

PROJECT	CUSTOMER	VEHICLE
X'trapolis-PRASA	PRASA	253 – M3 – VPT

RTR Vehicle Pre-Testing TS253 M3 Report  
GIB0000007351



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### Table of modifications

Rev	Date	Modifications Content	Writer
A0	28/10/2024	Creation	Nhlakanipho MASONDO

### Internal validations

	Name	Function	Date	Signature
<b>Creator</b>	Nhlakanipho MASONDO	EPU Manager	28/10/2024	X  Nhlakanipho MASONDO EPU Manager
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### Execution Plan

<b>Start Date</b>	21/10/2024
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## Section 1 – Purpose / Objectives

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### 1. Protective Bonding

The objective of this procedure is to verify the return path of the current to the ground.

### 2. Reflectometry

The objective of this procedure is to verify the integrity of the ethernet cables.

### 3. Config

The objective of this procedure is to set up car ID for specific systems such as fire and to verify wiring to the speed sensors and OTDR.

### 4. Traction motors

The objective of this procedure is to verify the wiring configuration of the motors. This is to ensure that all the motors are wired the same and shall rotate in the same direction in operation



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## Section 2 – Protective Bonding and Return Current

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### 2.1 Instructions list

### 2.1.1 012\_PB-Protective Bonding and Return Current

I - Information      A - Action      R - Result      NE - Not Executed

N°	Type	Instruction	File	Result status	Result value	Operator	Vehicle
10001	I	Return Circuit: Car Body to Ground		OK		Celiwe Sokhela - 491462	M3
10002	I	The purpose of this test is to confirm that the car body of each car in the train is connected to ground via the earthing brush which will ensure that current from the overhead wire is returned to the substation without damage to equipment or risk of electric shock		OK		Celiwe Sokhela - 491462	M3
10003	A	Use the Tool List to record the serial number of the Ohmmeter that will be used in this test		OK		Celiwe Sokhela - 491462	M3
10004	A	Ensure that the current setpoint is 50A and voltage <50V (applicable for all impedance measurement) on the ohmmeter device to be used for the test.		OK		Celiwe Sokhela - 491462	M3
10005	I	For all impedance measurements of the car body to ground the positive terminal shall be connected to the car body and the negative terminal to the rail		OK		Celiwe Sokhela - 491462	M3
10006	I	For all other impedance measurements, the positive terminal shall be connected to the tested subject and the negative terminal to the car body shell		OK		Celiwe Sokhela - 491462	M3
10007	A	Visually identify and inspect that the earthing cables of the 1st and 2nd axle of the 1st and 2nd Bogie Frame are properly connected to the axle brushes		OK		Celiwe Sokhela - 491462	M3
10008	A	Disconnect from the axle box the earthing cable of the 1st and 2nd axle of the 1st and 2nd Bogie Frame of the M3 car		OK		Celiwe Sokhela - 491462	M3
10009	R	All the earthing cables of the M3 car are disconnected.		OK		Celiwe Sokhela - 491462	M3
10010	A	Connect the earthing cable of the 1st axle in the 1st Bogie Frame		OK		Celiwe Sokhela - 491462	M3
10011	R	Only the earthing cable of the 1st axle of the 1st Bogie Frame is connected		OK		Celiwe Sokhela - 491462	M3

