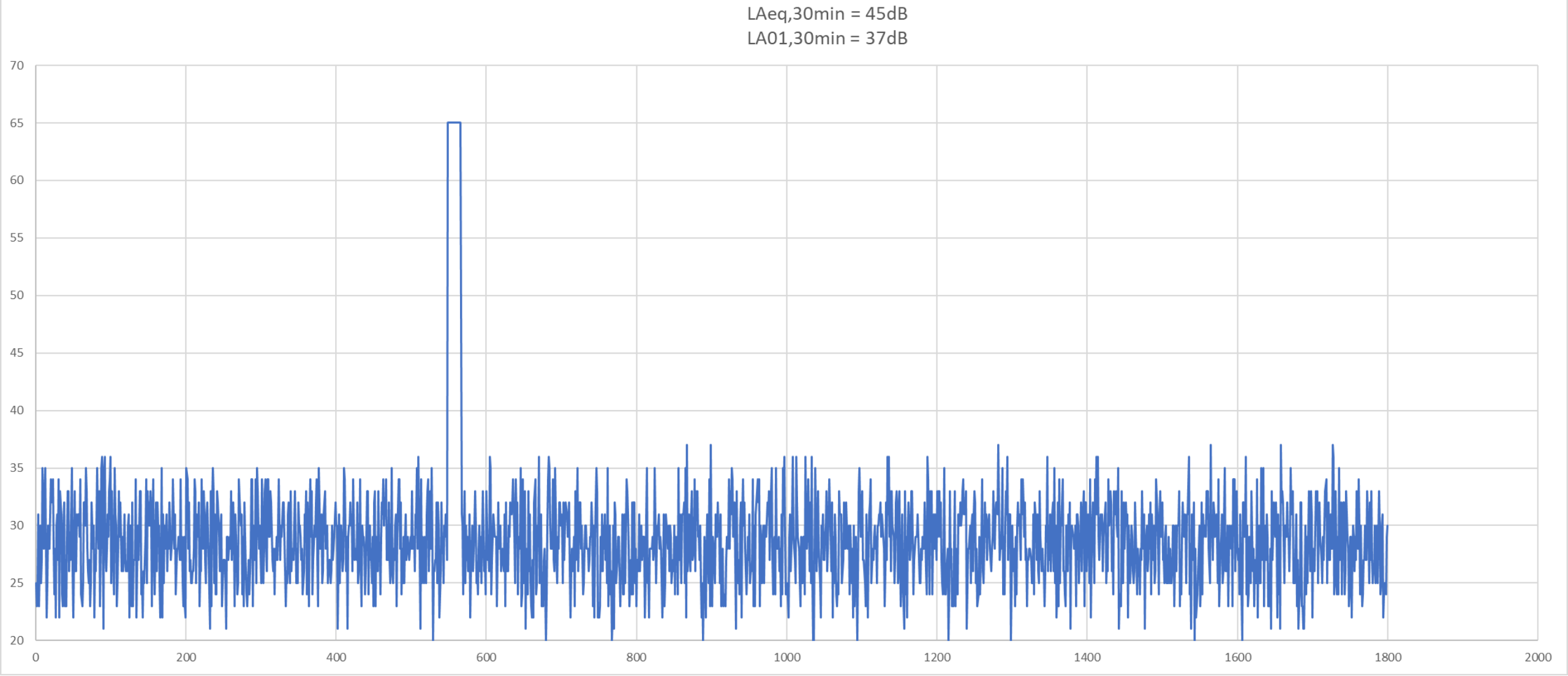


LAeq,30min = 40dB
LA01,30min = 46dB



LAeq,30min = 40dB
LA01,30min = 37dB




LAeq,30min = 45dB
LA01,30min = 37dB
70
65
60
55
50
45
40
35
30
25
20
0
200
400
600
800
1000
1200
1400
1600
1800
2000

Thank you

RBA ACOUSTICS