

Mesures du 10RS430 en bass-reflex de 55 litres

10RS430 measurements in 55 l vented enclosure

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1. Test enclosure

Enclosure made of 18mm external plywood, reinforcing cross-bars, lamello, glued (vinyl) and screwed.

Internal volume 50 litres, but the V_b has been adjusted to 55 litres to take account of the lining (rock wool).

Wall vibration damping with Amortson adhesive-filled bitumen (Audiophonics origin), 5mm thick. Cylindrical port made from 125 mm PVC tube, length 250 mm, \varnothing_{int} 117 mm, providing a fb of 39 Hz.

Hypex FA503 amplifier mounted on the back of the cabinet.



2. Measurements tools and conditions

UMIK 2 USB microphone with its calibration file, REW measurement software, Eversolo Z6 DAC.

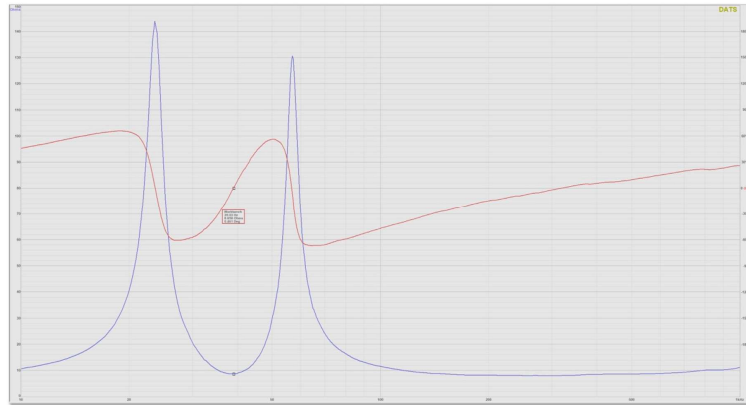
The first measurements were taken indoors in the near field and merged by addition.

The box was then set up outdoors and ground plane measured at 3.15m. The measurements have to be adjusted by 10dB for distance, plus 3dB for the mirror effect.

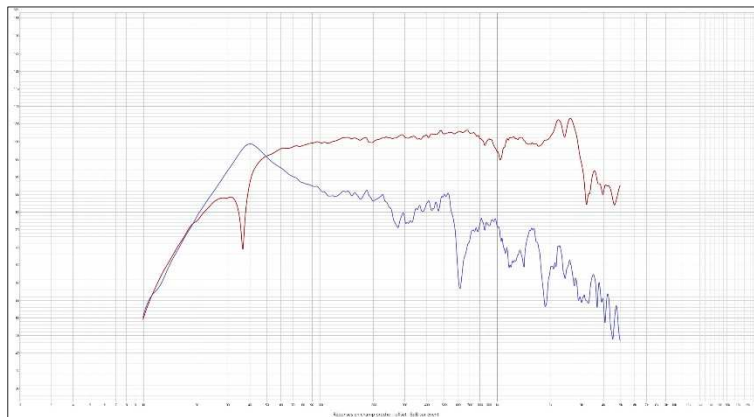
Fine weather, light wind, use of the small windscreen supplied with the microphone.

3. Initial indoor measurements

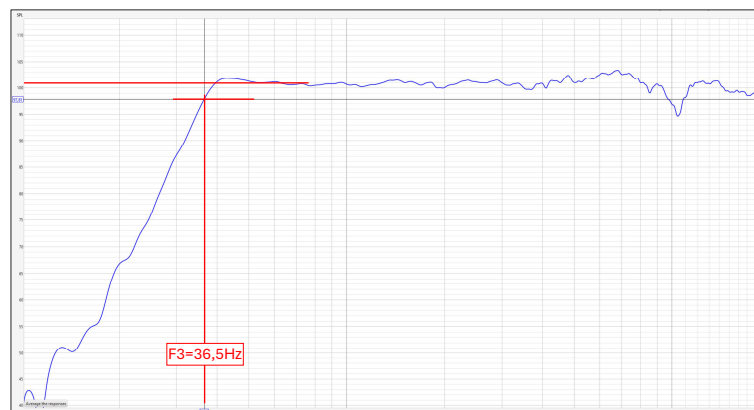
Impedance measurements were taken with DATS v3. The tuning frequency is 39 Hz.