10012	A	Using an ohmmeter measure the impedance between the car body to rail		OK		Celiwe Sokhela - 491462	M3
10013	R	Impedance Result Max: $x \leq 0.05$ (Ohm)		OK	0.00432	Celiwe Sokhela - 491462	M3
10014	A	Disconnect the earthing cable of the 1st axle of the 1st bogie frame		OK		Celiwe Sokhela - 491462	M3
10015	R	Earthing cable disconnected		OK		Celiwe Sokhela - 491462	M3
10016	A	Connect the earthing cable of the 2nd axle in the 1st Bogie Frame		OK		Celiwe Sokhela - 491462	M3
10017	R	Only the earthing cable of the 2nd axle of the 1st Bogie Frame is connected		OK		Celiwe Sokhela - 491462	M3
10018	A	Using an ohmmeter measure the impedance between the car body to rail		OK		Celiwe Sokhela - 491462	M3
10019	R	Impedance Result Max: $x \leq 0.05$ (Ohm)		OK	0.00624	Celiwe Sokhela - 491462	M3
10020	R	Earthing cable disconnected		OK		Celiwe Sokhela - 491462	M3
10021	A	Disconnect the earthing cable of the 2nd axle of the 1st bogie frame		OK		Celiwe Sokhela - 491462	M3
10022	I	Earthing of Equipment on the Underframe		OK		Celiwe Sokhela - 491462	M3
10023	A	Connect the earthing cable of the 1st axle in the 2nd Bogie Frame		OK		Celiwe Sokhela - 491462	M3
10024	R	Only the earthing cable of the 1st axle of the 2nd Bogie Frame is connected		OK		Celiwe Sokhela - 491462	M3
10025	A	Using an ohmmeter measure the impedance between the car body to rail		OK		Celiwe Sokhela - 491462	M3
10026	R	Impedance Result Max: $x \leq 0.05$ (Ohm)		OK	0.00453	Celiwe Sokhela - 491462	M3
10027	A	Disconnect the earthing cable of the 1st axle of the 2nd bogie frame		OK		Celiwe Sokhela - 491462	M3
10028	R	Earthing cable disconnected		OK		Celiwe Sokhela - 491462	M3
10029	A	Connect the earthing cable of the 2nd axle in the 2nd Bogie Frame		OK		Celiwe Sokhela - 491462	M3
10030	R	Only the earthing cable of the 1st axle of the 2nd Bogie Frame is connected		OK		Celiwe Sokhela - 491462	M3
10031	A	Using an ohmmeter measure the impedance between the car body to rail		OK		Celiwe Sokhela - 491462	M3

10032	R	Impedance Result Max: $x \leq 0.05$ (Ohm)		OK	0.00439	Celiwe Sokhela - 491462	M3
10033	A	Reconnect all earthing cables of the 1st and 2nd axle of the 1st and 2nd Bogie Frame		OK		Celiwe Sokhela - 491462	M3
10034	R	All earthing cables connected on the 1st and 2nd Bogie Frame		OK		Celiwe Sokhela - 491462	M3
10035	A	Visually inspect that the earthing cable connecting the Traction Inverter Case to M3 car body is properly connected and related bolts are correctly torqued.		OK		Celiwe Sokhela - 491462	M3
10036	R	Traction Inverter Case visually grounded and torque is correctly marked		OK		Celiwe Sokhela - 491462	M3
10037	A	Using an ohmmeter measure the impedance between the Traction Inverter Case and the car body		OK		Celiwe Sokhela - 491462	M3
10038	R	Impedance Result Max: $x \leq 0.05$ (Ohm)		OK	0.003284	Celiwe Sokhela - 491462	M3
10039	A	Visually inspect that the earthing cable connecting the Line Inductor Case to M3 car body is properly connected and related bolts are correctly torqued.		OK		Celiwe Sokhela - 491462	M3
10040	R	Line Inductor Case visually grounded and torque is correctly marked		OK		Celiwe Sokhela - 491462	M3
10041	A	Using an ohmmeter measure the impedance between the Line Inductor Case and the car body		OK		Celiwe Sokhela - 491462	M3
10042	R	Impedance Result Max: $x \leq 0.05$ (Ohm)		OK	0.004362	Celiwe Sokhela - 491462	M3
10043	A	Visually inspect that the earthing cable connecting the Traction Motors of the 1st and 2nd axle of the 1st Bogie Frame to the car body is properly connected and related bolts are correctly torqued		OK		Celiwe Sokhela - 491462	M3
10044	R	Traction Motors visually grounded and torque is correctly marked		OK		Celiwe Sokhela - 491462	M3
10045	A	Using an ohmmeter measure the impedance between the Traction Motor of the 1st and 2nd axle of the 1st Bogie Frame and the car body		OK		Celiwe Sokhela - 491462	M3
10046	R	Impedance Result Max: $x \leq 0.05$ (Ohm)		OK	0.00476	Celiwe Sokhela - 491462	M3
10047	A	Visually inspect that the earthing cable connecting the Traction Motors of the 1st and 2nd axle of the 2nd Bogie Frame to		OK		Celiwe Sokhela - 491462	M3

