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Report no. 21-00140-CC-GBM-00  
Client: MAN Truck & Bus SE  
Vehicle: MAN Lion's City 12 E

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## **C O N F I R M A T I O N**

*of the MAN eBus Efficiency Run on 18/05/2021*

**No. 21-00140-CC-GBM-00**

Confirmation of the electrical range achieved by the MAN Lion's City 12 E, vehicle identification number WMA12CZZ7MF015313, during the "MAN eBus Efficiency Run" on 18/05/2021

### **1. General information**

Name and address of client : MAN Truck & Bus SE  
Dachauer Straße 667  
80995 Munich, Germany

Test vehicle : MAN Lion's City 12 E  
*with the vehicle identification number*  
WMA12CZZ7MF015313

Name and address of contractor : TÜV SÜD Auto Service GmbH  
Daimlerstraße 11  
85748 Garching, Germany

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## 2. Subject

This document confirms the electrical range achieved by the MAN Lion's City 12 E, vehicle identification number WMA12CZZ7MF015313, during the "MAN eBus Efficiency Run" organised by MAN Truck & Bus SE on 18/05/2021.

During the Efficiency Run, a selected MAN Lion's City 12 E vehicle was driven on the Munich transport authority's (MVG) bus lines 176 and X80 without intermediate charging until it reached the lowest battery charge level that can be achieved in customer operations. The route started and finished at test track 1 at MAN's plant in Munich.

## 3. Description of test vehicle

Vehicle identification number : WMA12CZZ7MF015313

Vehicle production number : 12C1595

Vehicle number plate : M AN 7595

Vehicle class : M3, class 1 (two-axle low-floor bus)

Vehicle series : MAN Lion's City 12 E

Motor type : GE21F1 (electric MAN central motor)

Vehicle length / width / height : 12,185 mm / 2,550 mm / 3,320 mm

Motor output : 160 kW continuous output  
240 kW maximum output

Gearbox type : Single-stage MAN adapter gearbox

Rear-axle ratio : 5.12

Tyres : Pirelli MC:01 e-Urban 275/70 R 22.5

Dead weight : 14,560 kg (with measuring equipment but  
without driver)

Energy store : MAN Li-ion battery  
Model 36.26615 – 6007

Nominal energy capacity installed : 6 x 80 kWh = 480 kWh

Cooling system : Water cooling

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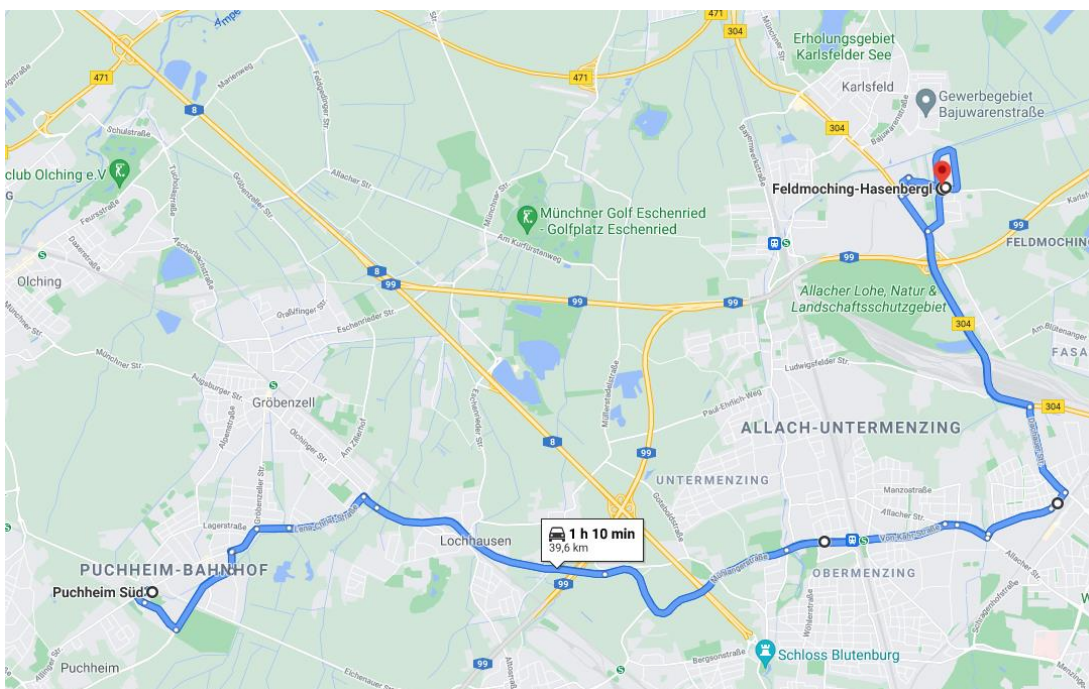
#### 4. Route profile

