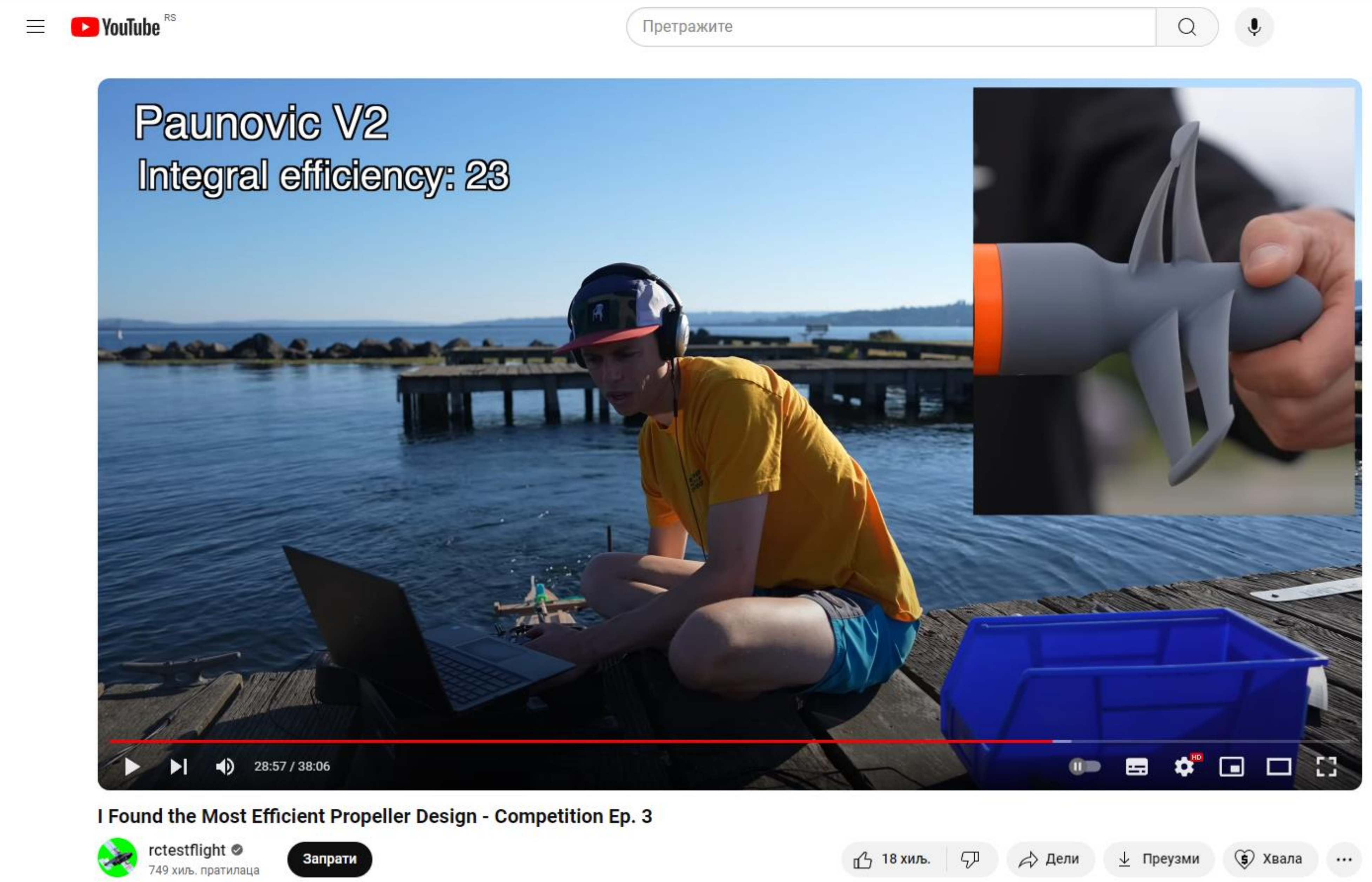
Results of spectral sound analyses of propellers presented on the rctestflight YouTube channel



Results of spectral sound analyses of propellers presented on the rctestflight YouTube channel - INTRO

The author of the YouTube channel "rctestflight" conducted a competition to find the best boat propeller concept. However, this testing process had several flaws:

1. Propeller designers did not know the exact technical characteristics of the testing motor.
2. The testing propellers did not have the same diameter.
3. The testing propellers did not have the same number of blades.
4. The angles of attack for the propeller blades were not the same.
5. The surface areas of the propeller blades were not identical.

All of these factors needed to be standardized to determine the best conceptual solution and the best propeller. Ideally, the motor should have been excluded from the testing, as the overall system (motor-propeller efficiency) was being evaluated. The author of the video series recognized this issue by the third video.

One aspect of the testing that may be the most scientific is the propeller noise testing. Here, the author tested the noise levels of each propeller for the same thrust level, which was 5 kgf.

In that testing, our Paunovic V2 propeller showed the lowest noise level for 5 kgf of thrust.

The spectral sound analysis from the third propellers testing video was conducted using Audacity software, and the extracted data were then organized and visualized in Excel. Sound spectrograms are made in Sonic Visualiser software.

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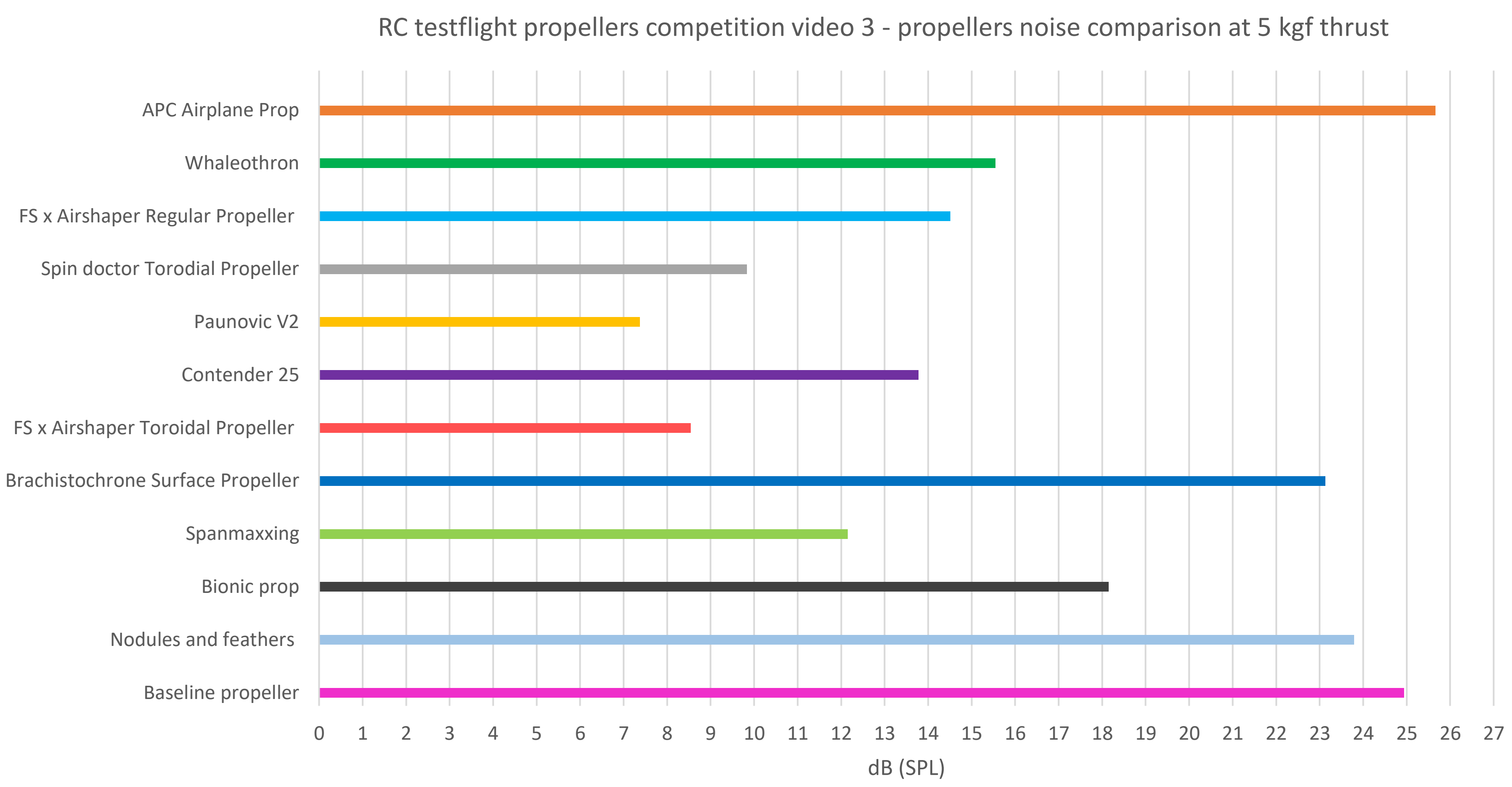
Tested propeller	Noise (dB)
Baseline propeller	24,94
Nodules and feathers	23,79
Bionic prop	18,15
Spanmaxxing	12,15
Brachistochrone Surface Propeller	23,13
FS x Airshaper Toroidal Propeller	8,54
Contender 25	13,78
Paunovic V2	7,37
Spin doctor Toroidal Propeller	9,83
FS x Airshaper Regular Propeller	14,51
Whaleothron	15,55
APC Airplane Prop	25,66



