PROJECT	CUSTOMER	VEHICLE
Xtrapolis-PRASA	**PRASA**	**215 – TC2 – VFT**

RTR Vehicle Functional Static Testing TS215 TC2 Report

GIB0000006300

	CREATED	VERIFIED	APPROVED	DISTRIBUTION
Name	Tshegofatso SETSHOGWE	Nkululeko NDOVELA	Kgomotso NKOANA	Confidentiality Category *Restricted* ☐ *Project* ☐ *Normal* ☑
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Table of modifications

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A0	09/04/2024	Creation	Tshegofatso SETSHOGWE

Internal validations

	Name	Function	Date	Signature
Creator	Tshegofatso SETSHOGWE	EPU Manager	09/04/2024	X Tshegofatso SETSHOGWE EPU Manager
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Execution Plan

Start Date	20/03/2024
End Date	21/03/2024

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3.3 Instructions list

3.3.1 012-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		Nokuzola Mdluli - 491469	TC2
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		Nokuzola Mdluli - 491469	TC2
10003	A	The Ohmmeter shall be off		OK		Nokuzola Mdluli - 491469	TC2
10004	A	Use the Tool List to record the serial number of the Ohmmeter that will be used for this test		OK		Nokuzola Mdluli - 491469	TC2
10005	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		Nokuzola Mdluli - 491469	TC2
10006	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		Nokuzola Mdluli - 491469	TC2
10007	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		Nokuzola Mdluli - 491469	TC2
10008	A	Visually identify and inspect that the earthing cables of the 1st axle of 1st bogie frame and the 2nd axle of 2nd bogie frame are properly connected to the axle brushes.		OK		Nokuzola Mdluli - 491469	TC2
10009	A	Disconnect from the axle box the earthing cable of the 2nd axle of 2nd bogie frame		OK		Nokuzola Mdluli - 491469	TC2
10010	R	Only the earthing cable of the 1st axle of the 1st bogie frame is connected		OK		Nokuzola Mdluli - 491469	TC2
10011	A	Measure the car body to ground impedance		OK		Nokuzola Mdluli - 491469	TC2

10012	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.00646	Nokuzola Mdluli - 491469	TC2
10013	A	Disconnect the earthing cable of 1st axle of 1st bogie frame		OK		Nokuzola Mdluli - 491469	TC2
10014	A	Connect the earthing cable of the 2nd axle of 2nd bogie frame		OK		Nokuzola Mdluli - 491469	TC2
10015	R	Only the earthing cable of the 2nd axle of the 2nd bogie frame of TC2 car is connected		OK		Nokuzola Mdluli - 491469	TC2
10016	A	Measure the car body to ground impedance		OK		Nokuzola Mdluli - 491469	TC2
10017	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.00378	Nokuzola Mdluli - 491469	TC2
10018	A	Connect the earthing cable of the 1st axle of 1st bogie frame		OK		Nokuzola Mdluli - 491469	TC2
10019	I	Earthing of Equipment on the Underframe		OK		Nokuzola Mdluli - 491469	TC2
10020	A	Visually inspect that the earthing cable connecting the Auxiliary Converter Case to TC2 car body is properly connected and related bolts are correctly torqued.		OK		Nokuzola Mdluli - 491469	TC2
10021	R	Auxiliary Converter visually grounded and torque is correctly marked		OK		Nokuzola Mdluli - 491469	TC2
10022	A	Measure the impedance between the Auxiliary Converter Case and the car body		OK		Nokuzola Mdluli - 491469	TC2
10023	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.00436	Nokuzola Mdluli - 491469	TC2
10024	A	Visually inspect that the earthing cable connecting the Battery Box to the car body is properly connected and the related bolts are correctly torqued		OK		Nokuzola Mdluli - 491469	TC2
10025	R	Battery Box visually grounded and torque is correctly marked		OK		Nokuzola Mdluli - 491469	TC2
10026	A	Measure the impedance between the Battery Box Case and the car body		OK		Nokuzola Mdluli - 491469	TC2
10027	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.00636	Nokuzola Mdluli - 491469	TC2
10028	A	Visually inspect that the earthing cable connecting the Eurobalise Antenna to the car body is properly connected and the		OK		Nokuzola Mdluli - 491469	TC2