		the car body is properly connected and related bolts are correctly torqued					
10048	R	Traction Motors visually grounded and torque is correctly marked		OK		Celiwe Sokhela - 491462	M3
10049	A	Using an ohmmeter measure the impedance between the Traction Motor of the 1st and 2nd axle of the 2nd Bogie Frame and the car body		OK		Celiwe Sokhela - 491462	M3
10050	R	Impedance Result Max: $x \leq 0.05$ (Ohm)		OK	0.00567	Celiwe Sokhela - 491462	M3
10051	I	Earthing of Interior Equipment		OK		Celiwe Sokhela - 491462	M3
10052	A	Visually inspect that the earthing cable connecting the LV3 cubicle, and the car body is properly connected and related bolts are correctly torqued		OK		Celiwe Sokhela - 491462	M3
10053	R	LV3 cubicle visually grounded and torque is correctly marked		OK		Celiwe Sokhela - 491462	M3
10054	A	Using an ohmmeter measure the impedance between the LV3 cubicle and the car body		OK		Celiwe Sokhela - 491462	M3
10055	R	Impedance Result Max: $x \leq 0.05$ (Ohm)		OK	0.004536	Celiwe Sokhela - 491462	M3
10056	A	Visually inspect that the earthing cable connecting the LV6 cubicle, and the car body is properly connected and related bolts are correctly torqued		OK		Celiwe Sokhela - 491462	M3
10057	R	LV6 cubicle visually grounded and torque is correctly marked		OK		Celiwe Sokhela - 491462	M3
10058	A	Using an ohmmeter measure the impedance between the LV6 cubicle and the car body		OK		Celiwe Sokhela - 491462	M3
10059	R	Impedance Result Max: $x \leq 0.05$ (Ohm)		OK	0.00453	Celiwe Sokhela - 491462	M3
10060	I	Earthing of Equipment on the Roof		OK		Celiwe Sokhela - 491462	M3
10061	A	Visually inspect that the earthing cable connecting the 1st Braking Resistor Box to M3 car body is properly connected and related bolts are correctly torqued.		OK		Celiwe Sokhela - 491462	M3
10062	R	1st Braking Resistor Box visually grounded and torque is correctly marked		OK		Celiwe Sokhela - 491462	M3
10063	A	Using an ohmmeter measure the impedance between the 1st Braking		OK		Celiwe Sokhela - 491462	M3

		Resistor Box and the car body					
10064	R	Impedance Result Max: $x \leq 0.05$ (Ohm)		OK	0.006785	Celiwe Sokhela - 491462	M3
10065	A	Visually inspect that the earthing cable connecting the Saloon HVAC to M3 car body is properly connected and related bolts are correctly torqued.		OK		Celiwe Sokhela - 491462	M3
10066	R	Saloon HVAC visually grounded and torque is correctly marked		OK		Celiwe Sokhela - 491462	M3
10067	A	Using an ohmmeter measure the impedance between the Saloon HVAC and the car body		OK		Celiwe Sokhela - 491462	M3
10068	R	Impedance Result Max: $x \leq 0.05$ (Ohm)		OK	0.00567	Celiwe Sokhela - 491462	M3
10069	A	Visually inspect that the earthing cable connecting the 2nd Braking Resistor Box to M3 car body is properly connected and related bolts are correctly torqued.		OK		Celiwe Sokhela - 491462	M3
10070	R	2nd Braking Resistor Box visually grounded and torque is correctly marked		OK		Celiwe Sokhela - 491462	M3
10071	A	Using an ohmmeter measure the impedance between the 1st Braking Resistor Box and the car body		OK		Celiwe Sokhela - 491462	M3
10072	R	Impedance Result Max: $x \leq 0.05$ (Ohm)		OK	0.00564	Celiwe Sokhela - 491462	M3



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## Section 3 – Reflectometry