The noise levels presented in the table above are the average values from the sound (noise) spectral analysis for the given propeller, adjusted by adding 96 dB. Adjusted noise levels mean that we have modified the baseline recorded noise level for better understanding. In Audacity software, the highest noise level is represented by a value of 0, with all other noise levels being negative. We added a value of 96 dB to these levels because -96 dB is the quietest sound that a 16-bit system can emit. By doing this, we ensure that in our presentation graphs, the lowest sound level is 0, rather than having 0 represent the loudest noise level as in Audacity. This adjustment makes it easier for people to understand noise levels, as they no longer have to interpret only negative values.

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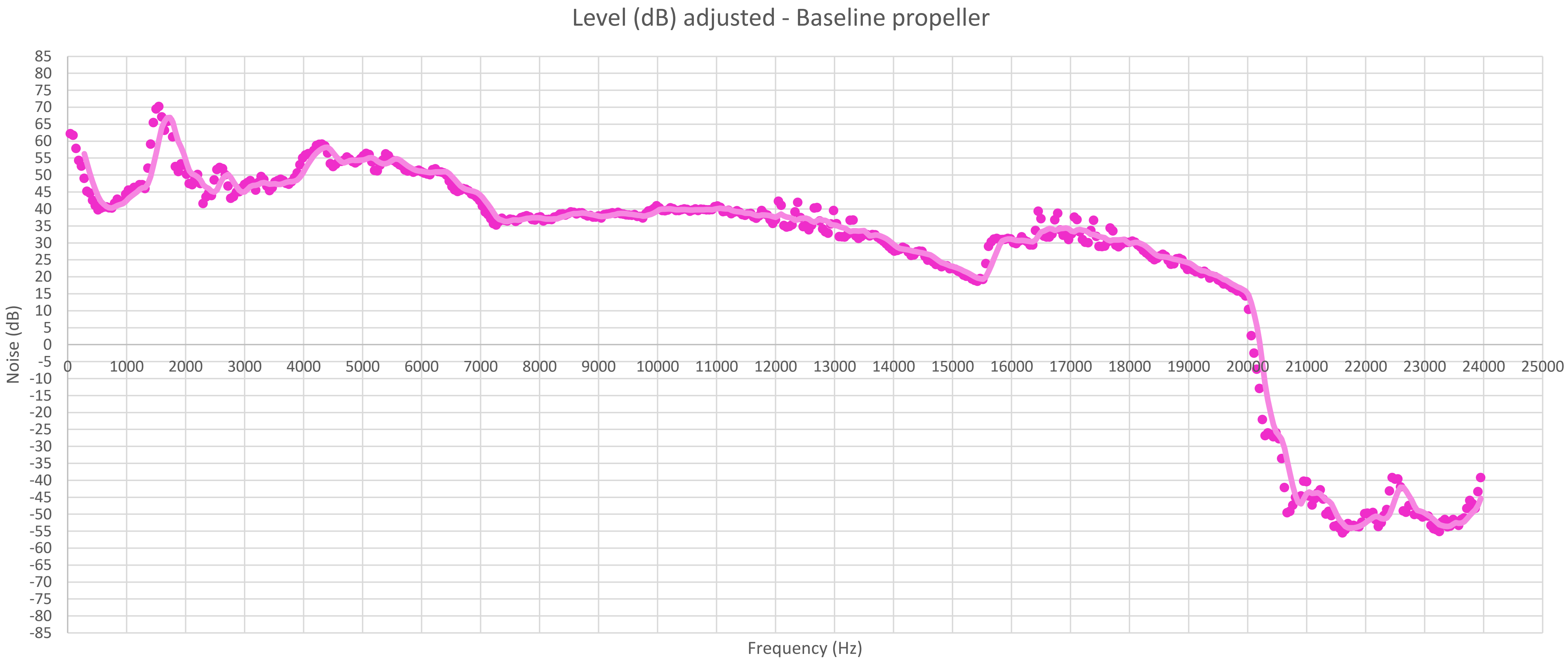