The response was measured at approximately 1cm from the cone, then at the vent outlet in line with the outlet section. An offset of -8dB was then applied to the response of the vent before merging:



Merging :



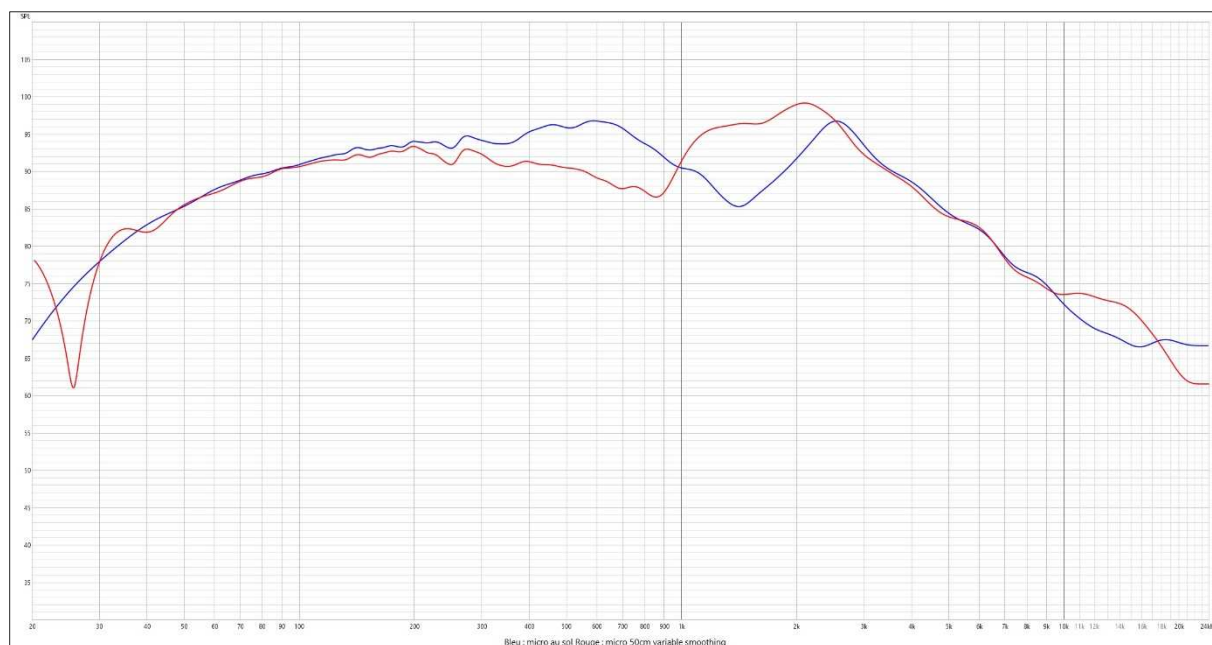
This is a first indication, the determination of the offset to be applied being done somewhat arbitrarily...

