

Report Nr. LM2408051.01_v0

Project Nr. LM2408051

ELECTRICITY CONSUMPTION TEST ACCORDING TO THE E-SORT PROCEDURE

Client's reference:

Xiamen King Long United Automotive Industry CO.,
LTD.

Represented by: --

Performed by:



Aaron Huang
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Powertrain Department

Approved by:



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Powertrain Department

Test period: 16th July to 18th July 2024

Issue date: 22nd of August 2024

This report contains 22 pages, including this cover and 4 annex.

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1. OBJECTIVE

The purpose of this project was to realise e-SORT electrical consumption tests carried out by IDIADA in cooperation with Kinglong at the performance track of Chongqing Motor Vehicle Compulsory Inspection Proving Ground (Jiulongpo, Chongqing, China), following e-SORT procedure. Kinglong was in charge of the test equipment correctly functioning and correctly measuring and for driving the tested bus under supervision of an IDIADA's engineer. The IDIADA's engineer was responsible for realization of the whole test according to the e-SORT standard.

2. VEHICLE INFORMATION

2.1. Basic vehicle information

The table below shows the vehicle characteristics:



Test applicant	Xiamen King Long United Automotive Industry Co., Ltd	
Manufacturer	Xiamen King Long United Automotive Industry Co., Ltd	
Vehicle	M3	
Type	XMQ6750BGWBEV	
Reception date	15/07/2024	
Chassis n°	LA9LC20E7RALA6541	
Engine	N/A	
Gearbox	N/A	
Tyres	Double Coin 215/75R17.5	
Mileage Initial / final (km)	860	1047

The results refer exclusively to the sample tested.

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3. TEST RESULTS

3.1. E-SORT electricity consumption results

The table below shows the vehicle electricity consumption for the E-SORT protocol:

	Electricity consumption		Range	
Cycle SORT 1	kWh/km	0.398	km	390.7
Cycle SORT 2	kWh/km	0.390	km	398.7
Cycle SORT 3	kWh/km	0.414	km	375.8
Energy from grid to charger	kWh	165.290		
Energy from charger to vehicle battery	kWh	155.506		
Charger efficiency	%	94.1		

3.2. Vehicle test weight

The table below shows the vehicle weight for the E-SORT tests:

Total weight	(kg)	8082
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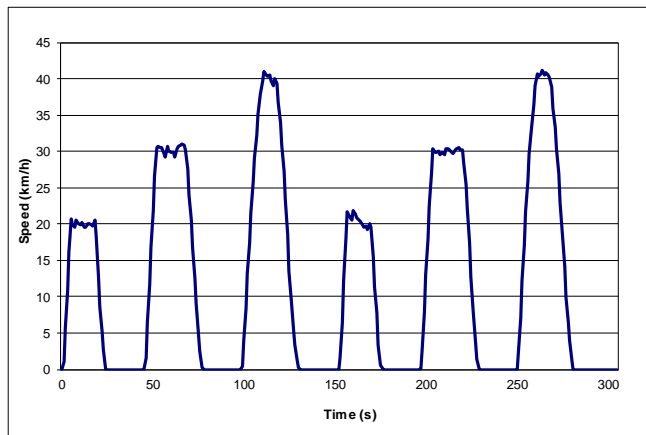
3.3. Test cycle SORT 1

The tables below show test characteristics in both directions of SORT1 cycles:

SORT 1 - Test 1

DIRECTION 1

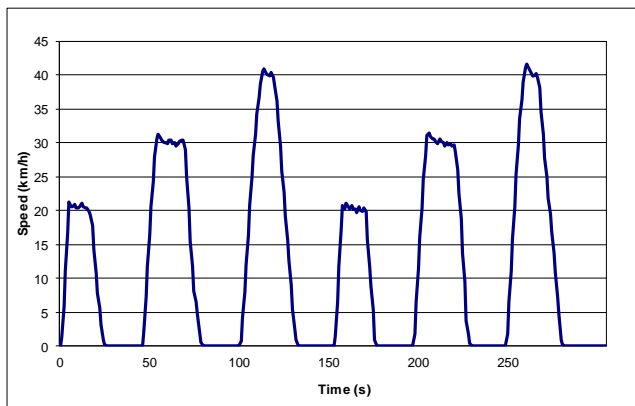
Date
17/07/2024 6:51



Total test distance	(m)	1,040.4
Total test time	(s)	305.0
Cycle speed	(km/h)	12.3
Total electricity / distance	(kWh/km)	0.401