### 3.1 Instructions list

#### 3.1.1 025\_NET\_054\_PIS-Network Cabling Integrity

I - Information      A - Action      R - Result      NE - Not Executed

N°	Type	Instruction	File	Result status	Result value	Operator	Vehicle
10001	I	Network Cabling Integrity Test		OK		Dilikani Ngubane - 526515	M3
10002	I	It is necessary to check the network cables to ensure that they have been installed correctly to improve the overall operation of the system.		OK		Dilikani Ngubane - 526515	M3
10003	I	The Cable Analyzer Module DSX-5000 will be used to validate cabling		OK		Dilikani Ngubane - 526515	M3
10004	I	Register as a new Operator on the DSX-5000. Check on the manual below on how to register as a new Operator		OK		Dilikani Ngubane - 526515	M3
10005	I	When saving the tests results for each line, it should be named by its trainset number (X) and the test code (Indicated in the test step). i.e. TS021_M3_P01 for PACIS and TS021_M3_T01 for TCMS.		OK		Dilikani Ngubane - 526515	M3
10006	I	TCMS cabling		OK		Dilikani Ngubane - 526515	M3
10007	A	From: [25A10 CRS1 (Local: +LV3; Connector: 25XP10_X3)] to: [25A11 CRS2 (Local: +LV3; Connector: 25XP11_X4)]  NOTE: Cable is crossed TSX_M3_T01		OK		Dilikani Ngubane - 526515	M3
10008	A	From: [25A10 Ethernet Switch (Local: +LV3; Connector: 25XP10_X4)] to: [ (Local: +END1; Connector: 90XP12.All)]  NOTE: Cable is straight TSX_M3_T02		OK		Dilikani Ngubane - 526515	M3
10009	A	From: [25A14 TBR (Local: +LV3; Connector:25XP14_ETH0)] to: [Inter-car		OK		Dilikani Ngubane - 526515	M3

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		(Local: +END1; Connector: 90XP11.All)]  NOTE: Cable is crossed TSX_M3_T03				
10010	A	From: [25A14 TBR (Local: +LV3; Connector: 25XP14_ETH1)] to: [Inter-car (Local: +END2; Connector: 90XP22.al)]  NOTE: Cable is straight TSX_M3_T04		OK		Dilikani Ngubane - 526515 M3
10011	A	From: [25A11 Ethernet Switch (Local: +LV3; Connector: 25XP11_X3)] to: [Inter- car (Local: +END2; Connector: 90XP22.all)]  NOTE: Cable is crossed TSX_M3_T05		OK		Dilikani Ngubane - 526515 M3
10012	A	From: [(Local: +END1; Connector: 90XR12.Al)] to: [Inter-car (Local: +END2; Connector: 90XP21.Al)]  NOTE: Cable is straight TSX_M3_T06		OK		Dilikani Ngubane - 526515 M3
10013	A	From: [(Local: +END1; Connector: 90XR11.Al)] to: [Inter-car (Local: +END2; Connector: 90XP21.all)]  NOTE: Cable is straight TSX_M3_T07		OK		Dilikani Ngubane - 526515 M3
10014	I	Pacis cabling		OK		Dilikani Ngubane - 526515 M3
10015	A	From: [(Local: +END1; Connector: - 90XR11.El)] to: [Inter-car (Local: +END2; Connector: -90XP21.el)]  NOTE: Cable is straight TSX_M3_P01		OK		Dilikani Ngubane - 526515 M3
10016	A	From: [54A10 CRS1 (Local: +LV6; Connector: 54XP10_X7)] to: [ (Local: +END1; Connector: -90XR12.El)]  NOTE: Cable is crossed TSX_M3_P02		OK		Dilikani Ngubane - 526515 M3
10017	A	From: [54A11 CRS2 (Local: +LV6; Connector: 54XP11_X8)] to: [ (Local: +END2; Connector: -90XP22.el)]  NOTE: Cable is straight TSX_M3_P03		OK		Dilikani Ngubane - 526515 M3



10018	A	From: [54A11 CRS2 (Local: +LV6; Connector: 54XP11_X7)] to: [54A10 CRS1 (Local: +LV6; Connector: 54XP10_X8)]  NOTE: Cable is crossed TSX_M3_P04	OK		Dilikani Ngubane - 526515	M3
10019	A	All cables have been validated on M3	OK		Dilikani Ngubane - 526515	M3
10020	R	Download all the results from Fluke and save them on PC with folder name "M3_TSxx"	OK		Ntobeko Ndlovu - 421595	M3

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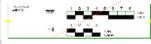
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## Section 4 – Config

