

**Noise Assessment Report**  
Zaporozhia, Ukraine  
16 x V112-3.3/3.45 MW &  
151 x V126-3.3/3.45 MW

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## 1. Introduction

The client (EuroCape Ukraine, Kyiv) intend to build a wind farm in the northern outskirts of Oleksandrivka, Ukraine. The wind farm will consist of up to 167 WTGs (wind turbine generators): 16 type V-112 by Vestas Company (nominal capacity – 3.45 MW, rotor diameter – 112 m, tower height – 119 m), and 151 123 wind turbine generators type V-126 by Vestas and 28 wind turbine generators type General Electric Wind Energy GE 3.6 (nominal capacity – 3.63 MW, rotor diameter – 137 m, tower height – 110 m).

This noise impact study is based on the "worst case", the noise emissions were calculated for 167 WTGs.

The intended wind farm is within an agriculturally used area which is ranged by several hedges. Single provincial towns and places like Devninskoe, Dobrivka, Dunaevka, Girsivka, Mordvinivka and Nadeshdine are located around this area. Beside positive environmental effects of electricity produced by WTGs, e.g. with respect to air pollution control, wind farms can have negative impacts on human health and well-being because of harmful noise emissions. As with any machine involving moving parts, wind turbines generate noise during operation. Noise from WEA arises mainly from two sources: (1) mechanical noise caused by the gearbox and generator; and (2) aerodynamic noise caused by interaction of the turbine blades with the wind. By a noise impact calculation it can be examined if the noise emission of a planned wind farm will exceed harmful noise limits. In Ukraine by now no recommendation, guide line or law exists to evaluate possible noise emissions caused by an operation of a wind farm. However, as the client wishes to investigate possible noise impacts to dwellings, the study evaluated noise emissions of the intended wind-farm according to the international regulation of ISO 9613-2 (General).

## 2. Sound measurement

Sound is measured in decibels (dB) and displayed on a logarithmic scale, which is characterizing the human response to the wide range of sound levels in a better way, than a linear scale would do. The strength or loudness of sound emissions is referred to as the "sound power" or "sound power level". Modern wind turbine sound emissions are dominated by noise made by the tip of the blades. The tip speed is directly related to the rotor size, which is fixed, and to the rotor rotation rate which is in a ratio to the wind speed. The noise emission of a wind turbine can be seen as a point source which spreads out the noise equally to all directions. The intensity of noise decreases with increasing distance to its source. Objects and ground may absorb some of the sound as well as it is dissipated or attenuated in the air. The attenuation due to the air is very dependent on the temperature and humidity. Finally it may be reflected by objects which could increase the sound levels. When it gets to a listener the loudness is referred to "sound pressure" or "sound pressure level" (SPL) and it is also

measured in decibels (dB). “Sound pressure” and “sound power levels” are determined by using sensitive calibrated microphones. To measure and evaluate the human perception of sound these “raw sound measurements” are converted into a so called A-weighting indicated as dB(A). All sound numbers in this study are A-weighted values.

### 3. The noise assessment

This Assessment has been completed based on the following:

- Noise sensitive areas provided by the customer.
- Noise limits for the noise sensitive areas provided by the customer
- The general noise assessment has been carried out according the calculation standard ISO 9613-2 for wind speed of 10 m/s at 10 meters height above ground level
- The low frequency noise assessment has been carried out according the Danish low frequency model based on the “Statuary Order no. 1284 of 15 December 2011” for wind speed of 6 and 8 m/s at 10 meters height above ground level
- The low frequency model calculates the sound pressure level inside the considered houses. The used sound power levels for 6 and 8 m/s at 10 m height are defined using the site specific wind shear
- The noise levels of the power mode applied for the turbine layout from General Specification 0034- 7282 V10 (V112), and 0034-7616 V12 (V126)
- Octave data according to the documents no 0049-4886 V01 (V112) and 0048-2151 V03 (V126) has been used

### 4. Applied method to evaluate noise impact

The potential noise impact (sound pressure levels) of the intended wind farm was calculated with the WindPRO 2.8.579 software, module DECIBEL. As data input information about:

- the characteristic sound emission levels of the wind turbines,
- the hub height,
- the geographical position of each turbine (being the result of a Micrositing)
- the geographical position of each dwelling being possibly affected and
- the land use in terms of orography and structure of vegetation.