DIRECTION 2

Date
17/07/2024 20:30



Total test distance	(m)	1,040.6
Total test time	(s)	305.0
Cycle speed	(km/h)	12.3
Total electricity / distance	(kWh/km)	0.398

Speed average	(km/h)	12.3
Electricity consumption average	(kWh/km)	0.399

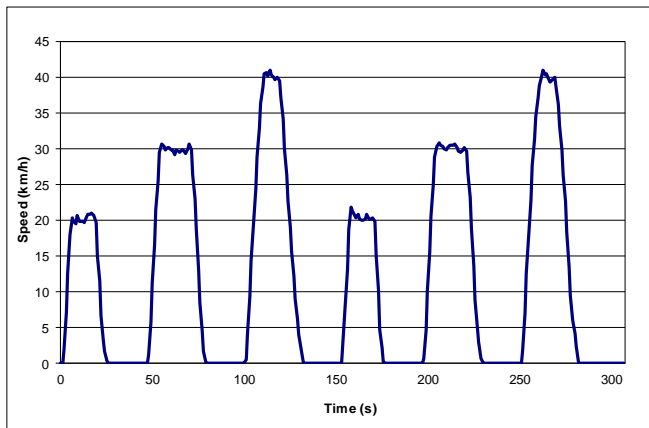
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SORT 1 - Test 2

DIRECTION 1

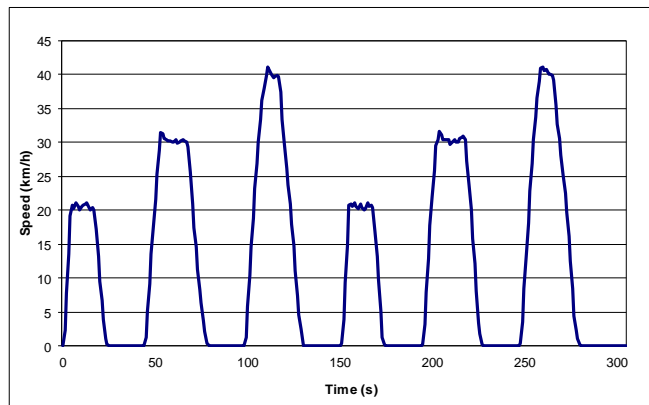
Date
17/07/2024 7:13



Total test distance	(m)	1,040.8
Total test time	(s)	306.0
Cycle speed	(km/h)	12.2
Total electricity / distance	(kWh/km)	0.399

DIRECTION 2

Date
17/07/2024 21:06



Total test distance	(m)	1,040.3
Total test time	(s)	305.0
Cycle speed	(km/h)	12.3
Total electricity / distance	(kWh/km)	0.396

Speed average	(km/h)	12.3
Electricity consumption average	(kWh/km)	0.398

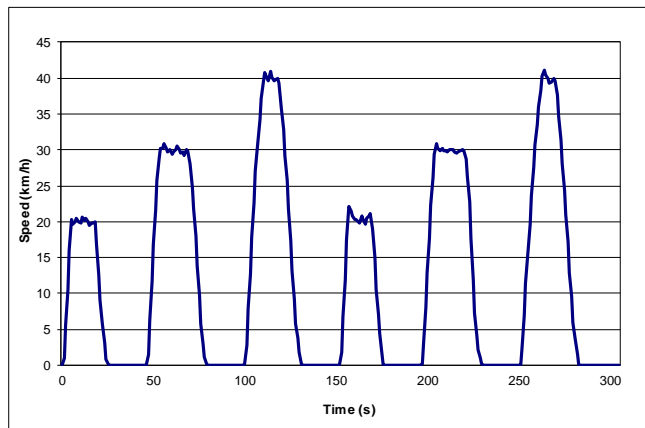
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SORT 1 - Test 3

DIRECTION 1

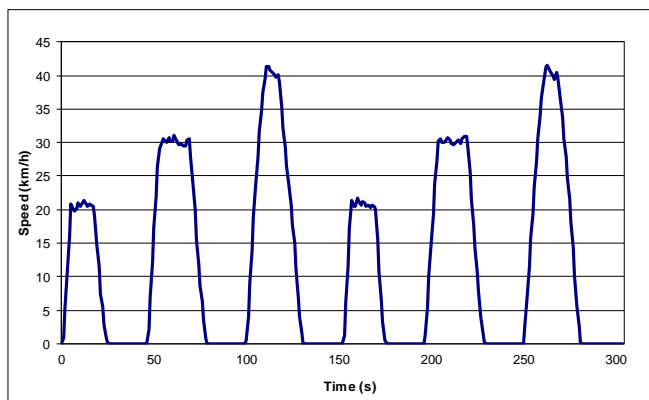
Date
17/07/2024 7:21



Total test distance	(m)	1,041.0
Total test time	(s)	305.0
Cycle speed	(km/h)	12.3
Total electricity / distance	(kWh/km)	0.397