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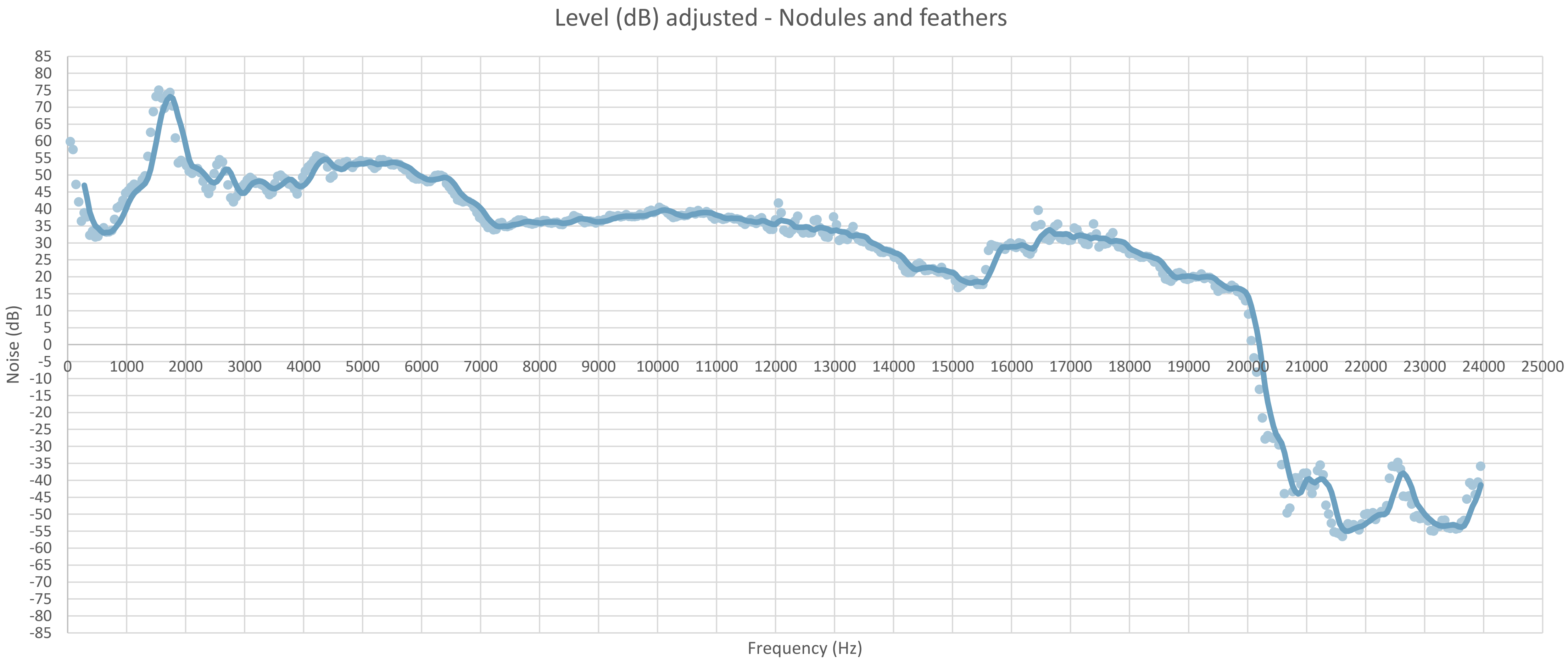

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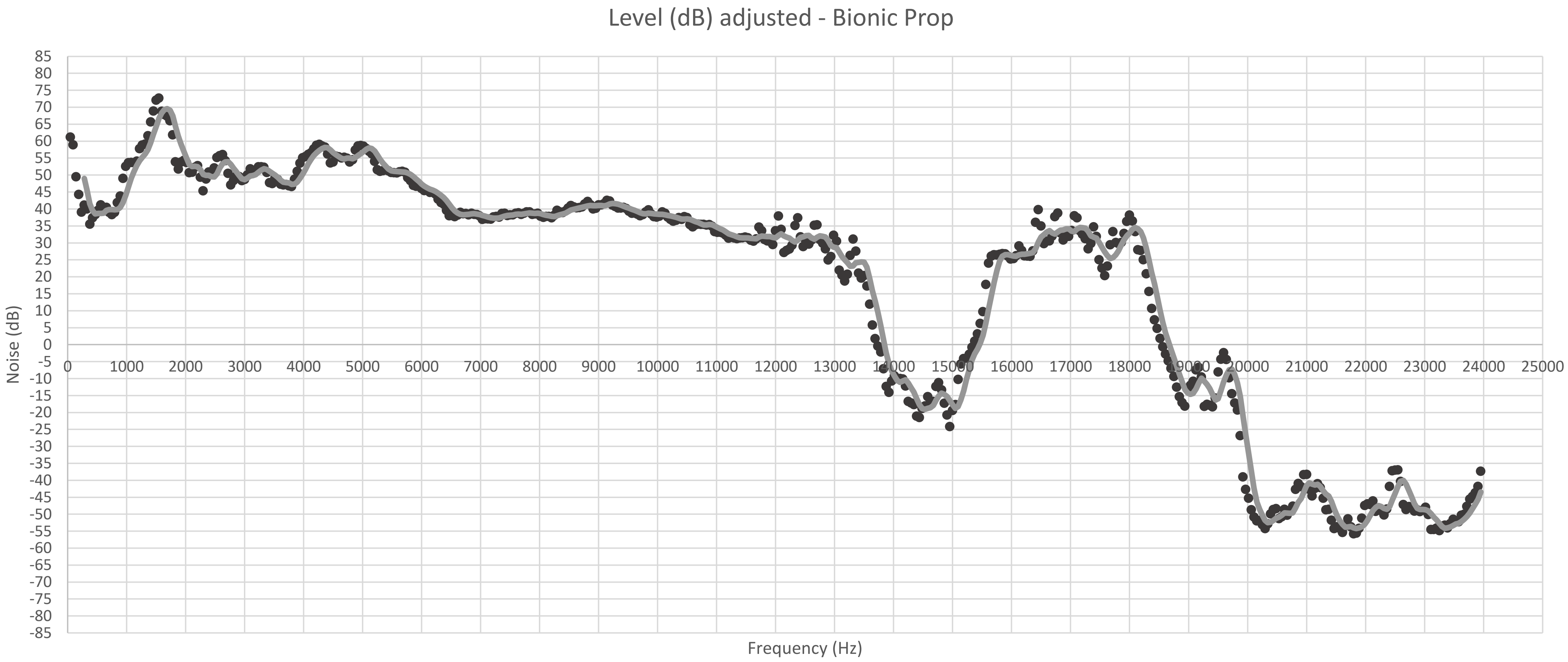

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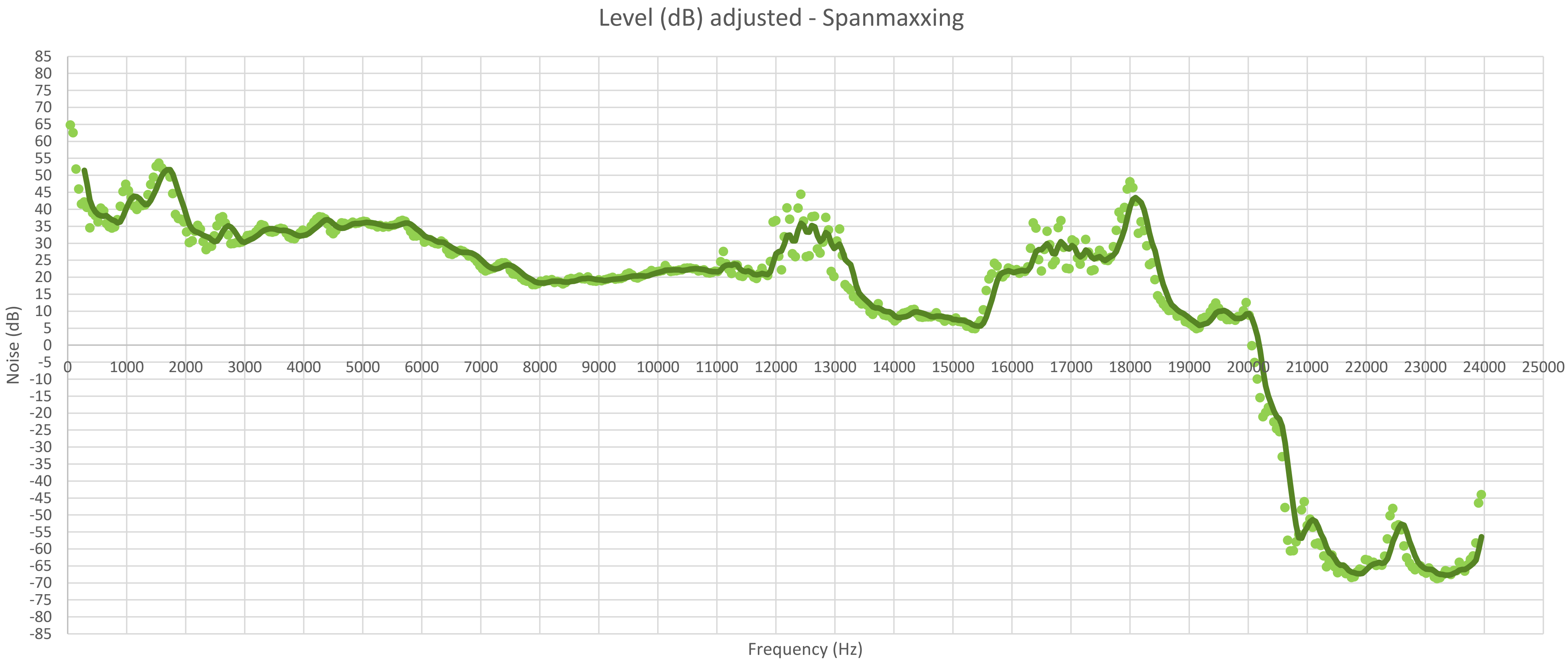