WindPRO calculates the sound pressure levels at all designated “noise sensitive locations.” which can be dwellings, property lines or any other location. In this study, “noise sensitive areas” are all residential buildings located next to the wind farm area.

The handling of the input data is in accordance to the internationally accepted standard for measuring wind turbine sound emissions, the IEC 61400-11. In each case, the data are assumed to have an uncertainty of +/- 2 dB. The sound power levels, **L<sub>W,A</sub>**, as specified by the manufacturers are shown in chapter 3 and table 1. Specifications for the wind turbines can be

found in the Appendices. These sound levels assume that the wind speed in the table is measured at 10 m above the ground and that specific assumptions can be made about how the wind changes with height.

To calculate the noise impact the ISO 9613-2 model was used which is commonly used and accepted worldwide. The model includes the following factors to calculate the sound pressure levels:

1. Reflections of the noise emitted by the turbines by which the noise heard by the receptor will be increased (**DC**).
2. Attenuation due to the spreading of the noise as the distance from the wind turbine increases, **Adiv**.
3. Attenuation due to absorption in the air, **Aatm**. For this calculation, the most conservative conditions (10° temperature and 70% humidity) are used.
4. Attenuation due to the shape of the terrain, **Agr**.
5. Attenuation due to shielding or noise protection, **Abar**. This is assumed to be zero in these calculations.
6. Attenuation due to buildings, vegetation or industry **Amisc**. This is also assumed to be zero in these calculations.
7. Additional attenuation due to meteorological conditions, **Cmet**. This is also assumed to be zero in these calculations.

If all of the sources of attenuation due to the location of the wind turbine are lumped together in one term, A, such that:

$$A = Adiv + Aatm + Agr + Abar + Amisc$$

then the sound pressure level at a receptor,  $L_{p,A}$ , is:

$$L_{p,A} = L_{W,A} + Dc - A - Cmet$$

During night time (10:00pm to 6:00am) a maximal noise impact of 45 dB (A) is assumed (day 50 dB (A)). Due to a lack of information further influencing parameters such as the noise preload could not be included in this study. For a better understanding examples of different sound levels are shown in Fig. 1.