DIRECTION 2

Date
17/07/2024 21:30



Total test distance	(m)	1,040.7
Total test time	(s)	304.0
Cycle speed	(km/h)	12.3
Total electricity / distance	(kWh/km)	0.398

Speed average	(km/h)	12.3
Electricity consumption average	(kWh/km)	0.397

Final electrical consumption SORT1

Electricity consumption average SORT1	(kWh/km)	0.398
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The results refer exclusively to the sample tested.

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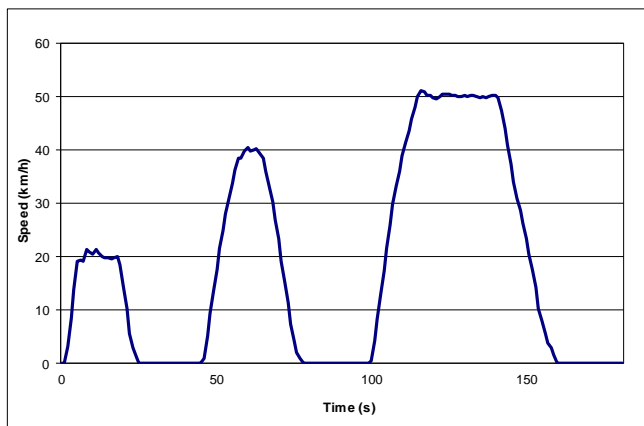
3.4. Test cycle SORT 2

The tables below show test characteristics in both directions of SORT2 cycles:

SORT 2 - Test 1

DIRECTION 1

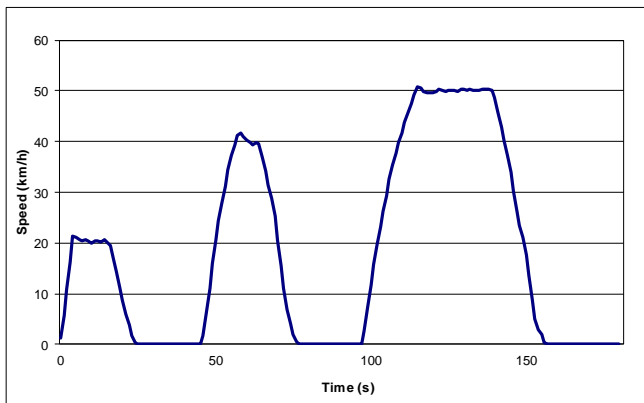
Date
16/07/2024 6:54



Total test distance	(m)	920.2
Total test time	(s)	181.0
Cycle speed	(km/h)	18.3
Total electricity / distance	(kWh/km)	0.393

DIRECTION 2

Date
16/07/2024 6:49



Total test distance	(m)	920.9
Total test time	(s)	181.0
Cycle speed	(km/h)	18.3
Total electricity / distance	(kWh/km)	0.388

Speed average	(km/h)	18.3
Electricity consumption average	(kWh/km)	0.390

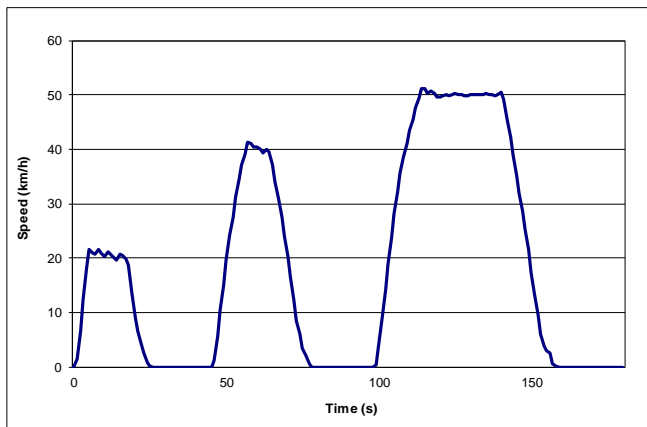
The results refer exclusively to the sample tested.

