Ultra Low Emission Bus Scheme Certificate - ESTIMATED

Customer:	**Wrigthbus Ltd**					
Customer Address:	**Wrightbus, Galgorm Industrial Estate, Ballymena, BT42 1PY**					
Test Purpose:	**ULEB Energy Consumption Simulation******			**DYNAMOMETER SETTINGS**		
Vehicle manufacturer:	**Wrightbus**	*Unladen Weight (kg)*	13200.0	Test Weight	14499.00	kg
Vehicle Type & Number:	**Wrightbus StreetAir**	*Gross Weight (kg)*	18000.0	F^0	1050.70	N
Engine:	**Electric drive motor**	*Seated Capacity*	27	F^1	87.3170	N/km/h
Transmission:	**N/A**	*Passenger Capacity*	**69**	F^2	-6.60490	N/(km/h) ^{2}
Euro VI certificate Y/N	**N/A**	GVW CHECK	**OK**	F^3	0.320760	N/(km/h) ^{3}

Declared fuel, properties and source plus carbon conversion factors

Net Heating Value: ***Diesel***	**N/A**	MJ / Litre	*Fuel Provider*	**UK market standard**
Well-to-Tank Factor: ***Diesel***	**N/A**	g CO2e / MJ	*WTT Evidence*	**UK GHG reporting factors 2018**
Well-to-Tank Factor: ***Electricity***	**97.99**	g CO2e / MJ	*Fuel Type**	**UK Grid Electricity inc. WTT + T&D**

Emissions and Energy consumption results from approved test facility - Average 3 tests

Test Phase	HC (g/km)	CO (g/km)	Nox (g/km)	PM (g/km)	CO_2 (g/km)	CH_4 (g/km)*	N_2O (g/km)*	Energy Consumption (KWhr)	Electrical Energy Consumption (kWh/ 100 km)
Outer london	0.00	0.00	0.00	0.000	0.00	0.000	0.000	11.53	178.4
Inner London	0.00	0.00	0.00	0.000	0.00	0.000	0.000	5.88	234.8
Rural	0.00	0.00	0.00	0.000	0.00	0.000	0.000	10.28	138.9
MLTB Average	0.00	0.00	0.00	0.0000	0.00	0.000	0.000	17.41	194.1
ULEB Average	**0.00**	**0.00**	**0.00**	**0.0000**	**0.00**	**0.000**	**0.000**	**27.69**	**169.1**

Zero Emissions (Z.E.) Range: Energy consumption and charging efficiency

Total measured energy consumed on vehicle (kWh)	***110.75***	**Distance in Z.E. mode (km)**	***65.48***	**Usable Battery Capacity (kWh)**	**240.0**
Measured grid energy during charging (kWh)	***120.38***	**Charging efficiency (%)**	***92%***	**Max Theoretical Z.E. Range (km)**	**141.9**

Total Tank-to-Wheel GHG CO_2 equivalent

Test Phase	CO_2 (g/km)	CH_4 (g/km x 25)*	N_2O (g/km x 298)*	Fuel TTW** GHG (CO2 Equivalent g/km)
Outer london	0.00	0.000	0.00	0.00
Inner London	0.00	0.000	0.00	0.00
Rural	0.00	0.000	0.00	0.00
MLTB	0.00	0.000	0.00	0.00
ULEB Total Average	**0.00**	**0.000**	**0.00**	**0.00**

Calculated total Well-to-Wheel GHG CO_2 equivalent emissions over test

Test Phase	Fuel Energy (MJ / km)	Fuel WTT*GHG Emissions (g CO_2e / km)	Electrical Energy (MJ / km)	Electricity WTT*GHG Emissions (g CO_2e / km)	Measured Fuel TTW**GHG Emissions (g CO_2e / km)	Total WTW*** GHG Emissions (g CO_2e / km)
Outer london	0.00	0.00	6.42	629.20	0.00	629.20
Inner London	0.00	0.00	8.45	828.40	0.00	828.40
Rural	0.00	0.00	5.00	489.83	0.00	489.83
MLTB	0.00	0.00	6.99	684.78	0.00	684.78
ULEB Total Average	**0.00**	**0.00**	**6.09**	**596.62**	**0.00**	**596.62**

Data Generated by (On behalf of Test facility): *30 May 2018*	*Data Approved by:* *30 May 2018*

Ultra Low Emission Bus Certificate Summary

GHG Well-to-Wheel	***596.62***	**g CO2e / km**
Euro VI Average Diesel Equivalent	***1129.98***	**g CO2e / km**
WTW GHG saving (compared with Euro VI diesel equivalent)	***533.36***	**g CO2e / km**
% WTW GHG saving (compared with Euro VI diesel equivalent)	***47%***	**g CO2e / km**
Max Theoretical Zero Emission Operating Range (km)	***141.9***	**km**
WTW CO2 per passenger km (@ Max Pass Capacity)	**8.6**	**g CO2e / pass km**
Approved as Ultra-Low Emission Bus? (30% saving or more)	***YES***	

**** WTT : Well-to-Tank*** ***** TTW : Tank-to-Wheel*** ****** WTW : Well-to-Wheel***

COMMENTS: **ALL RESULTS ARE FROM SIMULATION. Dynamometer Force coefficents $F^{\#}$ are not used for simulation as the corresponding dynamometer coefficients $D^{\#}$ are unknown. Coastdown curve from a Streetdeck (test mass 15401kg) was used to simulate aerodynamic and rolling resistance forces. UK Grid Electricity WTT factor includes transmission and distribution loses (T&D) and well-to-tank emissions for generation and T&D for 2017.**

Test Numbers: Simulated test using calculation

Certificate approved by: *On behalf of Bus manufacturer*	*Certificate approved by:* *On behalf of LowCVP/DfT*