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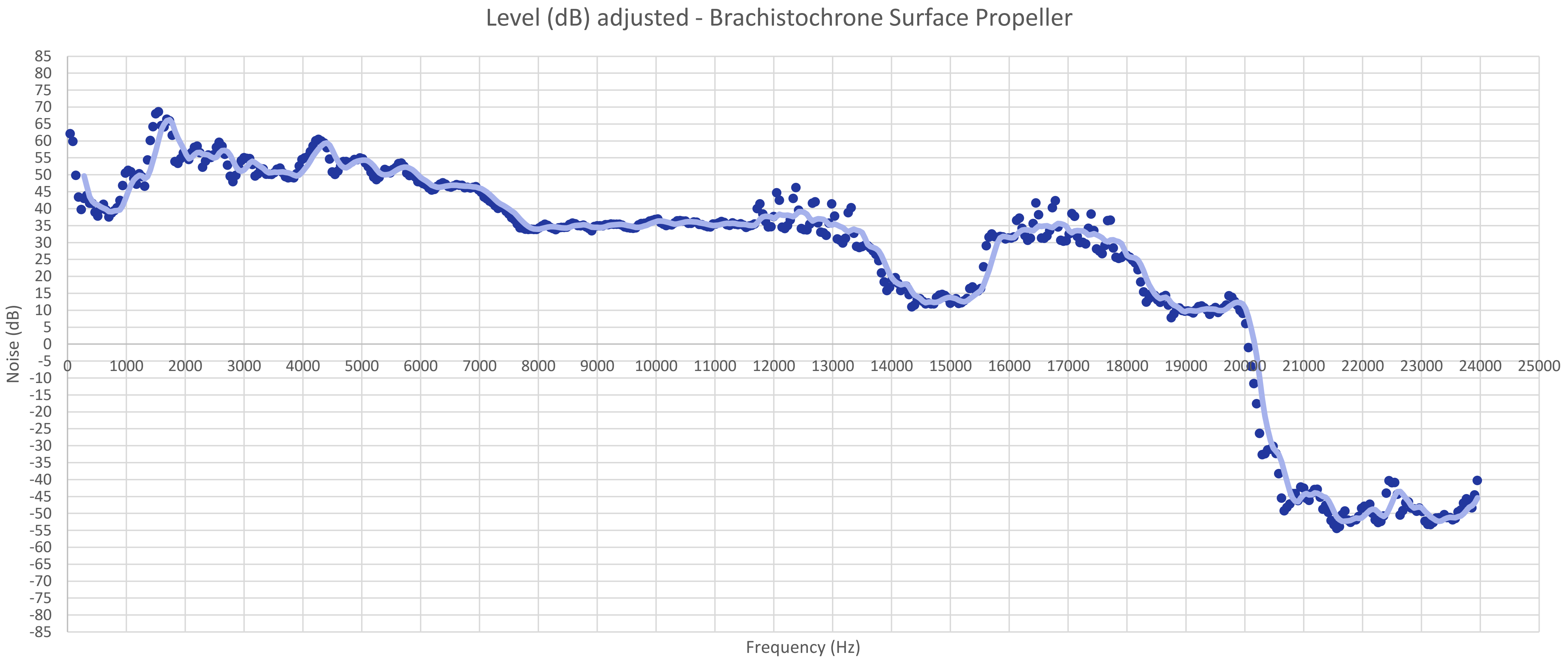

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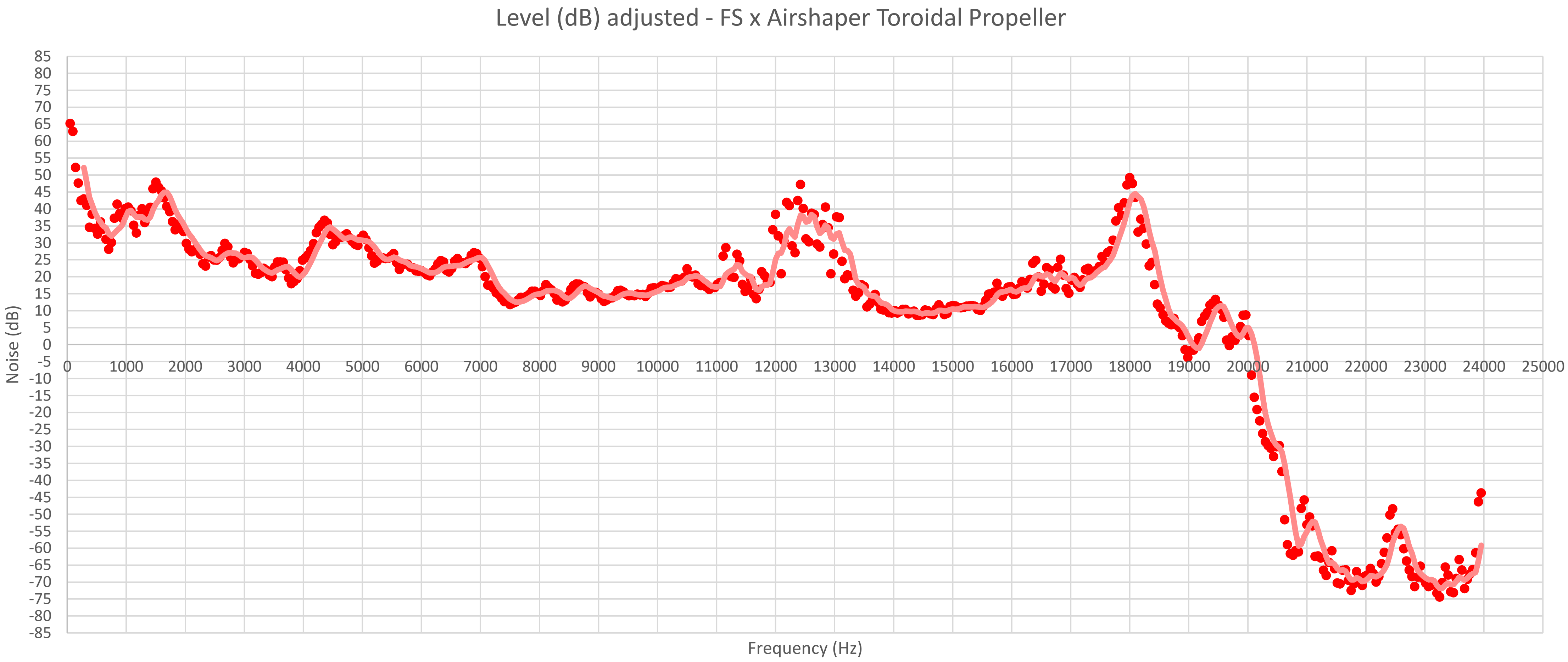