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SORT 2 - Test 2

DIRECTION 1

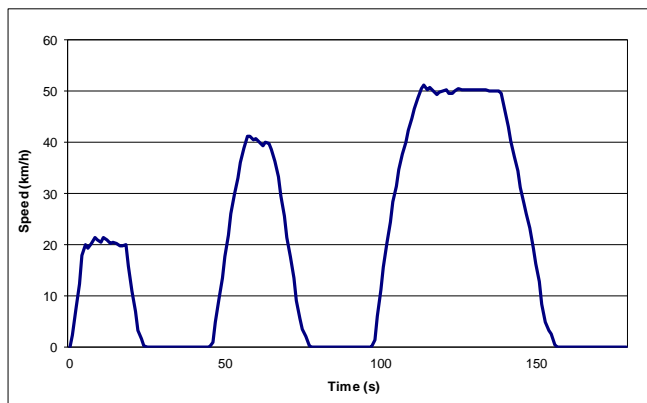
Date
16/07/2024 7:04



Total test distance	(m)	920.4
Total test time	(s)	180.0
Cycle speed	(km/h)	18.4
Total electricity / distance	(kWh/km)	0.392

DIRECTION 2

Date
16/07/2024 6:59



Total test distance	(m)	920.6
Total test time	(s)	179.0
Cycle speed	(km/h)	18.5
Total electricity / distance	(kWh/km)	0.388

Speed average	(km/h)	18.5
Electricity consumption average	(kWh/km)	0.390

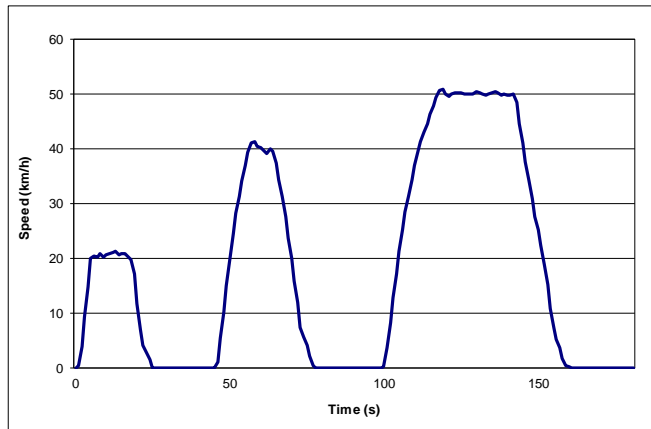
The results refer exclusively to the sample tested.

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SORT 2 - Test 3

DIRECTION 1

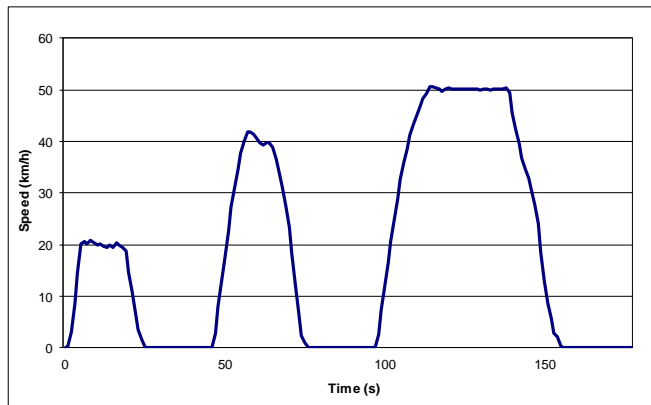
Date
16/07/2024 7:25



Total test distance	(m)	919.7
Total test time	(s)	181.0
Cycle speed	(km/h)	18.3
Total electricity / distance	(kWh/km)	0.395

DIRECTION 2

Date
16/07/2024 7:20



Total test distance	(m)	920.6
Total test time	(s)	177.0
Cycle speed	(km/h)	18.7
Total electricity / distance	(kWh/km)	0.385

Speed average	(km/h)	18.5
Electricity consumption average	(kWh/km)	0.390

Final electrical consumption SORT2

Electricity consumption average SORT2	(kWh/km)	0.390
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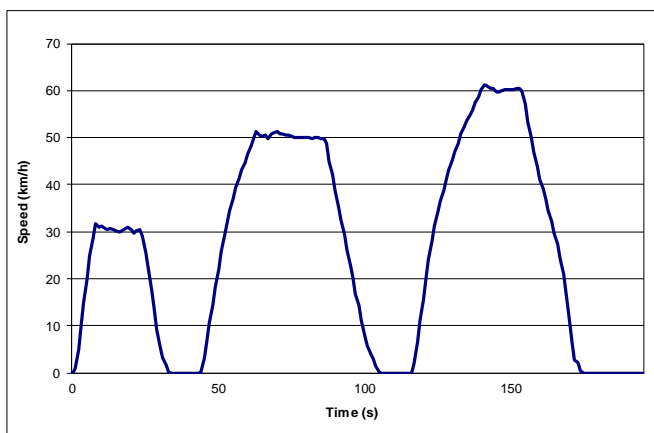
3.5. Test cycle SORT 3