4. Outdoor measurements

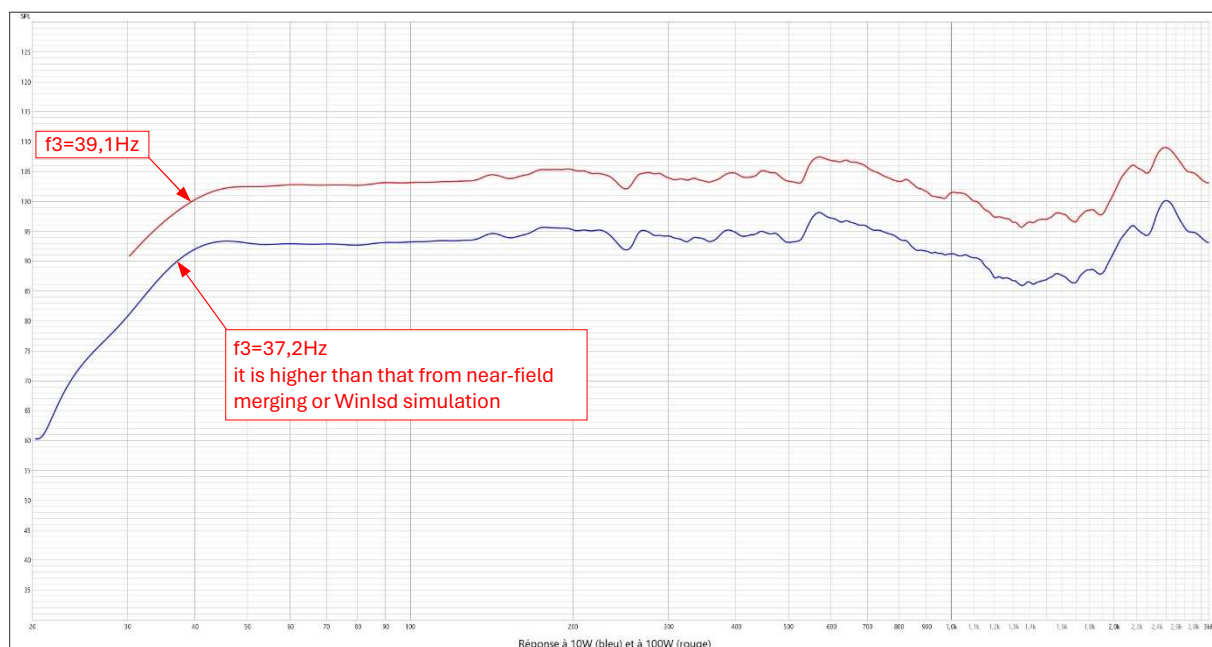
Microphone on the ground 3.15m from the cabinet, about 10cm above the ground (grass...)

To avoid wind pollution of the measurements, the tests were carried out at 10W and 100W.

As a matter of conscience, a first measurement was made at 10W with the microphone close to the ground in **blue**, then with the microphone at the height of the speaker (50cm) in **red** :