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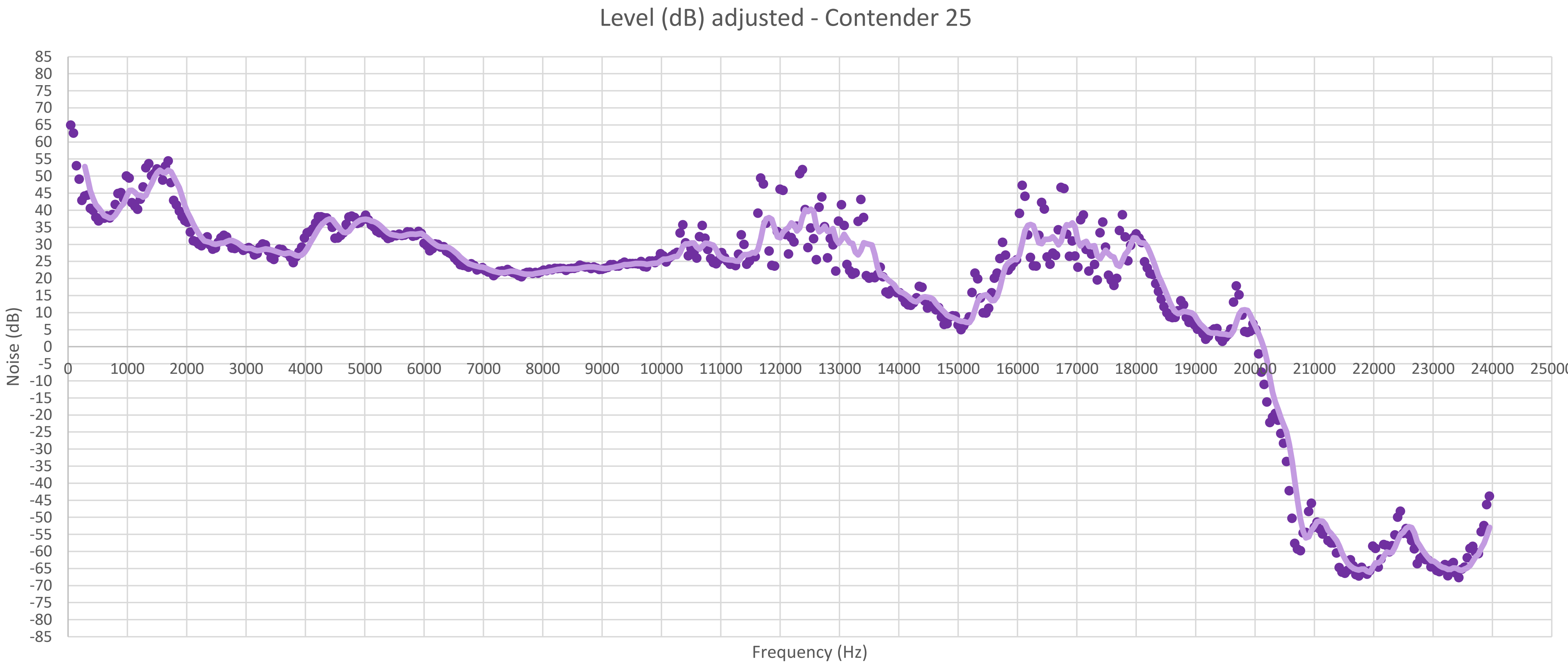

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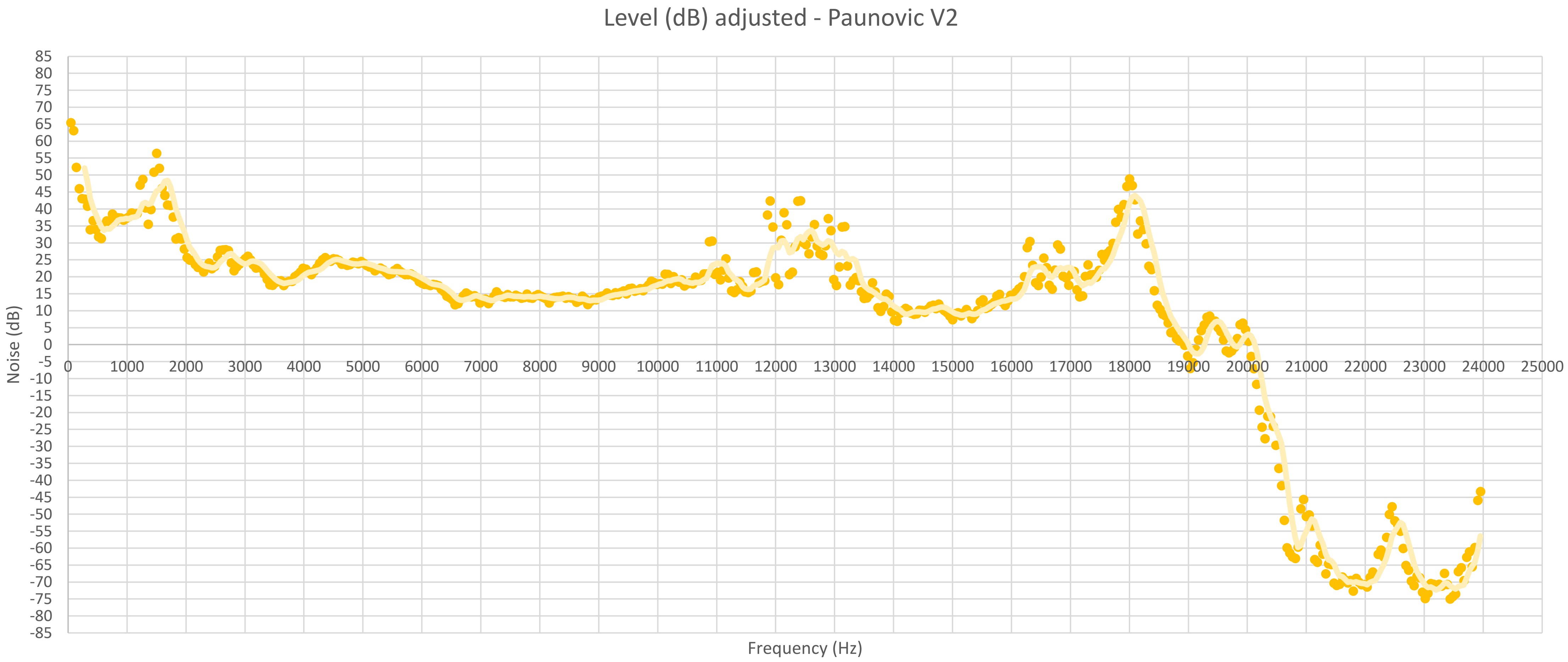