The tables below show test characteristics in both directions of SORT3 cycles:

SORT 3 - Test 1

DIRECTION 1

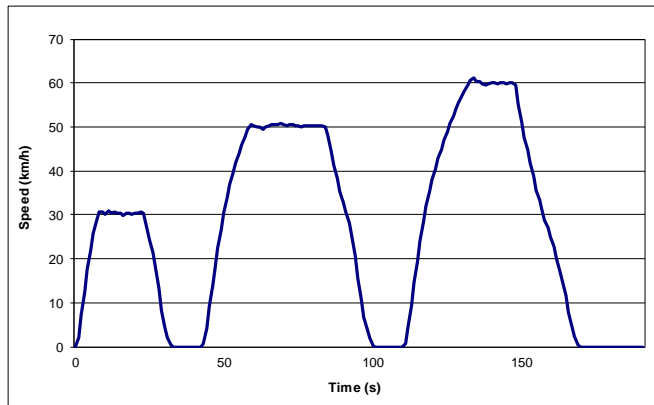
Date
18/07/2024 19:48



Total test distance	(m)	1,451.0
Total test time	(s)	195.0
Cycle speed	(km/h)	26.8
Total electricity / distance	(kWh/km)	0.404

DIRECTION 2

Date
18/07/2024 19:43



Total test distance	(m)	1,450.3
Total test time	(s)	191.0
Cycle speed	(km/h)	27.3
Total electricity / distance	(kWh/km)	0.430

Speed average	(km/h)	27.1
Electricity consumption average	(kWh/km)	0.417

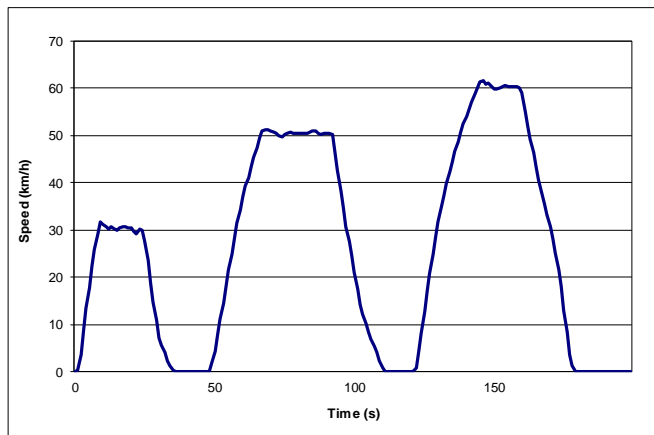
The results refer exclusively to the sample tested.

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SORT 3 - Test 2

DIRECTION 1

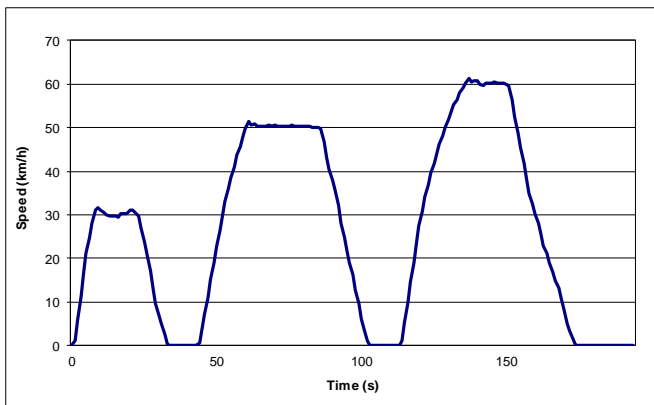
Date
18/07/2024 20:07



Total test distance	(m)	1,451.9
Total test time	(s)	199.0
Cycle speed	(km/h)	26.3
Total electricity / distance	(kWh/km)	0.402

DIRECTION 2

Date
18/07/2024 20:12



Total test distance	(m)	1,450.4
Total test time	(s)	194.0
Cycle speed	(km/h)	26.9
Total electricity / distance	(kWh/km)	0.421

