5) Source noise reports:

5.1) SD3: Here is the source noise report 2019-119 Issue-1 published by TUV SUD. Measurements are performed on a SD6. The SD3 is the same design and make as the SD6. The difference is between the blade swept area which is 11.9m2 compared to the SD6 which is 24.6m2.

24.6 / 11.9 = 2.06

Hence an SD3 is 48% of an SD6.

According to Peggy Friis from DTU who advises EGV (Danish Energy Agency's Approval Secretariat for Wind Turbines). It is reasonable to estimate the source noise level from an SD3 will be approximately 50% of an SD6. The table below shows source noise figures for SD6 and for SD3. SD3 is the number adjusted -3 dB(A) which is a halving of noise (energy) compared to the SD6 measurements.

5.2) ENAIR E70-Pro: Included in the source noise report of Laboratory CEDER-CIEMAT 2018

5.3) Britwind R9000: For comparison with a similar but slightly larger mill, assigned to the source noise report for the Britwind R9000 Issued by Grontmij A/S Acoustic 2012

5.4) Reference Noise level (LWAref) declared from source noise report:

Wind Turbine	SD6	SD3	ENAIR E70-PRO	Britwind R-9000
Blade Area (m2)	24.6	11.9	14.9	23.75
Power (kW)	6	3	3.5	5
Sound Levels at **6 m/s** dB(A)	85.7	82.7	79.3	84.9
Sound Levels at **8 m/s** dB(A)	88.4	85.4	87.0	87.4
Low frequency at **6 m/s**	2.4	0 (-0.6)	20.00 *	69.3
Low frequency at 8 **m/s**	0 *	0 (-3.0)	23.9 *	70.6

*) Source noise report for SD6 and E70P does not contain specific LWA LF reference calculation. However, since broadband noise and low-frequency noise are proportional, the requirement is considered to be met. Similarly demonstrated by R9000 low frequency noise level.

6.0) **Calculation of noise level at different distances**: The sound pressure level 1.5 metres above ground LpA is calculated according to BEK135 on the basis of the reference sound power level as:

LpA = LWA,ref – 10·log(l2 + h2) – 11 +DeltaLg – DeltaLa dB

Where l = The distance from the Wind Turbine base to the point of calculation

h= Hub Height of Wind Turbine

DeltaLa = air absorption (1.0 dB for 10ºC. 75% RH, 75m)

DeltaLg = terrain correction (1.5 dB for land-based wind turbines)

6.1) Calculated noise level versus distance from turbine:

DISTANCE (**m**)		80	75	70	65	60	55	50	45
CORRECTION (**dB**)		-48.7	-48.2	-47.6	-47	-46.3	-45.6	-44.9	-44
MODEL	LWA Ref								
SD3 @ 6m/s	81.6	32.89	33.43	34.02	34.62	35.3	35.99	36.75	37.58
SD3 @ 8m/s	84.4	35.69	36.23	36.82	37.42	38.1	38.79	39.55	40.38
E70P @ 6m/s	79.3	30.59	31.13	31.73	32.32	33	33.69	34.45	35.28
E70P @ 8m/s	87	38.29	38.83	39.42	40.02	40.7	41.39	42.15	42.98
Britwind R9000 @ 6m/s	84.9	36.19	36.73	37.32	37.92	38.6	39.29	40.05	40.88
Britwind R9000 @ 8m/s	87.4	38.69	39.23	39.82	40.42	41.1	41.79	42.55	43.38
SD6 @ 6m/s	84.6	35.89	36.43	37.02	37.62	38.3	38.99	39.75	40.58
SD6 @ 8m/s	87.4	38.69	39.23	39.82	40.42	41.1	41.79	42.55	43.38

It is consistent with smaller turbines having low frequency noise which is why it is difficult to measure due to background noise. SD6/E70P measurements were not able to differentiate low frequency source noise from background noise.