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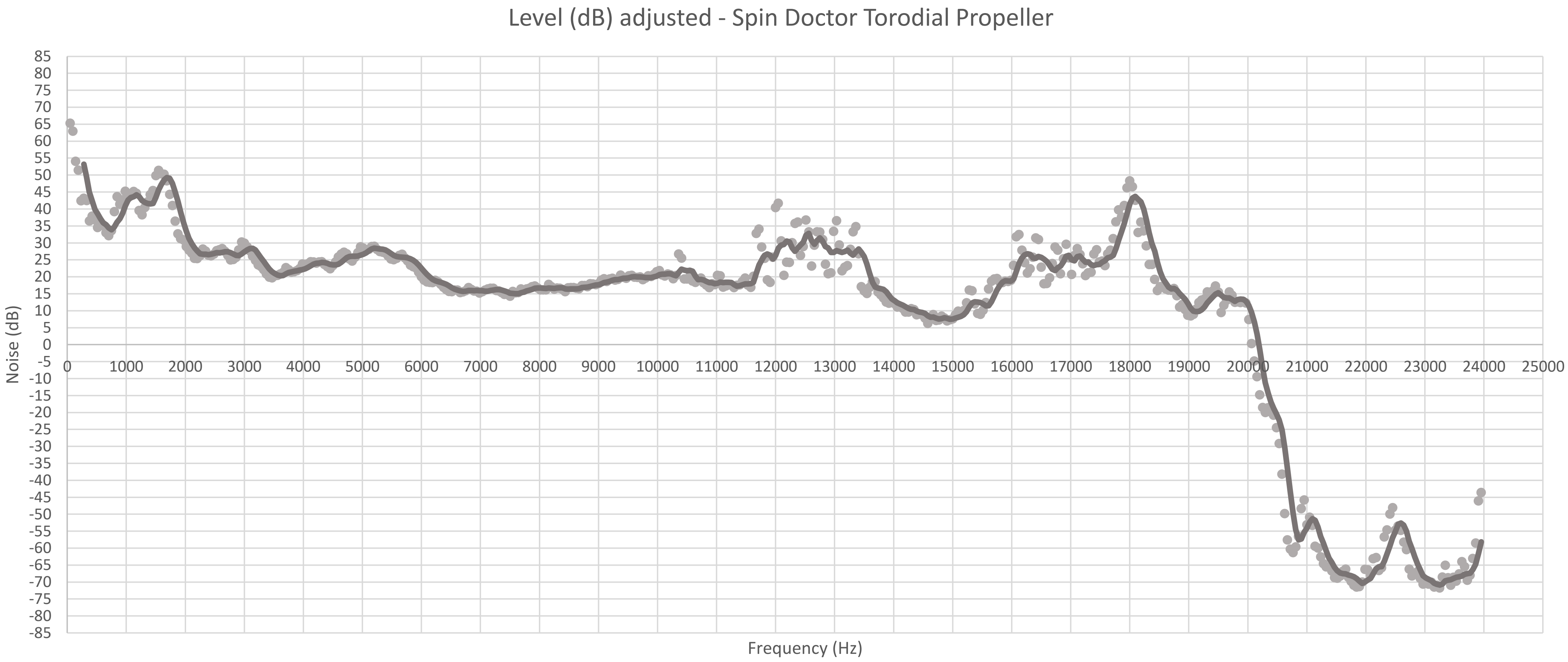

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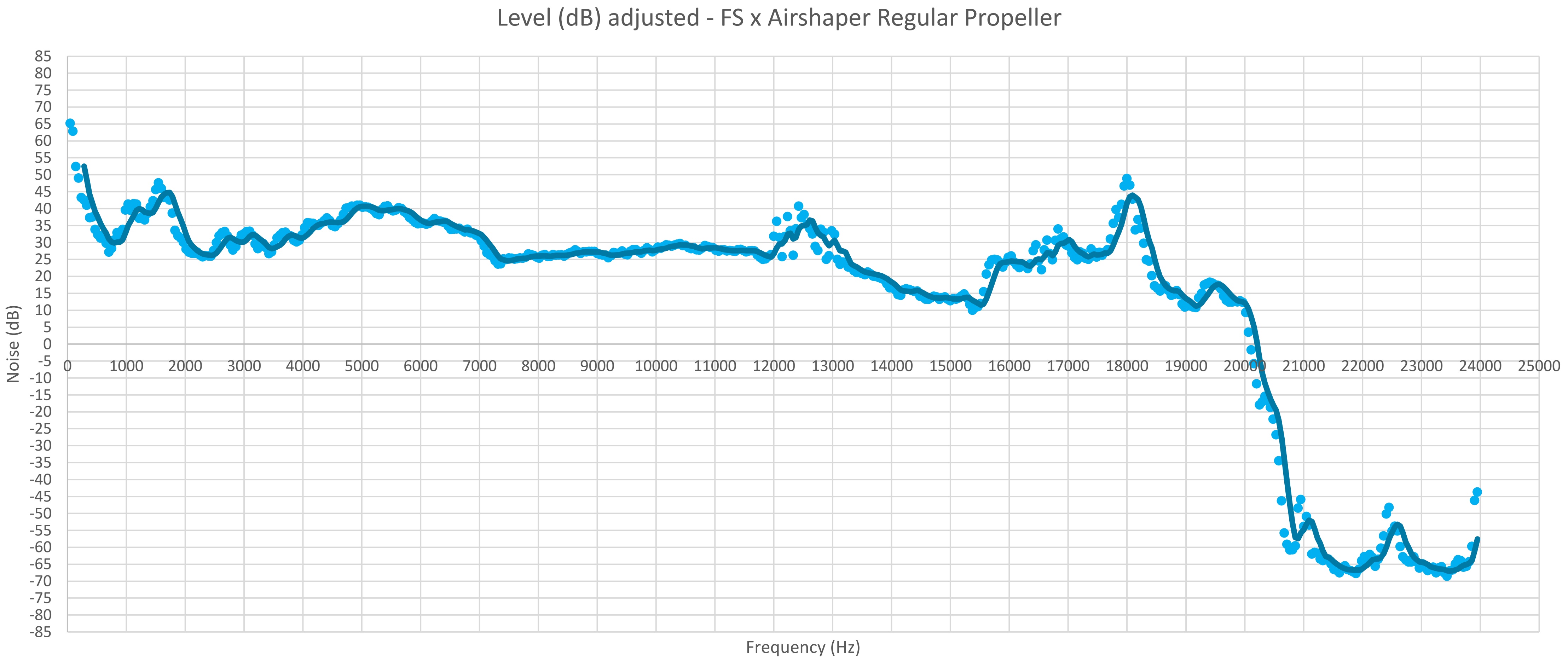