Speed average	(km/h)	26.6
Electricity consumption average	(kWh/km)	0.412

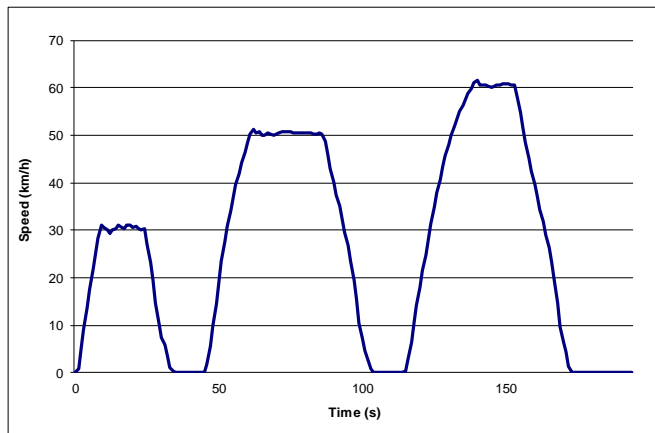
The results refer exclusively to the sample tested.

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SORT 3 - Test 3

DIRECTION 1

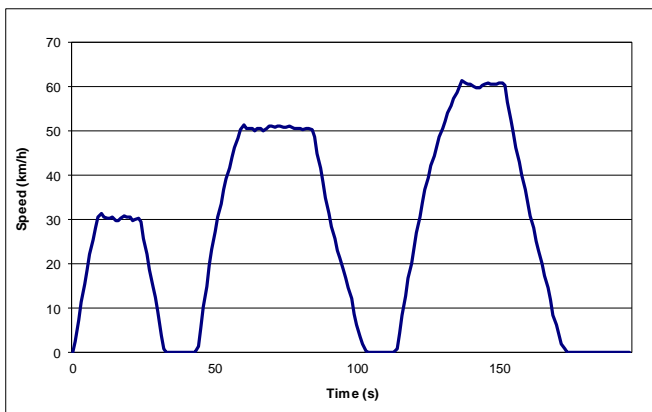
Date
18/07/2024 20:16



Total test distance	(m)	1,451.3
Total test time	(s)	194.0
Cycle speed	(km/h)	26.9
Total electricity / distance	(kWh/km)	0.401

DIRECTION 2

Date
18/07/2024 20:54



Total test distance	(m)	1,450.7
Total test time	(s)	196.0
Cycle speed	(km/h)	26.6
Total electricity / distance	(kWh/km)	0.425

Speed average	(km/h)	26.8
Electricity consumption average	(kWh/km)	0.413

Final electrical consumption SORT3

Electricity consumption average SORT3	(kWh/km)	0.414
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The results refer exclusively to the sample tested.

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4. VEHICLE INSTRUMENTATION

The vehicle instrumentation used during the test was as follows:

Equipment	Brand	Model	Serial Number
Speed sensor	Racelogic	VBoxX3i	101610
Electrical consumption	Hioki	PW8001	230902093
Current clamp-500A	Hioki	CT6844-05	200372
Current clamp-500A	Hioki	CT6844-05	200373
Current clamp-500A	Hioki	CT6844-05	200374
Current clamp-1000A	Hioki	CT6846-05	200375
Current clamp-1000A	Hioki	CT6846-05	200376
Weather Station	GILL	GMX500	20490027
Tyre tread depth	Deqing	(0~25mm)/0.01mm	SYF23093984
Tyre pressure gauge	PCL	230609147	235066

5. VERSION CONTROL

Version	Date	Reason
v0	22/08/2024	Initial

Annex I: Sheet 3 Test protocol

This annex contains 5 pages.

Sheet 3: Test protocol

For tests to be repeatable, it is necessary to definition with accuracy the vehicle actually tested, especially because a certain level of margin is left to manufacturers.

The test must consequently be documented with accuracy in a test protocol describing the most relevant elements, so that in case of later confirmation tests, the tested bus is clearly defined and cannot give rise to dispute or misinterpretation.