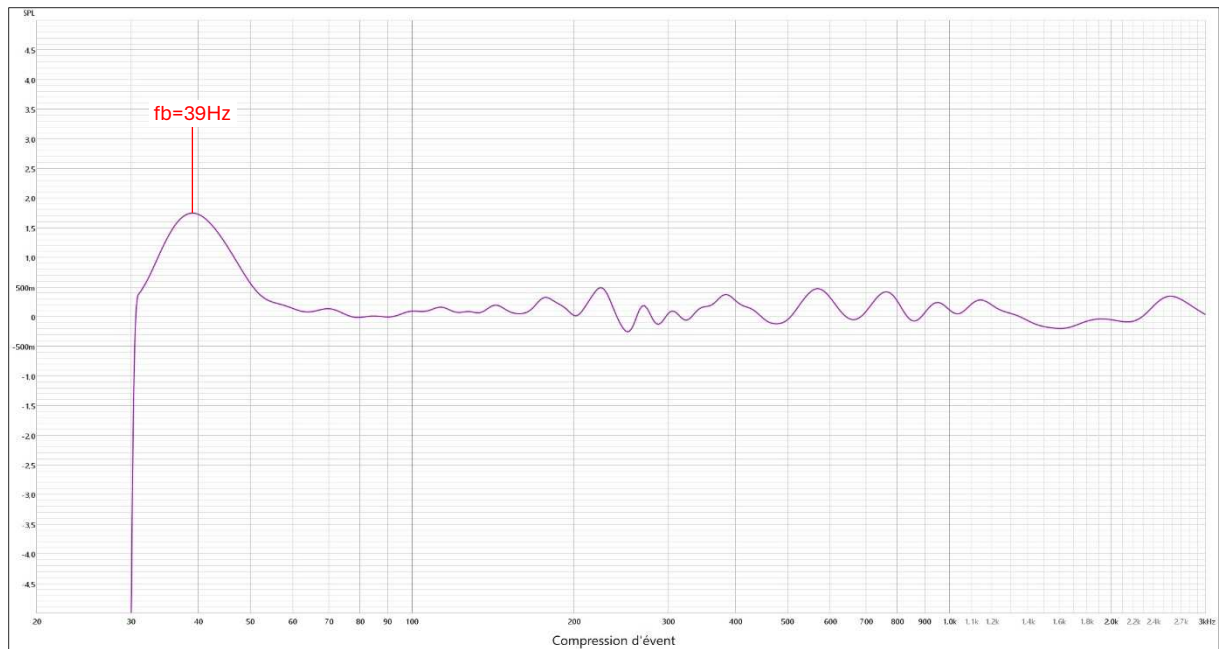


The response accident observed around 250 Hz is probably due to a parasitic reflection.



For 100W, the effect of vent compression is visible.

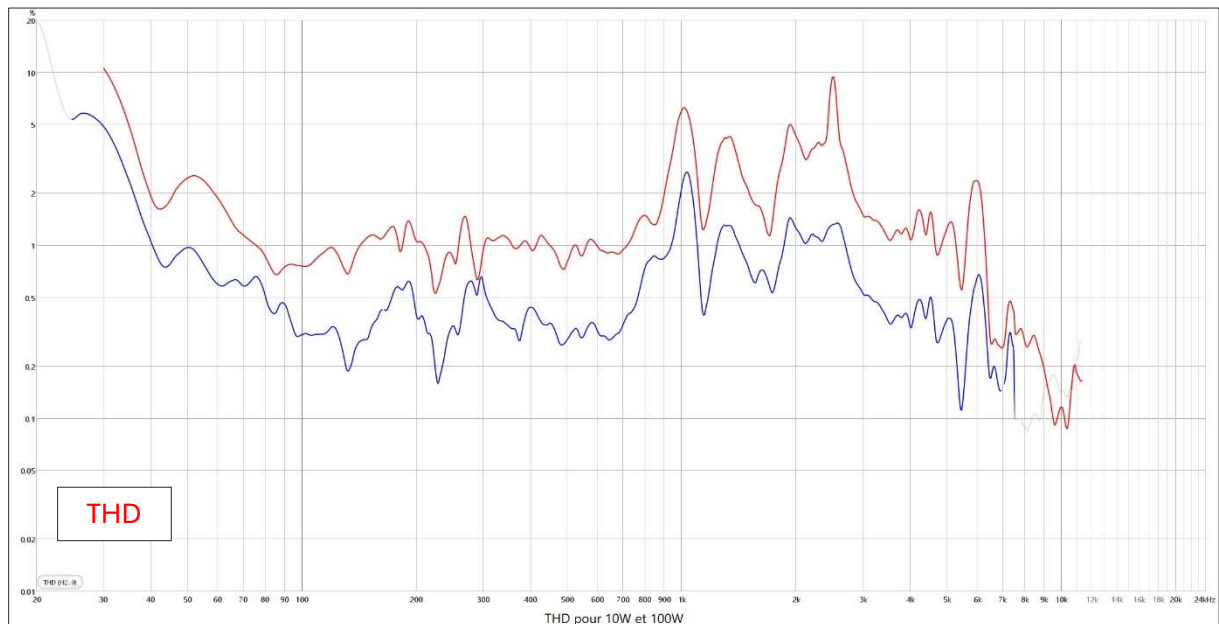
By creating a 10dB offset on the response at 10W and applying an A/B, this vent compression becomes more visible :



This vent compression is logically centered on the tuning frequency, and covers about an octave. Here, it reaches around 1.75dB at 39Hz, which has a direct impact on the bass response as indicated above.