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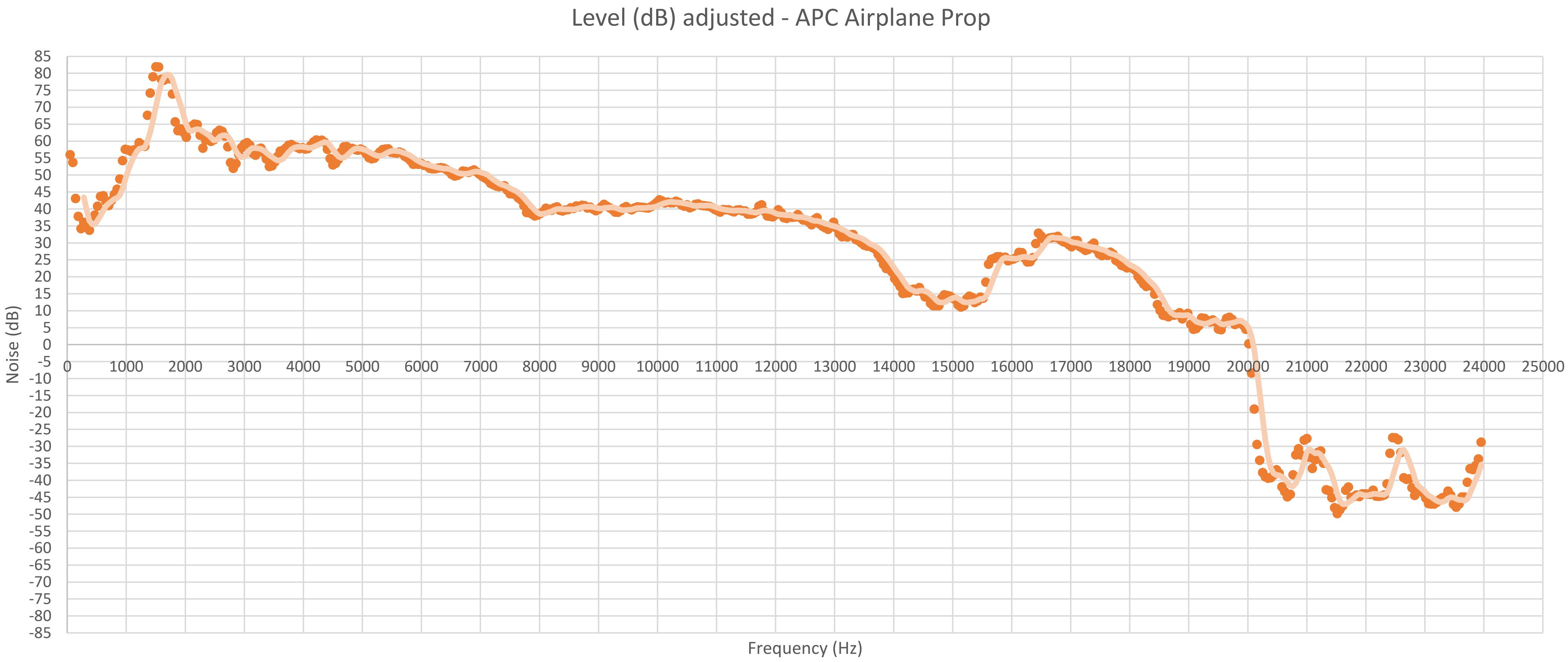

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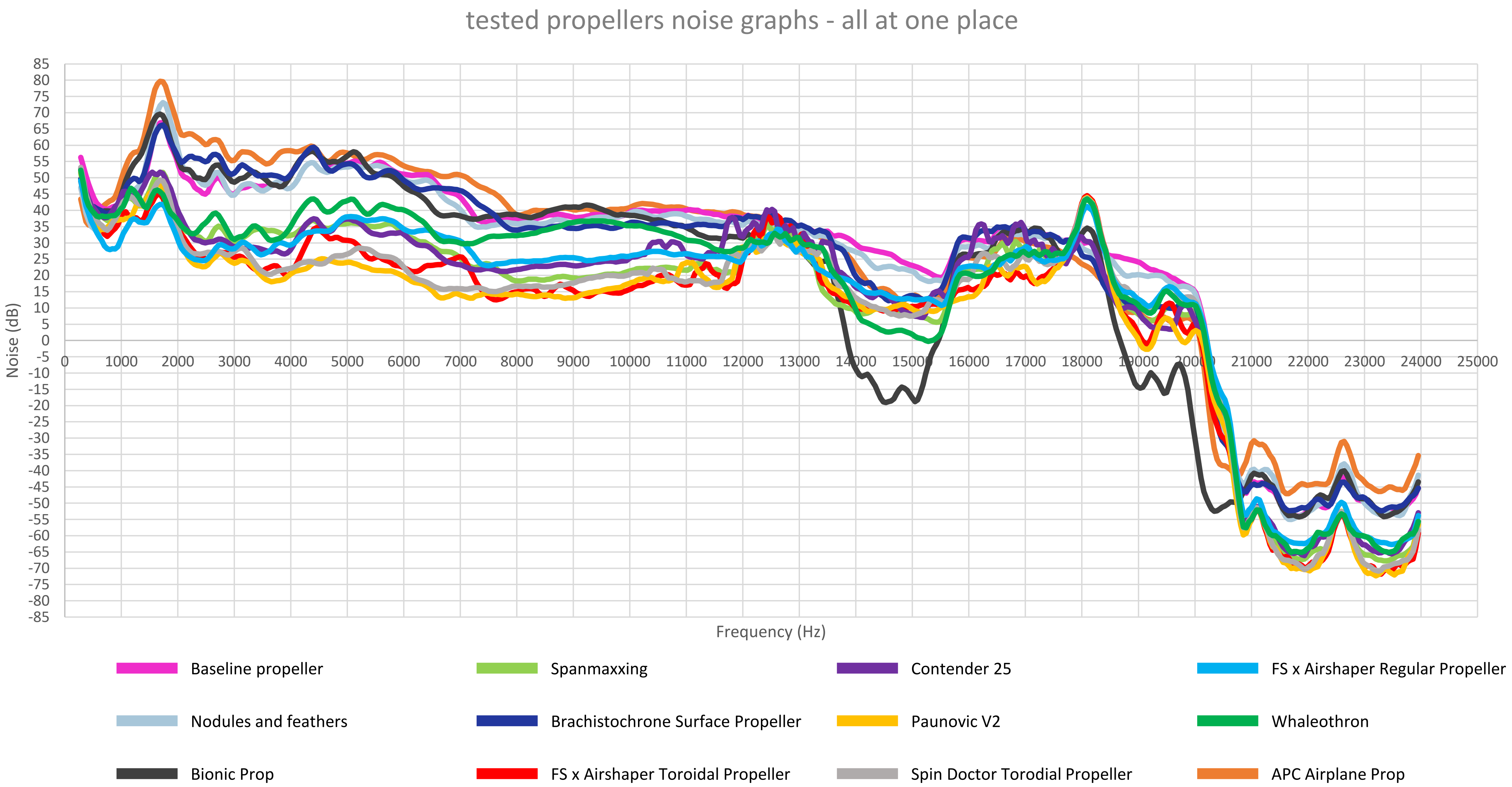