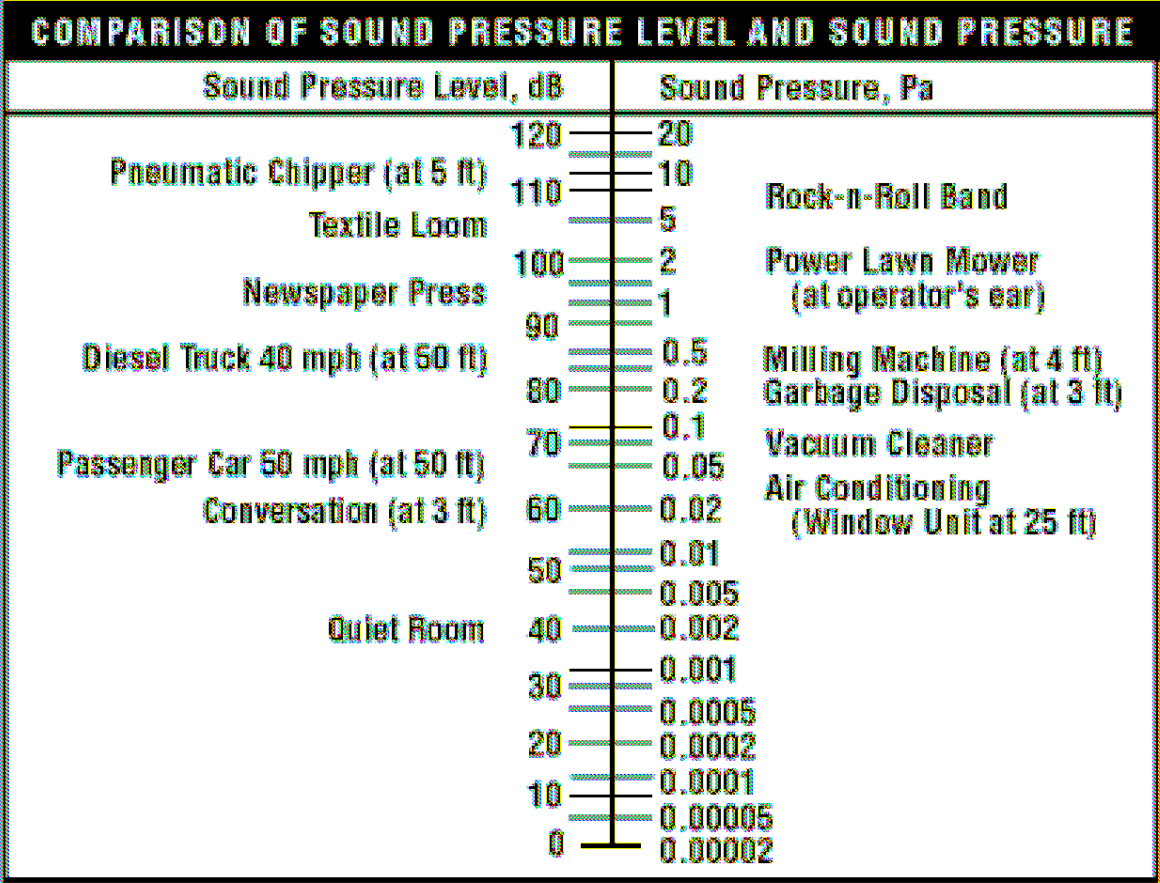


Fig. 1. Examples of noise levels

### 5. Location and WTG data

The customer plans to build a wind farm approximately north of the village Oleksandrivka. Nearby there lie single provincial towns and places like Devninskoe (DE), Neckine (NE), Dunaivka (DU), Viktorivka (V), Girsivka (G), Mordvinivka (M), Dobrovka (DO), Nadeshdine (NA), Novopokrovka (NO) and Volna (VO).

The wind farm area is surrounded by an agriculturally used area, criss-crossed by hedges (see the photos 1- 4).



Photo 1. Typical outskirts of Oleksandrivka I



Photo 2. Typical outskirts of Oleksandrivka II





Photo 3: Agricultural land, criss-crossed by hedges



Photo 4: A typical hedge



Based on a desk based analysis of the topographic maps UA-L36-059, UA-L36-060, UA-L36-048 and UA-L36-047 (scale 1:100.000) and generally accessible aerial picture information, verified through customer information a total of 52 dwellings identified as noise sensible areas, possible affected by noise emissions from the wind farm. These are the nearest houses in the peripheral zones of the villages Devninskoe, Nechkine, Dunaivka, Viktorivka, Girsivka, Mordvinivka, Dobrovka, Nadeshdine, Novopokrovka, Volna and Oleksandrivka. The position of the noise recipients are shown in Map 1 and figure 2. The coordinates as well as the distances between the noise recipients and the WTG (in meters) are given in the appendix (see WindPro main result and detailed results). The characteristics of the turbine type are shown in Tab. 1.

Tab. 1. Working data WEA for general noise

	<b>Vestas V112</b>	<b>Vestas V126</b>	<b>General Electric GE3.6</b>
<b>Number of turbines</b>	16	123	28
<b>Producer</b>	Vestas	Vestas	General Electric
<b>WEA type</b>	Vestas V112-3.3	Vestas V126-3.3	GE 3.6
<b>Rotor diameter m</b>	112	126	137
<b>Hub height m</b>	119	117	110
<b>Capacity MW</b>	3.45 MW	3.45MW	3.63MW
<b>Rotor speed m/s</b>	10	10	10
<b>Noise prediction dB(A)</b>	106.7	108.0	106.0

## 6. Results

The calculated sound pressure levels at each of the 52 noise sensitive locations are shown in **Error! Reference source not found.** The detailed results of the WindPRO analysis are presented in the Appendix. Assuming an allowed noise immission of 45 dB(A) during night time and 50 dB(A) during the day, in none of the potentially affected dwellings even the critical value for the nighttime is exceeded. Thus no harmful noise impacts would occur. The turbine producer defines the uncertainty of the sound power level to be +/- 2 dB(A). But also in this case in none of the potentially affected dwellings even the critical value of 45 dB (A) during night time and 50 dB(a) during the day is exceeded, too.