##### 4.1 General

The route follows the Munich transport authority's (MVG) bus lines 176 and X80 running between Karlsfelder Straße – Moosach station – Puchheim station. The route started and finished at test track 1 (TS1) at MAN's plant in Munich. MAN's test track 2 (TS2) located at Karlsfelder Straße 260 was a stopping point between the trips. During the test, the bus drove to and stopped at the bus stops on each bus line (see attached timetable).

The test was conducted both during the day and at night with the standard, prevailing traffic situation and ambient conditions.

##### 4.2 View



Source: Google Maps

##### 4.3 Route information

Distance travelled per trip : 39.6 km  
(TS2 – Puchheim station – TS2)

Geographical altitude of start and : 495 m  
finish point (TS1)

Geographical altitude of destination : 521 m  
station(Puchheim station)

Primary road surface along the route : Asphalt

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## 5. Measuring equipment used

### 5.1 General

The electrical range achieved during the "MAN eBus Efficiency Run" on 18/05/2021 was calculated based on the difference between the tachograph mileage readings from before and after the test. Its accuracy in conjunction with the tyres used was checked beforehand as per Art. 57b and Art. 57d of the German Road Traffic Licensing Regulations (StVZO).

### 5.2 Tachograph information

Manufacturer : Stoneridge Electronics AB  
Serial number : 1489543  
Last inspected on : 06/05/2021

## 6. Details of the test

### 6.1 General

Date / time for start of test : 18/05/2021 / 04:00  
Date / time for end of test : 19/05/2021 / 04:00

### 6.2 Vehicle

Tyre pressure on front axle / rear axle : 8.8 / 8.8  
[bar]  
Mileage at start of test [km] : 1278.1  
Mileage at end of test [km] : 1828.9  
Difference (range achieved) [km] : 550.8  
Load state : 14 passengers, each weighing 68 kg, were simulated using water-filled dummies  
Tested weight including measuring equipment and driver:15,600 kg  
Plus individual participants in the event (roughly 2-5 people over the course of the day)