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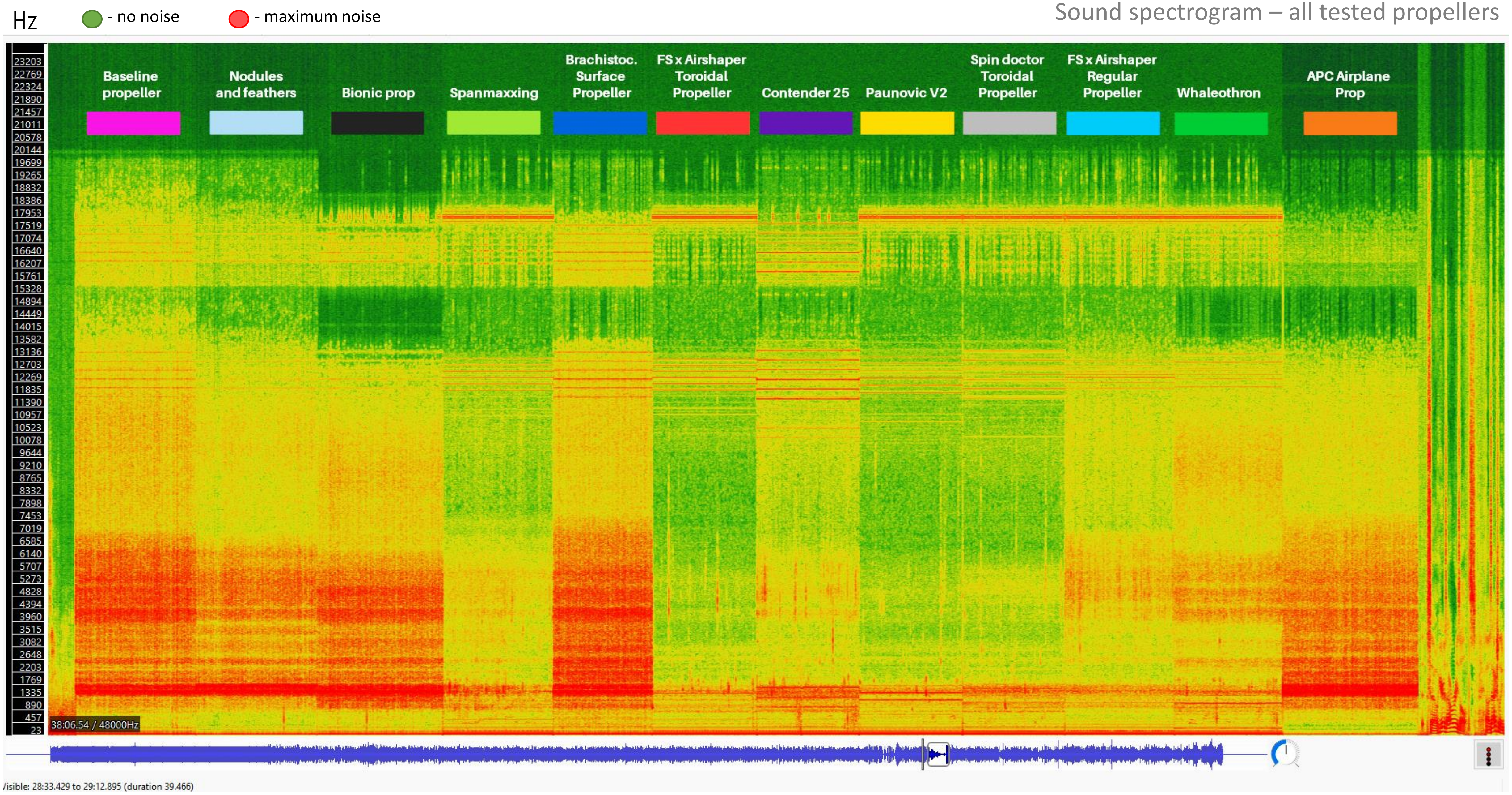
Sound spectrogram – all tested propellers



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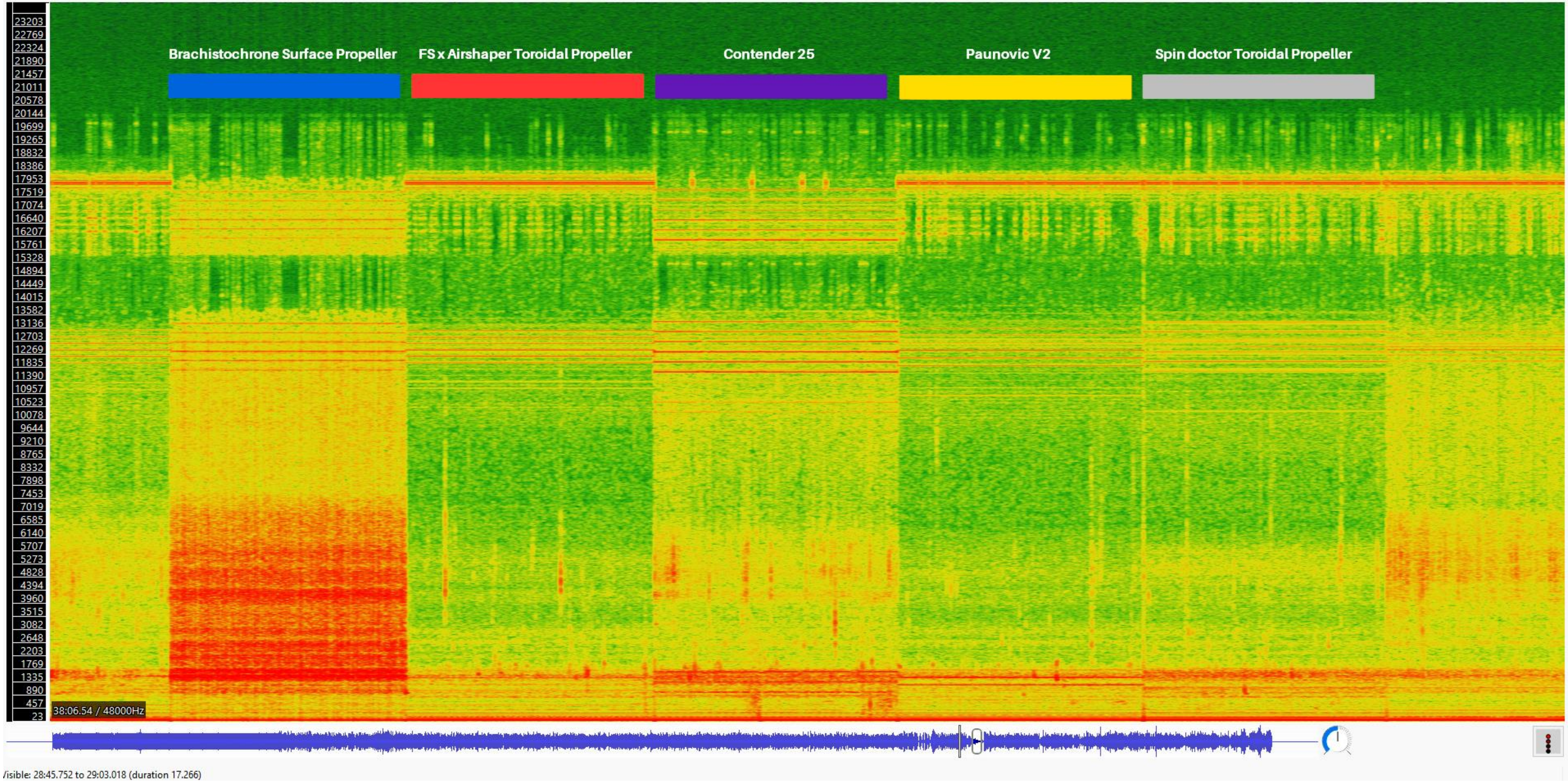
Hz - no noise - maximum noise

Sound spectrogram – enlarged for three lowest noise emitting propellers



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For any info about this spectral sound analysis or Paunovic propellers you can reach me at:

Email: nenad.paunovic@poduhvat.com
Cell number: +381643254562
Paunovic propellers website: www.paunovic-propulsion.com