Although the response at 100W was the last in a burst of 6, no thermal compression can be observed.

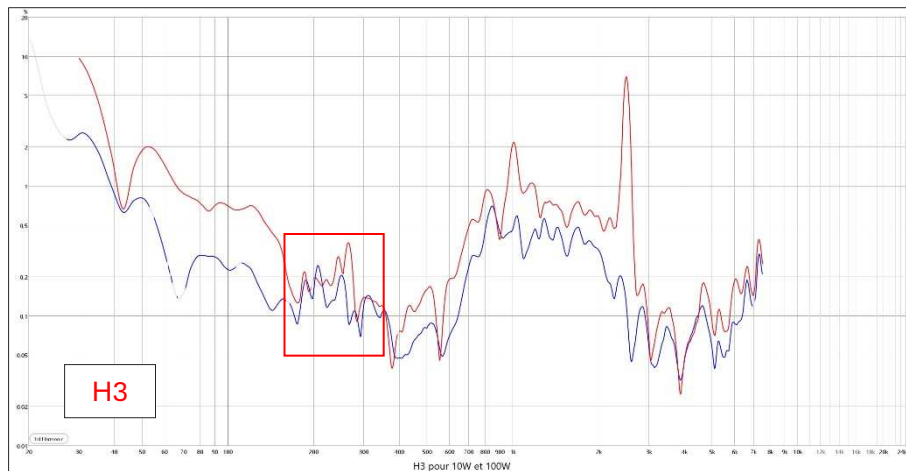
Distortion



THD is very reasonable for a driver of this diameter.

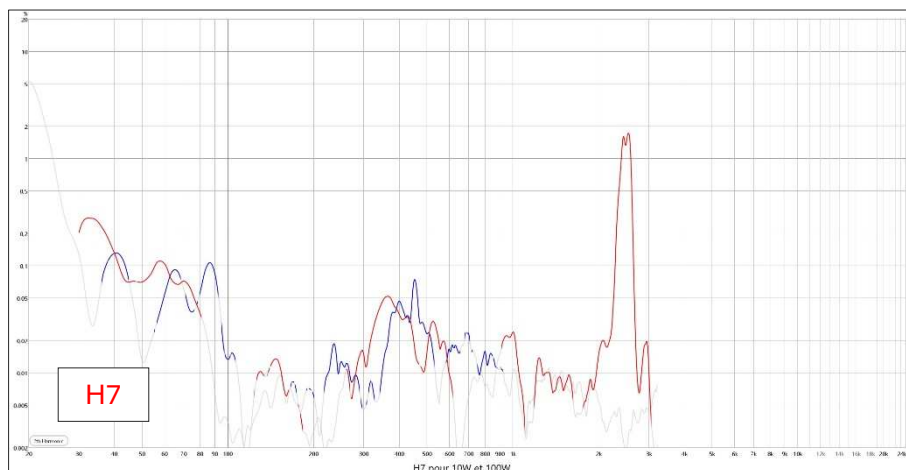
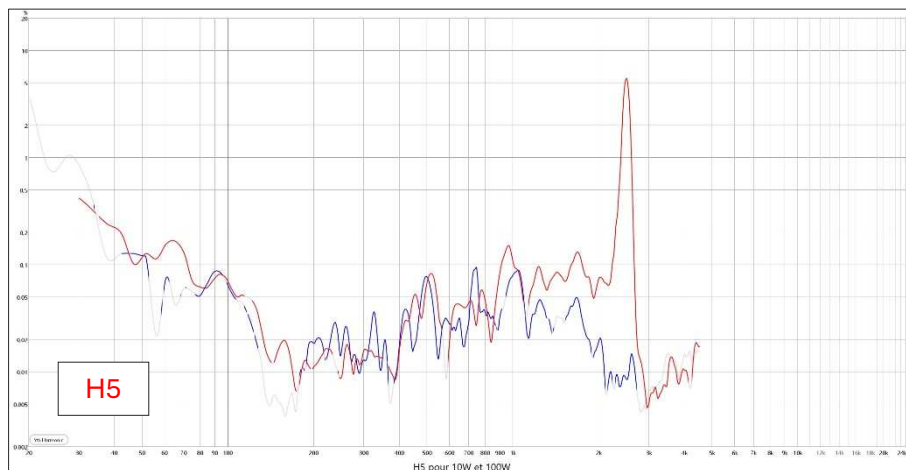
At 100W, it is roughly 1% up to 700 Hz, and would logically be about 3 times less (-10dB) for 10W.