Tab. 2. Results of the calculation during nighttime for the general noise

<b>Noise recipient</b>	<b>place</b>	<b>Acceptances dB(A)</b>	<b>total load dB(A)</b>	<b>Acceptable</b>
A	Devninskoe Village	45.0	34.0	YES
B	Devninskoe Village	45.0	35.1	YES
C	Devninskoe Village	45.0	36.6	YES
D	Devninskoe Village	45.0	35.7	YES
E	Dobrovka Village	45.0	35.0	YES
F	Dobrovka Village	45.0	38.1	YES

Noise recipient	place	Acceptances dB(A)	total load dB(A)	Acceptable
G	Dobrovka Village	45.0	37.7	YES
H	Dobrovka Village	45.0	35.0	YES
I	Dunaivka Village	45.0	32.2	YES
J	Dunaivka Village	45.0	31.8	YES
K	Dunaivka Village	45.0	34.2	YES
L	Dunaivka Village	45.0	37.6	YES
M	Dunaivka Village	45.0	37.9	YES
N	Dunaivka Village	45.0	36.3	YES
O	Girsivka Village	45.0	34.0	YES
P	Girsivka Village	45.0	36.7	YES
Q	Girsivka Village	45.0	36.8	YES
R	Girsivka Village	45.0	35.8	YES
S	Girsivka Village	45.0	33.4	YES
T	Mordvinivka Village	45.0	35.1	YES
U	Mordvinivka Village	45.0	35.3	YES
V	Mordvinivka Village	45.0	35.0	YES
W	Mordvinivka Village	45.0	33.2	YES
X	Mordvinivka Village	45.0	30.4	YES
Y	Nadeshdine Village	45.0	36.4	YES
Z	Nadeshdine Village	45.0	36.7	YES
AA	Nadeshdine Village	45.0	36.5	YES
AB	Nadeshdine Village	45.0	36.9	YES
AC	Nadeshdine Village	45.0	39.4	YES
AD	Nadeshdine Village	45.0	37.2	YES
AE	Nechkine Village	45.0	33.7	YES
AF	Nechkine Village	45.0	32.4	YES
AG	Nechkine Village	45.0	31.1	YES
AH	Nechkine Village	45.0	32.2	YES
AI	Novopokrovka Village	45.0	32.7	YES
AJ	Novopokrovka Village	45.0	35.0	YES
AK	Novopokrovka Village	45.0	34.6	YES
AL	Oleksandrivka Village	45.0	36.5	YES
AM	Oleksandrivka Village	45.0	31.5	YES
AN	Oleksandrivka Village	45.0	28.0	YES
AO	Oleksandrivka Village	45.0	26.2	YES
AP	Oleksandrivka Village	45.0	26.7	YES
AQ	Oleksandrivka Village	45.0	29.4	YES
AR	Oleksandrivka Village	45.0	31.4	YES
AS	Viktorivka Village	45.0	30.5	YES
AT	Viktorivka Village	45.0	28.5	YES
AU	Viktorivka Village	45.0	27.9	YES
AV	Viktorivka Village	45.0	30.9	YES
AW	Volna Village	45.0	43.3	YES
AX	Volna Village	45.0	39.5	YES
AY	Volna Village	45.0	39.2	YES
AZ	Volna Village	45.0	43.1	YES

## 7. Summary

The Client intend to build a wind farm in the northern outskirts of Oleksandrivka, Ukraine. The wind farm will consist of up to 167 WTGs (wind turbine generators): 16 type V-112 by Vestas Company (nominal capacity – 3.45 MW, rotor diameter – 112 m, tower height – 119 m), and 151 123 wind turbine generators type V-126 by Vestas and 28 wind turbine generators type General Electric Wind Energy GE 3.6 (nominal capacity – 3.63 MW, rotor diameter – 137 m, tower height – 110 m).

The intended wind farm is within an agriculturally used area, criss-crossed by hedges. Nearby there lie the single provincial towns Devninskoe, Nechkine, Dunaivka, Viktorivka, Girsivka, Mordvinivka, Dobrovka, Nadeshdine, Novopokrovka, Volna and Oleksandrivka.