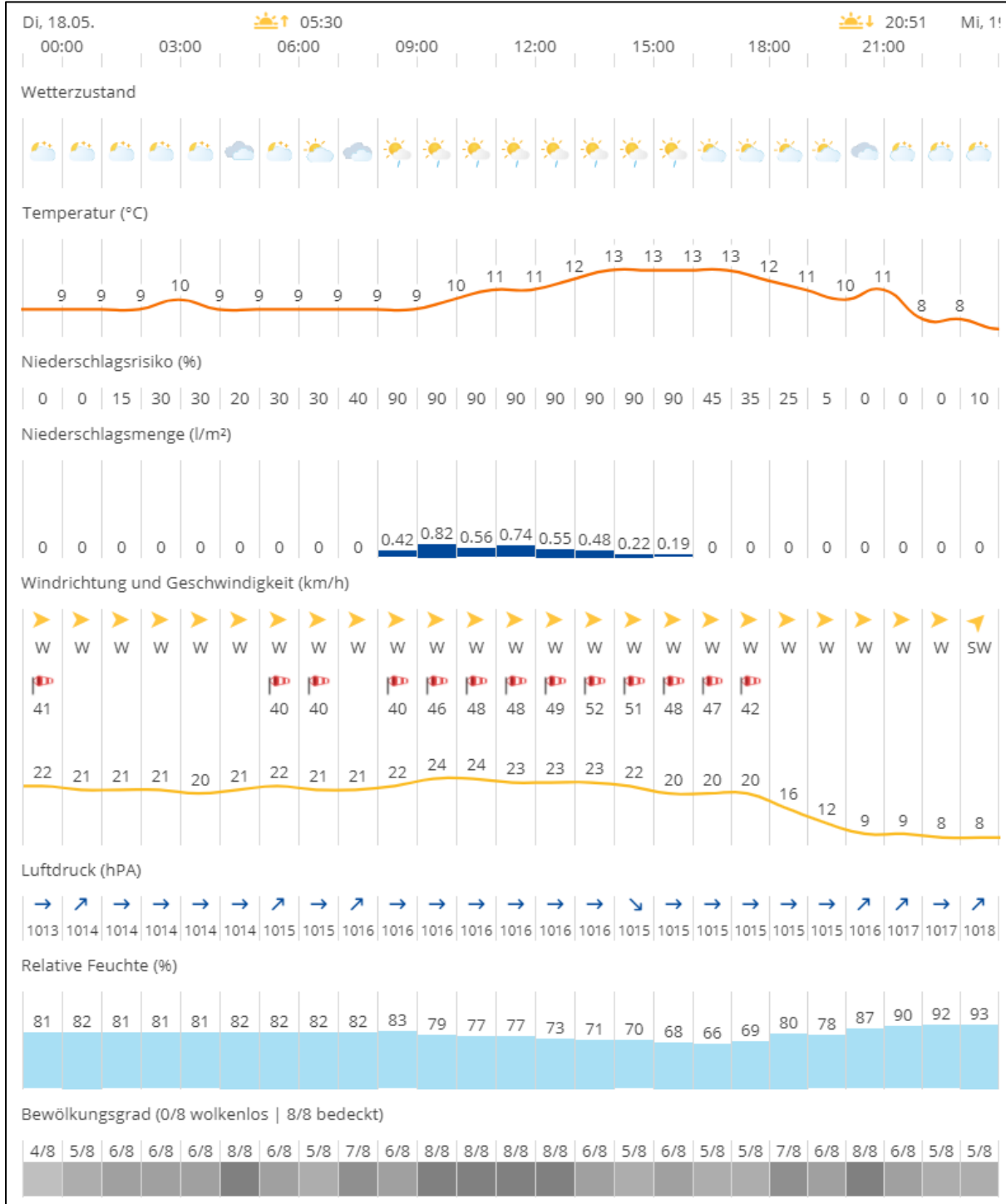
### 6.3 Weather conditions

(See next page; source: wetter.com for the location of Karlsfeld)

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As at 17/05/2021 at 14:30



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## 7. Result

We hereby confirm that the vehicle listed in section 3, driven under the conditions described in this document (in terms of the route profile and ambient conditions), achieved an electrical range of

**550.8 km**

The amount of electrical energy required during the test, as measured on the battery, amounted to

**363.3 kWh**

of which 311.0 kWh was required to power the propulsion system of the vehicle and 52.3 kWh was required to power auxiliary units such as consumers for enhancing passenger comfort. This figure was achieved with an efficient driving style by a professional MAN ProfiDrive driver.

Munich, 19/05/2021



**Auto Service**

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Dipl.-Ing. (FH) Jonatan Schenk





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	Line	Name of stop (in German)
Outbound	<b>MAN</b>	<b>TS1</b>
	<b>MAN</b>	<b>TS2</b>
	176	MAN-Siedlung
	<b>176</b>	<b>Karlsfelder Straße</b>
	176	Kristallstraße
	<del>176</del>	<del>Ferchenbachstraße</del>
	176	Rangierbahnhof
	176	Max-Born-Straße
	176	Haylerstraße
	176	Eininger Straße
	176	Gröbenzeller Straße
	176	Moosach Bf
	X80	Moosach Bf
	X80	Untermenzing Bf
	X80	Von-Kahr-Straße
	X80	Lochhausen Bf
	X80	Gröbenzell, Ziegelei-Ring
	X80	Puchheim-Bf, Lagerstraße
	X80	Puchheim-Bf, Heussstraße
	Return	<b>X80</b>
<b>X80</b>		<b>Puchheim Bf (Süd)</b>
X80		Puchheim-Bf, Heussstraße
X80		Puchheim-Bf, Lagerstraße
X80		Lochhausen Bf
X80		Von-Kahr-Straße
X80		Untermenzing Bf
X80		Moosach Bf
176		Moosach
176		Gröbenzeller Straße
176		Eininger Straße
176		Haylerstraße
176		Max-Born-Straße
176		Rangierbahnhof
<del>176</del>		<del>Ferchenbachstraße</del>
176		Kristallstraße
176		Opalstraße
176		MAN-Siedlung
<b>176</b>		<b>Karlsfelder Straße</b>
<b>MAN</b>		<b>TS2</b>
<b>MAN</b>	<b>TS1</b>	