At low frequencies, it rises below 80 Hz, but if Thxrd is to be believed, this cannot be heard...



H3 shows a rise from 600Hz.

Below this, there is a zone of anomaly around 250Hz, which could be related to the response accident previously observed in the same zone (see above).



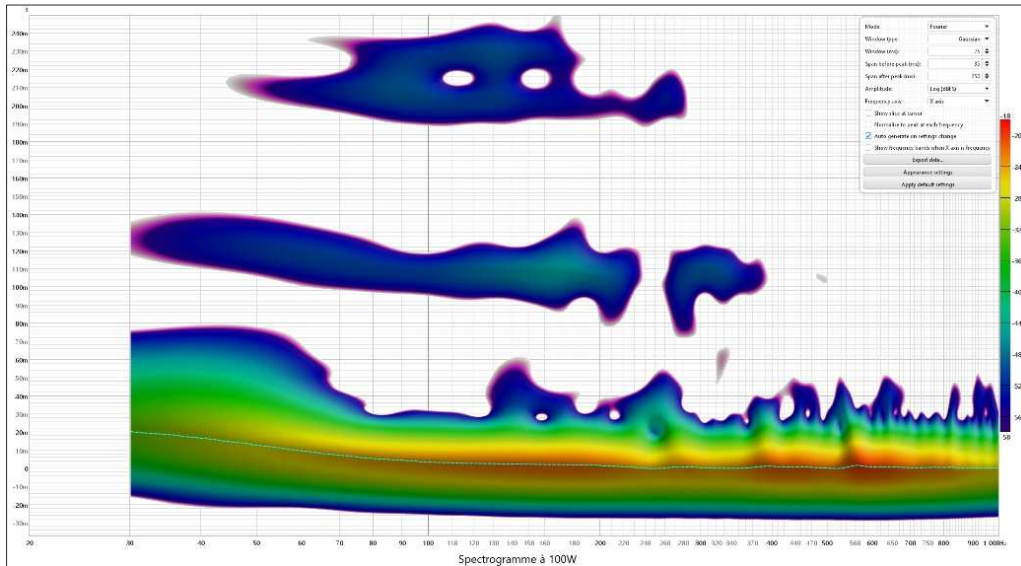
For H5 and H7, the levels are low, and the 10W and 100W curves mix, we're almost at the noise floor, nothing special to note.

All these graphs show a distortion peak at the break up frequency, which is largely out-of-band anyway.

Time behaviour

Given the reflections due to the measurement conditions, the data is difficult to use, especially as REW does not allow it to be windowed.