Based on a desk based analysis of the topographic maps UA-L36-059, UA-L36-060, UA-L36-048 and UA-L36-047 (scale 1:100.000) and generally accessible aerial picture information, verified through customer information a total of 52 dwellings identified as noise sensible areas, possible affected by noise emissions from the wind farm. These are the nearest houses in the peripheral zones of the above-named neighboring villages. The potential noise impact (sound pressure levels) of the 52 dwellings was calculated with the WindPRO 2.8.579 software, module DECIBEL. In Ukraine by now no recommendation, guide line or law exists to evaluate possible noise emissions caused by an operation of a wind farm. However, as the client wishes to investigate possible noise impacts to dwellings, the study evaluated noise emissions of the intended wind-farm according to the international regulation of ISO 9613-2 (General). According to the WindPro 2.8.579 User guide this calculation model is internationally applicable. The results of the noise study show that for none of the 52 noise recipients the acceptable noise limit of 45 dB(A) is exceeded.

Thus for the dwellings next to the wind farm no harmful noise impact is to be expected.

## 8. References

[1] ISO 9613-2: Acoustics -- Attenuation of sound during propagation outdoors -- Part 2: General method of calculation

[2] WindPRO 2.8.579 User Giude, EMD International A/S, Aalborg, DENMARK

**Appendix 1 – Noise modeling results**





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**DECIBEL - Main Result****Sound Level**