Date of test	16 th – 18 th of July 2024
Time of test begin	6:00
Time of test end	22:30
Place of test	Jiulongpo, Chongqing, China

A. Test external conditions (for information)

1. Street conditions

N°	Item	Value	Unit
1.1	State of track surface	Dry	--
1.2	Min / Max longitudinal gradient	--	%
1.3	Track altitude	--	m
1.4	Min. radius	--	m
1.5	Track length	--	m

2. Weather conditions

N°	Item	Value						Unit
		Sort 1 start	Sort 1 end	Sort 2 start	Sort 2 end	Sort 3 start	Sort 3 end	
2.1	Wind speed	0	0.4	0	0	0	0.8	m/s
2.2	Temperature	28.1	29.5	27.1	29.2	29.7	28.4	°C
2.3	Humidity	81.2	69.9	89.0	89.7	68.7	72.4	%
2.4	Atmospheric pressure	96.5	96.7	96.7	96.8	96.5	96.6	kPa

B. Vehicle set-up

1.1. Type et dimension:

N°	Item	Value	Unit
1.1.1	Vehicle type(name)	XMQ6750BGWBEV	--
1.1.2	Length	7.5	m
1.1.3	Width	2.28	m
1.1.4	Height	3.0	m
1.1.5	Empty weight	6826	kg
1.1.6	Mileage	860	km

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1.2. Engine

N°	Item	Value	Unit
1.2.1	Manufacturer and type	--	--
1.2.2	Maximum power	--	kW
1.2.3	Maximum torque	--	Nm
1.2.4	Engine governed speed	--	rpm
1.2.5	Driving mode of engine ventilator	--	

1.3. Gearbox

N°	Item	Value
1.3.1	Manufacturer and type	--
1.3.2	Program used	--

1.4. Rear Axle

N°	Item	Value
1.4.1	Manufacturer and type	Dongfeng, DF0601D-365
1.4.2	Reduction ratio	5.29

1.5. Tyres

N°	Item	Value	Unit
1.5.1	Manufacturer and type	Double Coin 215/75R17.5	--
1.5.2	Dimensions	Inflatable outer diameter 774mm; Static radius 362mm, rolling radius 376mm	--
1.5.3	Front axle nominal pressure	8.3	bar
1.5.4	Rear axle nominal pressure	8.3	bar
1.5.5	Pattern depth of new tires	14	mm
1.5.6	Actual pattern depth measured	11.9	mm

1.6. Engine lubricant

N°	Item	Value
1.6.1	Type	--
1.6.2	SAE Grade	--
1.6.3	Other features	--

1.7. Gearbox lubricant

N°	Item	Value
1.7.1	Type	--
1.7.2	SAE Grade	--
1.7.3	Other features	--

1.8. Batteries 24V

N°	Item	Value	Unit
1.8.1	Type	60AH	--
1.8.2	Number	2	--
1.8.3	Nominal unit voltage	2*12	V
1.8.4	Unit weight	25*2	kg

The results refer exclusively to the sample tested.

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1.9. Miscellaneous equipment

N°	Item	Value
1.9.1	Number of doors	2
1.9.2	Retarder / alternator	The motor regenerates braking
1.9.3	Air conditioning	KL-18D-08NJ-GY
1.9.4	Other	--

1.10. Calculation of the load characteristics C_L , of the tested vehicle

N°	Item	Formula	Calculated Value
1.10.1	Load factor C_L (load)	$C_L = 116,19 \times (L - 1,20) \times W$	1669

1.11. Optional equipment

N°	Item	Weight to deduct from lump load	Unit
1.11.1	Air-conditioning	270	kg
1.11.2	Ticketing equipment (excluding pay desk)	0	kg
1.11.3	Automatic vehicle monitoring system (AVM)	20	kg
1.11.4	Information equipment	20	kg
1.11.5	Security driver cabin	0	kg
1.11.6	Additional mass of double glazing	65	kg
1.11.7	Lubrimatic equipment	0	kg
1.11.8	Ramp for wheelchair users	0	kg
1.11.9	Other equipment	0	kg
(1)	Total weight to be deducted from lump load	375	kg

1.12. Other factors to take into account

N°	Item	Actual weight (A)	Reference weight (B)	Difference (A-B)
1.12.1	Seats:	19		
	Load factor C_S (seats)	$C_S = \text{the integers of } \{1,09 \times (L-1,20) \times W\}$		
	N is the actual number of seats in the tested vehicle	$N \times 10 \text{ kg}$	$C_S \times 10 \text{ kg}$	$(C_S - N) \times 10 \text{ kg}$
	Calculated values:	190	150	40
1.12.2	Fuel tank capacity (litres x 0,840)			
	Load factor C_F (fuel volume)	$C_F = 7,26 \times (L-1,20) \times W$		
	V is the actual volume of the fuel tank of the tested vehicle	$V \times 0,840$	$C_F \times 0,840$	$(C_F - V) \times 0,84 \text{ kg}$
	Calculated values:	--	--	--
1.12.3	On board persons excluding the driver	--	--	--
1.12.4	Electrical measuring equipment	--	--	--
(2)	Total weight to be deducted from lump load			40

The results refer exclusively to the sample tested.