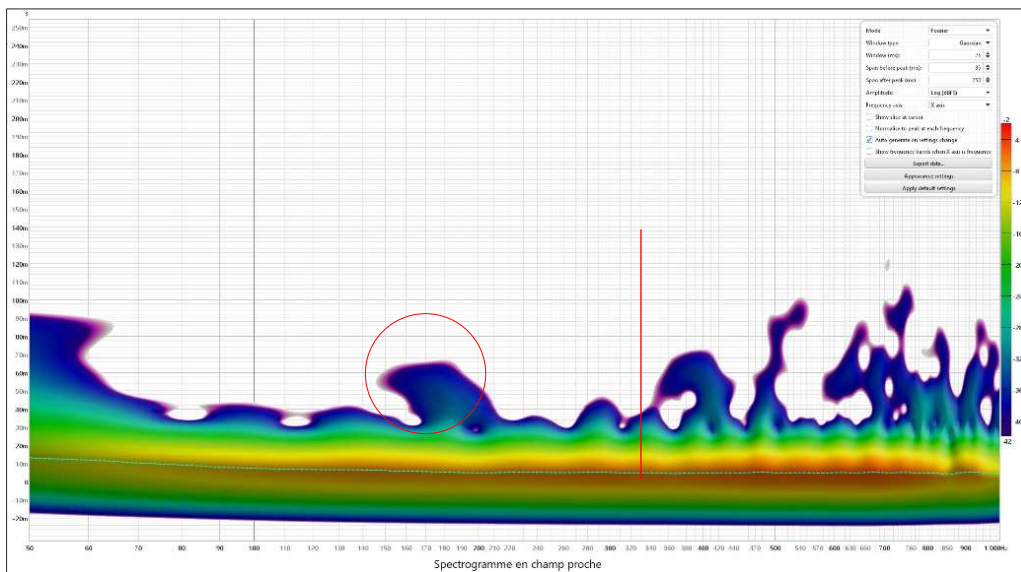
Below the spectrogram :



You can see the main reflections...

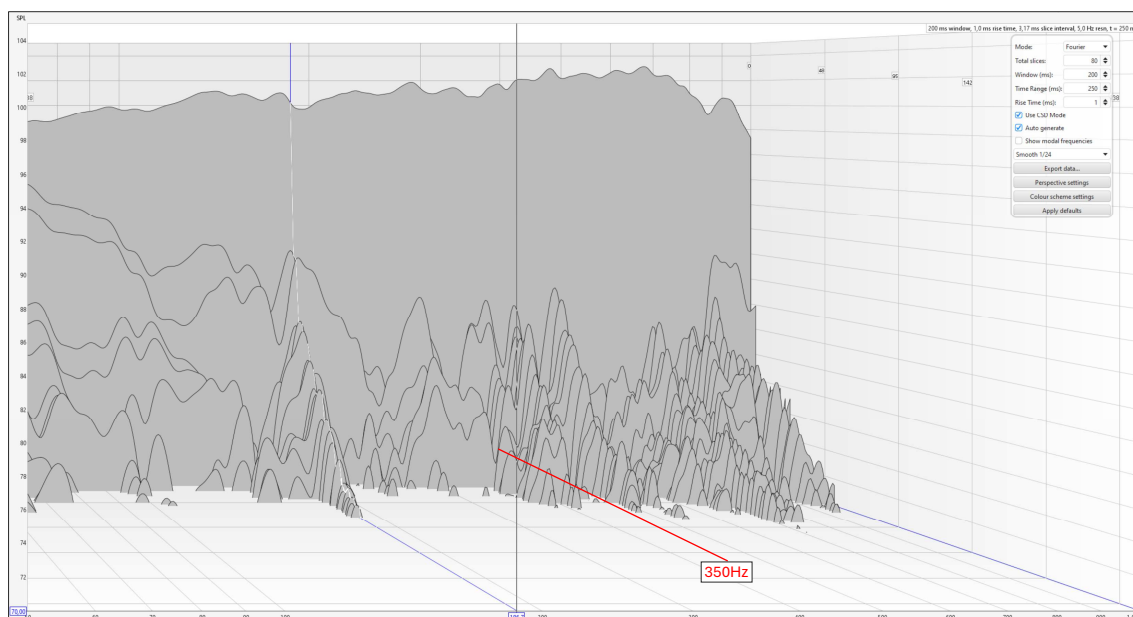
At the bottom end of the spectrum, you'll notice the classic blistering of BR speakers, which is why their reproduction is always a little 'boomy'. The rest of the spectrum shows no glaring anomalies.