### 4.1 Instructions list

#### 4.1.1 CONFIG-Vehicle Configuration

I - Information    A - Action    R - Result    NE - Not Executed

N°	Type	Instruction	File	Result status	Result value	Operator	Vehicle
10001	I	Configuration Checks		OK		Tebogo Mtombeni - 529938	M3
10002	A	Check continuity on all pins of End 1 connector 90XP15 & 90XP14 to ground		OK		Tebogo Mtombeni - 529938	M3
10003	R	There is no continuity		OK		Tebogo Mtombeni - 529938	M3
10004	A	Check continuity on all pins of End 2 connector 90XP15 & 90XP14 to ground		OK		Tebogo Mtombeni - 529938	M3
10005	R	There is no continuity		OK		Tebogo Mtombeni - 529938	M3
10006	I	Smoke Detector Address Configuration		OK		Tebogo Mtombeni - 529938	M3
10007	A	Remove and configure the Smoke Detector 67A2 (+PA1) according to the figure attached		OK		Tebogo Mtombeni - 529938	M3
10008	A	Reconnect Smoke Detector 67A2		OK		Tebogo Mtombeni - 529938	M3
10009	A	Remove and configure the Smoke Detector 67A3 (+PA3) according to the figure attached		OK		Tebogo Mtombeni - 529938	M3
10010	I	Line Heat Detection		OK		Tebogo Mtombeni - 529938	M3
10011	R	Measure the resistance between point 1 and point 4 of the connector 67XP3_11 Result Min/Max: 550<= x<= 700 ( )		OK	618	Tebogo Mtombeni - 529938	M3
10012	A	Reconnect Smoke Detector 67A3		OK		Tebogo Mtombeni - 529938	M3
10013	I	OTDR LOOP		OK		Tebogo Mtombeni - 529938	M3
10014	I	Check the continuity between the following points:		OK		Tebogo Mtombeni - 529938	M3



10015	A	From: [ +IV1 (local +END2 Connector - 93XP23.b (pin1))] to: [local +END1 Connector - 90XR13.B(pin1)]		OK		Tebogo Mtombeni - 529938	M3
10016	A	From: [ -IV1 (local +END2 Connector - 93XP23.b (pin2))] to: [local +END1 Connector - 90XR13.B(pin2)]		OK		Tebogo Mtombeni - 529938	M3

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## Section 5 – Traction Motors

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### 5.1 Instructions list

### 5.1.1 011\_TRM-Traction Motors

I - Information      A - Action      R - Result      NE - Not Executed

N°	Type	Instruction	File	Result status	Result value	Operator	Vehicle
10001	I	Traction Motors (SPP = 11)		OK		Tebogo Mtombeni - 529938	M3
10002	I	Ensure all the CONNECTORS are fully ASSEMBLED before running a continuity test.		OK		Tebogo Mtombeni - 529938	M3
10003	I	The following test is used to confirm the wiring of the traction motors.		OK		Tebogo Mtombeni - 529938	M3
10004	I	SAFETY NOTICE: It is important to ensure that there is no 400Vac power supply on the vehicle.		OK		Tebogo Mtombeni - 529938	M3
10005	A	Switch OFF the 400Vac power supply at the source and disconnect the supply cables from the vehicle		OK		Tebogo Mtombeni - 529938	M3
10006	R	There is no 400Vac available on the vehicle		OK		Tebogo Mtombeni - 529938	M3
10007	I	Bogie 1 (MB1)		OK		Tebogo Mtombeni - 529938	M3
10008	I	Visual Inspection		OK		Tebogo Mtombeni - 529938	M3
10009	A	For motor 1 and motor 2 connect 11XR1 and 11XR2 and visually inspect that the following cables are connected from - 11XR1 connector to -11M1 motor and - 11XR2 connector to -11M2 motor respectively. NOTE: the cable configuration should be straight, none should cross the other		OK		Tebogo Mtombeni - 529938	M3
10010	I	Motor 2		OK		Tebogo Mtombeni - 529938	M3
10011	R	[ -11XR2 connector (local: UND - 11XP2_2.X1 pin 1)] connected to: [ - 11XT2 motor terminals (U) -11M2].		OK		Tebogo Mtombeni - 529938	M3
10012	R	[ -11XR2 connector (local: UND - 11XP2_2.X2 pin 1)] connected to: [ - 11XT2 motor terminals (V) -11M2].		OK		Tebogo Mtombeni - 529938	M3
10013	R	[ -11XR2 connector (local: UND - 11XP2_2.X3 pin 1)] connected to: [ - 11XT2 motor terminals (W) -11M2].		OK		Tebogo Mtombeni - 529938	M3