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1.13. Final value of lump load to apply

N°	Item	Value		Unit
1.13.1	Empty weight	6826		kg
1.13.2	Lump load	1669		kg
1.13.3	Optional equipment (1)	370		kg
1.13.4	Other factors (2)	40		kg
1.13.5	=1669-(1)-(2)	1254		kg
1.13.6	Empty weight + load	Calculated	8080	kg
		Measured	8082	kg

1.14. Rechargeable Energy Storage System (RESS)

N°	Parameter	Value	Unit
1.14.1	Manufacturer and types	CATL, CATL 579.6V/302Ah/175KWH	--
1.14.2	Nominal tension	579.6	V
1.14.3	Power	144/278	kW
1.14.4	Weight	1768	kg
1.14.5	Total capacity of whole vehicle	175	kWh
1.14.6	Pack battery capacity	35	kWh
1.14.7	Minimum SOC level	0	%
1.14.8	Warning SOC level	20	%
1.14.9	Maximum SOC level	100	%
1.14.10	Max. Charging power	131.4	kW
1.14.11	Number of the battery packs	5	--

1.15. Electric motors

N°	Parameter	Value	Unit
1.15.1	Type	TZ370XSKLJ210	--
1.15.2	Number	1	--
1.15.3	Power	90/180	kW
1.15.4	Weight	198	kg

1.16. Hybrid drive line

N°	Parameter	Value	Unit
1.16.1	Configuration (series/parallel)	--	--

1.17. Variation of state of charge

N°	Parameter	Value	Unit
1.17.1	Device used to measure current: specify and document (via a current clamp or shunt resistor or similar)	HIOKI 3390 with current clamp	

Annex II: Test results

The results refer exclusively to the sample tested.

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CONSUMPTION MEASURES

Test 1: Usable energy

N°	Item	Definition	Value	Unit
0.1	Charger	YLUXD240KE-01		
0.2	EGmax	Energy from the grid	165.290	kWh
0.3	ECmax	Energy from the charger	155.506	kWh
0.5	/	Nominal charging power	240	kW
0.6	/	Charge duration (maximum 360 minutes)	70	min

Comments:


- The vehicle was discharged until 20% of vehicle SOC level (the warning alarm appeared, the charge began at 19% SOC) and charged until it's maximum SOC (100%) level obtaining the values described above.

Test 2: Energy consumption

Data to provide for each needed SORT cycle:

N°	Item	Definition	Value	Unit
1.1	Di	Total distance on SORT 1	1,04	km
1.2		Energy consumption on SORT1	0.414	kWh
1.3	Di	Total distance on SORT 2	0,92	km
1.4		Energy consumption on SORT2	0.359	kWh
1.5	Di	Total distance on SORT 3	1,45	km
1.6		Energy consumption on SORT3	0.600	kWh
1.7	/	Battery pack outside temperature at the beginning of the tests	NA	°C
1.8	/	Battery pack outside temperature at the end of the tests)	NA	°C

Annex III: Run-in statement


 Page 1

DECLARATION OF VEHICLE MILEAGE

Date: 2024-07-15

We, Xiamen King Long United Automotive Industry Co., LTD., are the manufacturer of the bus XMQ6750BGWBEV chassis no.LA9LC20E7RALA6541.

We certify that the test vehicle traveled more than 300km in the seven days before July 15,2024.



Signature: 

Name: Chen Liyan
Position: Manager of overseas homologation

Yours faithfully:
Xiamen King Long United Automotive Industry Co., Ltd.



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CHINA'S BUS & COACH LEADER

The results refer exclusively to the sample tested.

If Applus+ IDIADA can be identified as the author of the text, its permission is required for the inclusion of this information in other documents (reports, articles, publicity, etc.)

Annex IV: Test track statement

DECLARATION OF e-SORT TEST TRACK

We, Xiamen King Long United Automotive Industry Co., LTD., are the manufacturer of vehicle XMQ6750BGWBEV with VIN reference LA9LC20E7RALA6541, certify that SORT Test was performed in Jiulongpo, Chongqing, China, on the performance track of Chongqing Motor Vehicle Compulsory Inspection Proving Ground.

Test track complies with the UITP 2014 Sort Test Protocol defined track requirements.

Signature:



Name: Chen Liyan

Position: Manager of overseas homologation

Yours faithfully,

Xiamen King Long United Automotive Industry Co., Ltd.