As the temporal behaviour hardly varies with power, it may be interesting to look at what the near-field measurement near the cone shows, which makes it possible to overcome parasitic reflections. Of course this measurement is only of interest for the frequency range beyond the zone of action of the vent ($>75\text{Hz}$).

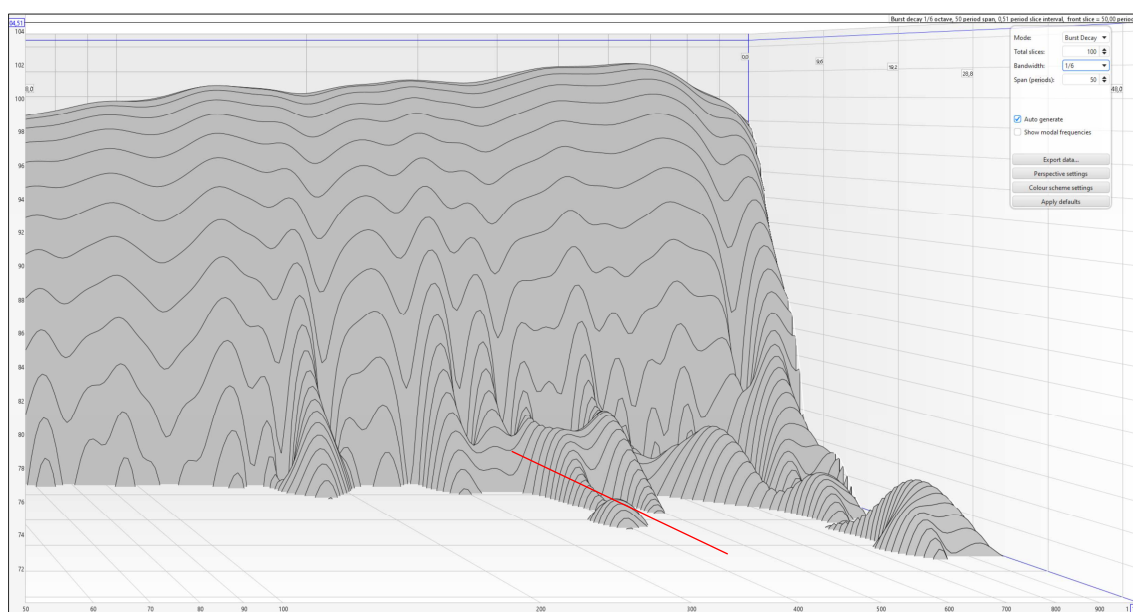


In the frequency range considered for this loudspeaker ($<350\text{Hz}$), we can only observe an anomaly, but one that extinguishes relatively quickly, at around 180Hz.

This is confirmed by the waterfall below, presented with a depth of 35dB.



The burst decay is perhaps a little more explicit since it displays the extinction in number of periods and not in milliseconds :



5. Conclusion

- 10" speakers capable of handling such high power levels are very rare (the 10RS430 is rated at 400W AES, Xmax 14mm). To tell the truth, I haven't identified any really competitive models. Hence the interest of the exercise.
- The HP's performance is very good. Response is even, distortion is well under control for a speaker of this diameter, and there are no design or manufacturing issues to note.
- Ideally, it can be used up to 350Hz, which makes no problem when connected to a well-chosen 6" to 8" midrange driver (tests to come), but it could be used up to 600 or 800 Hz without any real audible disadvantage if necessary.
- If you're a perfectionist, you could undoubtedly improve the behaviour of the port (a little) by increasing its cross-section and/or rounding off its ends.