Noise sensitive area		UTM (north)-WGS84 Zone: 36				Demands		Sound Level	Demands fulfilled ?
No.	Name	East	North	Z	Imission height	Noise	From WTGs	Noise	
				[m]	[m]	[dB(A)]	[dB(A)]		
A	Noise sensitive point: User defined (1)	695 734	5 170 724	0.0	5.0	45.0	34.0	Yes	
B	Noise sensitive point: User defined (2)	695 411	5 170 377	0.0	5.0	45.0	35.1	Yes	
C	Noise sensitive point: User defined (3)	695 317	5 169 633	0.0	5.0	45.0	36.6	Yes	
D	Noise sensitive point: User defined (4)	695 908	5 168 958	0.0	5.0	45.0	35.7	Yes	
E	Noise sensitive point: User defined (5)	694 650	5 176 827	0.0	5.0	45.0	35.0	Yes	
F	Noise sensitive point: User defined (6)	693 876	5 176 261	0.0	5.0	45.0	38.1	Yes	
G	Noise sensitive point: User defined (7)	694 296	5 175 572	0.0	5.0	45.0	37.7	Yes	
H	Noise sensitive point: User defined (8)	695 249	5 175 115	0.0	5.0	45.0	35.0	Yes	
I	Noise sensitive point: User defined (9)	684 080	5 160 891	0.0	5.0	45.0	32.2	Yes	
J	Noise sensitive point: User defined (10)	684 610	5 160 109	0.0	5.0	45.0	31.8	Yes	
K	Noise sensitive point: User defined (11)	685 900	5 160 095	0.0	5.0	45.0	34.2	Yes	
L	Noise sensitive point: User defined (12)	686 835	5 160 335	0.0	5.0	45.0	37.6	Yes	
M	Noise sensitive point: User defined (13)	686 714	5 160 900	0.0	5.0	45.0	37.9	Yes	
N	Noise sensitive point: User defined (14)	685 807	5 161 293	0.0	5.0	45.0	36.3	Yes	
O	Noise sensitive point: User defined (15)	682 666	5 169 326	0.0	5.0	45.0	34.0	Yes	
P	Noise sensitive point: User defined (16)	683 700	5 168 927	0.0	5.0	45.0	36.7	Yes	
Q	Noise sensitive point: User defined (17)	683 706	5 167 284	0.0	5.0	45.0	36.8	Yes	
R	Noise sensitive point: User defined (18)	683 417	5 166 775	0.0	5.0	45.0	35.8	Yes	
S	Noise sensitive point: User defined (19)	682 558	5 166 769	0.0	5.0	45.0	33.4	Yes	
T	Noise sensitive point: User defined (20)	681 462	5 178 092	0.0	5.0	45.0	35.1	Yes	
U	Noise sensitive point: User defined (21)	681 532	5 177 722	0.0	5.0	45.0	35.3	Yes	
V	Noise sensitive point: User defined (22)	681 576	5 176 822	0.0	5.0	45.0	35.0	Yes	
W	Noise sensitive point: User defined (23)	681 192	5 176 260	0.0	5.0	45.0	33.2	Yes	
X	Noise sensitive point: User defined (24)	680 117	5 176 040	0.0	5.0	45.0	30.4	Yes	
Y	Noise sensitive point: User defined (25)	686 035	5 174 759	0.0	5.0	45.0	36.4	Yes	
Z	Noise sensitive point: User defined (26)	687 059	5 174 954	0.0	5.0	45.0	36.7	Yes	
AA	Noise sensitive point: User defined (27)	687 213	5 174 387	0.0	5.0	45.0	36.5	Yes	
AB	Noise sensitive point: User defined (28)	687 080	5 173 540	0.0	5.0	45.0	36.9	Yes	
AC	Noise sensitive point: User defined (29)	685 985	5 172 994	0.0	5.0	45.0	39.4	Yes	
AD	Noise sensitive point: User defined (30)	685 298	5 173 411	0.0	5.0	45.0	37.2	Yes	
AE	Noise sensitive point: User defined (31)	693 808	5 161 707	0.0	5.0	45.0	33.7	Yes	
AF	Noise sensitive point: User defined (32)	694 180	5 161 255	0.0	5.0	45.0	32.4	Yes	
AG	Noise sensitive point: User defined (33)	695 204	5 161 746	0.0	5.0	45.0	31.1	Yes	
AH	Noise sensitive point: User defined (34)	694 795	5 162 240	0.0	5.0	45.0	32.2	Yes	
AI	Noise sensitive point: User defined (35)	694 746	5 178 887	0.0	5.0	45.0	32.7	Yes	
AJ	Noise sensitive point: User defined (36)	694 163	5 178 250	0.0	5.0	45.0	35.0	Yes	
AK	Noise sensitive point: User defined (37)	694 509	5 177 675	0.0	5.0	45.0	34.6	Yes	
AL	Noise sensitive point: User defined (38)	690 925	5 159 361	0.0	5.0	45.0	36.5	Yes	
AM	Noise sensitive point: User defined (39)	689 968	5 157 380	0.0	5.0	45.0	31.5	Yes	
AN	Noise sensitive point: User defined (40)	689 237	5 155 791	0.0	5.0	45.0	28.0	Yes	
AO	Noise sensitive point: User defined (41)	690 115	5 154 776	0.0	5.0	45.0	26.2	Yes	
AP	Noise sensitive point: User defined (42)	691 458	5 155 353	0.0	5.0	45.0	26.7	Yes	
AQ	Noise sensitive point: User defined (43)	692 099	5 157 235	0.0	5.0	45.0	29.4	Yes	
AR	Noise sensitive point: User defined (44)	692 265	5 158 415	0.0	5.0	45.0	31.4	Yes	
AS	Noise sensitive point: User defined (45)	686 213	5 157 832	0.0	5.0	45.0	30.5	Yes	
AT	Noise sensitive point: User defined (46)	685 634	5 157 063	0.0	5.0	45.0	28.5	Yes	
AU	Noise sensitive point: User defined (47)	685 831	5 156 534	0.0	5.0	45.0	27.9	Yes	
AV	Noise sensitive point: User defined (48)	686 693	5 157 709	0.0	5.0	45.0	30.9	Yes	
AW	Noise sensitive point: User defined (49)	689 155	5 170 080	0.0	5.0	45.0	43.3	Yes	
AX	Noise sensitive point: User defined (50)	691 215	5 172 303	0.0	5.0	45.0	39.5	Yes	
AY	Noise sensitive point: User defined (51)	691 417	5 172 137	0.0	5.0	45.0	39.2	Yes	
AZ	Noise sensitive point: User defined (52)	689 341	5 169 920	0.0	5.0	45.0	43.1	Yes	







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**DECIBEL - Main Result**

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Table with 24 columns (WTG, A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V) and 100 rows of numerical data. The table contains decibel values for various wind turbine configurations.

To be continued on next page...