10014	R	-11M2 Motor terminals PE connected to -11GND2.		OK		Tebogo Mtombeni - 529938	M3
10015	I	Motor 1		OK		Tebogo Mtombeni - 529938	M3
10016	R	[ -11XR1 connector (local: UND - 11XP1_2.X1 pin 1)] connected to: [ -11XT1 motor terminals (U) -11M1].		OK		Tebogo Mtombeni - 529938	M3
10017	R	[ -11XR1 connector (local: UND - 11XP1_2.X2 pin 1)] connected to: [ -11XT1 motor terminals (V) -11M1].		OK		Tebogo Mtombeni - 529938	M3
10018	R	[ -11XR1 connector (local: UND - 11XP1_2.X3 pin 1)] connected to: [ -11XT1 motor terminals (W) -11M1].		OK		Tebogo Mtombeni - 529938	M3
10019	R	-11M1 Motor terminals PE connected to -11GND.		OK		Tebogo Mtombeni - 529938	M3
10020	I	Bogie 2 (MB2)		OK		Tebogo Mtombeni - 529938	M3
10021	I	Visual Inspection		OK		Tebogo Mtombeni - 529938	M3
10022	A	For motor 3 and motor 4 visually inspect that the following cables are connected from -11XR3 connector to -11M3 motor and -11XR4 connector to -11M4 motor respectively. NOTE: the cable configuration should be straight, none should cross the other		OK		Tebogo Mtombeni - 529938	M3
10023	I	Motor 3		OK		Tebogo Mtombeni - 529938	M3
10024	R	[ -11XR3 connector (local: UND - 11XP3_2.X1 pin 1)] connected to: [ -11XT3 motor terminals (U) -11M3].		OK		Tebogo Mtombeni - 529938	M3
10025	R	[ -11XR3 connector (local: UND - 11XP3_2.X2 pin 1)] connected to: [ -11XT3 motor terminals (V) -11M3].		OK		Tebogo Mtombeni - 529938	M3
10026	R	[ -11XR3 connector (local: UND - 11XP3_2.X3 pin 1)] connected to: [ -11XT3 motor terminals (W) -11M3].		OK		Tebogo Mtombeni - 529938	M3
10027	R	-11M3 Motor terminals PE connected to -11GND3.		OK		Tebogo Mtombeni - 529938	M3
10028	I	Motor 4		OK		Tebogo Mtombeni - 529938	M3
10029	R	[ -11XR4 connector (local: UND - 11XP4_2.X1 pin 1)] connected to: [ -11XT4 motor terminals (U) -11M4].		OK		Tebogo Mtombeni - 529938	M3

10030	R	[ -11XR4 connector (local: UND - 11XP4_2.X2 pin 1)] connected to: [ - 11XT4 motor terminals (V) -11M4].		OK		Tebogo Mtombeni - 529938	M3
10031	R	[ -11XR4 connector (local: UND - 11XP4_2.X3 pin 1)] connected to: [ - 11XT4 motor terminals (W) -11M4].		OK		Tebogo Mtombeni - 529938	M3
10032	R	-11M4 Motor terminals PE connected to - 11GND.		OK		Tebogo Mtombeni - 529938	M3



Serial Tests Report  
TS253 – M3 – VPT  
RTR Vehicle Pre-Testing Report

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## Section 6 – Report summaries

### 6.1 Results status

Test Instruction Sheet	Compliant	Incomplete	Non-compliant
Traction Motors	X		
Reflectometry	X		
Protective Bonding and Return Current	X		
Config	X		

### 6.2 Tools used.

Function	Tool name	Tool number	Next Calibration date
012_PB	Protective bonding	Megger	8/25/2025
025_NET_054_PIS	Cable Analyser DSX5000	Cable analyser DSX5000	10/30/2024
CONFIG	Multimetro	Multi-meter 2	10/31/2024

Vehicle	Equipment	Expected version	Version loaded
M3			