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**DECIBEL - Main Result**

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WTG	AS	AT	AU	AV	AW	AX	AY	AZ
31	5673	6428	6955	5851	7403	10353	10321	7349
32	5515	6207	6750	5741	7883	10859	10836	7841
33	5747	6564	7068	5868	7037	9933	9887	6964
34	5047	5908	6389	5124	7586	10400	10335	7491
35	5120	6023	6472	5139	7479	10212	10133	7367
36	5700	6611	7053	5703	6911	9620	9539	6793
37	6246	7123	7594	6295	6363	9171	9107	6265
38	5934	6871	7280	5882	6806	9397	9300	6668
39	5588	6540	6921	5496	7305	9820	9712	7157
40	5332	6293	6638	5192	7796	10230	10111	7638
41	4508	5470	5800	4349	8612	11081	10964	8460
42	3634	4592	4955	3524	9196	11780	11676	9061
43	3130	4093	4425	2978	9794	12362	12255	9658
44	3096	4047	4312	2856	10175	12673	12556	10030
45	9709	10628	11061	9685	3056	5602	5520	2891
46	9165	10097	10513	9115	3758	6170	6067	3581
47	8696	9639	10037	8621	4398	6710	6593	4214
48	8106	9053	9442	8020	5001	7330	7211	4822
49	7121	8040	8474	7103	5537	8190	8105	5405
50	6540	7476	7887	6489	6218	8790	8692	6075
51	7137	8076	8481	7076	5702	8213	8110	5548
52	6802	7754	8134	6707	6221	8642	8527	6058
53	7524	8476	8854	7424	5623	7958	7836	5448
54	6915	7877	8201	6747	6755	8931	8790	6568
55	6504	7463	7813	6368	6773	9104	8977	6601
56	6287	7249	7566	6110	7303	9548	9411	7124
57	6365	7323	7601	6145	7699	9822	9672	7510
58	6839	7790	8037	6588	7815	9771	9608	7614
59	6361	7302	7524	6085	8394	10391	10229	8196
60	5837	6789	7044	5592	8304	10459	10311	8119
61	5389	6350	6641	5184	8223	10523	10388	8051
62	5408	6346	6568	5128	8928	11091	10942	8745
63	4468	5399	5612	4176	9583	11872	11733	9412
64	3577	4506	4721	3282	10149	12550	12422	9992
65	10654	11470	11977	10758	2799	5798	5845	2869
66	10512	11388	11861	10550	2129	5094	5082	2073
67	10660	11555	12012	10670	1947	4762	4724	1826
68	10176	11083	11529	10169	2492	5166	5103	2343
69	10195	11051	11537	10258	2597	5610	5612	2578
70	10071	10900	11401	10163	3016	6047	6068	3035
71	9190	10098	10543	9183	3458	6142	6072	3321
72	8786	9675	10137	8809	3810	6629	6577	3707
73	8433	9299	9778	8487	4217	7120	7082	4141
74	7754	8622	9100	7808	4883	7756	7710	4799
75	7222	8108	8572	7255	5377	8177	8115	5274
76	6440	7351	7793	6438	6178	8880	8799	6057
77	11794	12677	13144	11820	828	3835	3844	807
78	11246	12146	12599	11250	1397	4159	4122	1249
79	12475	13337	13819	12526	869	3644	3716	1074
80	10762	11675	12115	10744	2031	4558	4487	1848
81	9822	10757	11168	9764	3281	5539	5427	3083
82	9302	10247	10640	9219	3996	6156	6029	3795
83	8757	9713	10078	8638	4861	6904	6761	4656
84	9150	10110	10454	9005	4992	6786	6624	4771
85	9758	10719	11059	9608	4768	6336	6161	4536
86	10360	11321	11658	10206	4608	5914	5726	4368
87	10957	11918	12252	10799	4528	5531	5329	4283
88	11252	12215	12526	11070	5069	5795	5576	4824
89	11587	12549	12880	11425	4531	5175	4957	4286
90	12199	13161	13489	12034	4615	4881	4649	4375
91	12843	13805	14130	12675	4796	4647	4402	4565
92	12627	13590	13896	12438	5310	5264	5018	5073

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**DECIBEL - Main Result**

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WTG	AS	AT	AU	AV	AW	AX	AY	AZ
93	12275	13237	13526	12069	5710	5835	5591	5469
94	12267	13225	13492	12038	6300	6410	6164	6058
95	12290	13242	13487	12040	6890	6988	6739	6648
96	13401	14363	14695	13241	4749	4241	3988	4530
97	13678	14633	15000	13559	3768	3056	2807	3572
98	13862	14810	15194	13763	3331	2461	2217	3155
99	13374	14318	14712	13288	2804	2504	2290	2613
100	12780	13722	14120	12700	2478	2879	2696	2260
101	12181	13120	13523	12109	2272	3332	3177	2033
102	11559	12495	12904	11496	2229	3855	3724	1985
103	11624	12570	12961	11536	2769	4006	3843	2523
104	11435	12388	12761	11323	3363	4458	4276	3118
105	11277	12236	12588	11141	3964	4943	4746	3719
106	10201	11158	11518	10075	4123	5687	5518	3888
107	10373	11323	11704	10273	3541	5263	5111	3309
108	10575	11516	11917	10501	2962	4875	4743	2735
109	10987	11919	12334	10933	2355	4371	4257	2126
110	10417	11345	11767	10374	2620	4908	4808	2417
111	16900	17839	18242	16825	5055	2095	2008	5018
112	17430	18373	18768	17344	5691	2736	2649	5650
113	17240	18168	18588	17188	5046	2021	2046	5052
114	17830	18768	19173	17757	5859	2836	2805	5843
115	18088	19018	19436	18032	5892	2874	2904	5904
116	17493	18413	18844	17456	5128	2184	2277	5163
117	16422	17333	17774	16400	3973	1166	1345	4019
118	16700	17602	18053	16694	4151	1637	1855	4230
119	18063	18971	19416	18047	5546	2814	2966	5617
120	18721	19639	20073	18687	6303	3410	3510	6352
121	18517	19418	19870	18511	5953	3345	3515	6041
122	17618	18499	18969	17641	5027	2959	3194	5156
123	18107	18980	19455	18139	5537	3566	3800	5678
124	18978	19871	20330	18982	6389	3895	4076	6491
125	19156	20067	20508	19133	6661	3864	3988	6728
126	19402	20305	20755	19393	6844	4184	4335	6931
127	18597	19463	19943	18639	6059	4167	4401	6210
128	18992	19870	20342	19018	6406	4220	4432	6537
129	19447	20333	20798	19460	6850	4460	4650	6966
130	19855	20751	21208	19855	7272	4705	4868	7371
131	20477	21381	21830	20466	7921	5233	5373	8008
132	20332	21221	21684	20342	7737	5262	5435	7847
133	19931	20811	21281	19954	7341	5040	5236	7466
134	20469	21341	21817	20502	7897	5687	5888	8033
135	20910	21795	22262	20926	8314	5890	6067	8432
136	21003	21899	22356	21002	8419	5824	5976	8518
137	21500	22387	22851	21512	8903	6426	6594	9017
138	22067	22949	23417	22084	9471	7031	7201	9591
139	21474	22331	22817	21523	8959	6894	7102	9110
140	20862	21723	22206	20907	8330	6252	6462	8478
141	21838	22674	23173	21910	9453	7635	7859	9623
142	21258	22098	22595	21327	8855	7043	7269	9024
143	20677	21520	22015	20742	8254	6451	6679	8422
144	20337	21192	21679	20390	7845	5913	6135	8002
145	20109	20947	21444	20179	7733	6071	6308	7907
146	19941	20765	21269	20026	7696	6267	6513	7883
147	19395	20161	20689	19533	7882	7299	7560	8106
148	19262	20003	20539	19421	8120	7824	8085	8353
149	19186	19905	20446	19361	8376	8294	8554	8614
150	19116	19806	20354	19311	8755	8918	9176	8998
151	19594	20298	20843	19780	8957	8908	9168	9196
152	19726	20454	20994	19895	8719	8438	8699	8953
153	19751	20502	21035	19901	8407	7898	8159	8634
154	20378	21127	21660	20529	9006	8392	8652	9231

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**DECIBEL - Main Result**

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WTG	AS	AT	AU	AV	AW	AX	AY	AZ
155	20328	21054	21594	20497	9276	8886	9147	9509
156	20202	20905	21450	20388	9501	9334	9595	9739
157	20719	21431	21974	20898	9826	9484	9745	10060
158	20996	21726	22265	21162	9823	9273	9534	10052
159	20957	21710	22243	21106	9494	8743	9001	9716
160	21252	22021	22548	21387	9562	8594	8850	9776
161	21842	22608	23136	21979	10157	9138	9391	10370
162	21614	22363	22897	21765	10147	9323	9580	10367
163	21596	22324	22863	21763	10406	9781	10040	10633
164	21318	22028	22572	21499	10394	9967	10228	10627
165	21917	22625	23170	22099	10965	10460	10720	11196
166	22110	22847	23384	22270	10767	9988	10246	10990
167	22204	22957	23490	22352	10655	9714	9968	10872