		related bolts are correctly torqued					
10029	R	Eurobalise Antenna visually grounded and torque is correctly marked		OK		Nokuzola Mdluli - 491469	TC2
10030	A	Measure the impedance between the Eurobalise Antenna and the car body		OK		Nokuzola Mdluli - 491469	TC2
10031	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.00775	Nokuzola Mdluli - 491469	TC2
10032	A	Visually inspect that the earthing cable connecting the LVB/Brake Module to the car body is properly connected and the related bolts are correctly torqued		OK		Nokuzola Mdluli - 491469	TC2
10033	R	LVB/Brake Module visually grounded and torque is correctly marked		OK		Nokuzola Mdluli - 491469	TC2
10034	A	Measure the impedance between the LVB/Brake and the car body		OK		Nokuzola Mdluli - 491469	TC2
10035	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.00747	Nokuzola Mdluli - 491469	TC2
10036	I	Earthing of Equipment on the Exterior		OK		Nokuzola Mdluli - 491469	TC2
10037	I	Exterior Front		OK		Nokuzola Mdluli - 491469	TC2
10038	A	Visually inspect that the earthing cable connecting the Front Coupler to the car body is properly connected and the related bolts are correctly torqued		OK		Nokuzola Mdluli - 491469	TC2
10039	R	Front Coupler visually grounded and torque is correctly marked		OK		Nokuzola Mdluli - 491469	TC2
10040	A	Measure the impedance between the Front Coupler and the car body		OK		Nokuzola Mdluli - 491469	TC2
10041	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.00537	Nokuzola Mdluli - 491469	TC2
10042	I	Earthing of Equipment on the Roof		OK		Nokuzola Mdluli - 491469	TC2
10043	A	Visually inspect that the earthing cable connecting the Saloon HVAC to the car body is properly connected and the related bolts are correctly torqued		OK		Nokuzola Mdluli - 491469	TC2
10044	R	Saloon HVAC visually grounded and torque is correctly marked		OK		Nokuzola Mdluli - 491469	TC2

10045	A	Measure the impedance between the Saloon HVAC and the car body		OK		Nokuzola Mdluli - 491469	TC2
10046	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.00368	Nokuzola Mdluli - 491469	TC2
10047	A	Visually inspect that the earthing cable connecting the Cab HVAC to the car body is properly connected and the related bolts are correctly torqued		OK		Nokuzola Mdluli - 491469	TC2
10048	R	Cab HVAC visually grounded and torque is correctly marked		OK		Nokuzola Mdluli - 491469	TC2
10049	A	Measure the impedance between the Cab HVAC and the car body		OK		Nokuzola Mdluli - 491469	TC2
10050	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.00648	Nokuzola Mdluli - 491469	TC2
10051	I	Earthing of interior equipment		OK		Nokuzola Mdluli - 491469	TC2
10052	I	Cabin		OK		Nokuzola Mdluli - 491469	TC2
10053	A	Visually inspect that the earthing cable connecting LV1 cubicle to the car body is properly connected and the related bolts are correctly torqued		OK		Nokuzola Mdluli - 491469	TC2
10054	R	LV1 visually grounded and torque is correctly marked		OK		Nokuzola Mdluli - 491469	TC2
10055	A	Measure the impedance between the LV1 cubicle and the car body		OK		Nokuzola Mdluli - 491469	TC2
10056	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.00365	Nokuzola Mdluli - 491469	TC2
10057	A	Visually inspect that the earthing cable connecting LV2 cubicle to the car body is properly connected and the related bolts are correctly torqued		OK		Nokuzola Mdluli - 491469	TC2
10058	R	LV2 visually grounded and torque is correctly marked		OK		Nokuzola Mdluli - 491469	TC2
10059	A	Measure the impedance between the LV2 cubicle and the car body		OK		Nokuzola Mdluli - 491469	TC2
10060	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.00637	Nokuzola Mdluli - 491469	TC2
10061	A	Visually inspect that the earthing cable connecting Under Desk Left cubicle to the car body is properly connected and the		OK		Nokuzola Mdluli - 491469	TC2

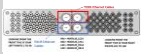
		related bolts are correctly torqued					
10062	R	Under Desk Left cabinet visually grounded and torque is correctly marked		OK		Nokuzola Mdluli - 491469	TC2
10063	A	Measure the impedance between the Under Desk Left cabinet and the car body		OK		Nokuzola Mdluli - 491469	TC2
10064	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.00574	Nokuzola Mdluli - 491469	TC2
10065	A	Visually inspect that the earthing cable connecting Under Desk Middle cabinet to the car body is properly connected and the related bolts are correctly torqued		OK		Nokuzola Mdluli - 491469	TC2
10066	R	Under Desk Middle cabinet visually grounded and torque is correctly marked		OK		Nokuzola Mdluli - 491469	TC2
10067	A	Measure the impedance between the Under Desk Middle cabinet and the car body		OK		Nokuzola Mdluli - 491469	TC2
10068	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.00637	Nokuzola Mdluli - 491469	TC2
10069	A	Measure the impedance between the Master Controller and the car body		OK		Nokuzola Mdluli - 491469	TC2
10070	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.00464	Nokuzola Mdluli - 491469	TC2
10071	A	Measure the impedance between the Foot Heater and the car body		OK		Nokuzola Mdluli - 491469	TC2
10072	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.00547	Nokuzola Mdluli - 491469	TC2
10073	I	Saloon		OK		Nokuzola Mdluli - 491469	TC2
10074	A	Visually inspect that the earthing cable connecting LV7 cubicle to the car body is properly connected and the related bolts are correctly torqued		OK		Nokuzola Mdluli - 491469	TC2
10075	R	LV7 visually grounded and torque is correctly marked		OK		Nokuzola Mdluli - 491469	TC2
10076	A	Measure the impedance between the LV7 cubicle and the car body		OK		Nokuzola Mdluli - 491469	TC2
10077	R	Impedance Result Max : x <= 0.05 (Ohm)		OK	0.00478	Nokuzola Mdluli - 491469	TC2

Section 4 – Reflectometry

4.3 Instructions list

4.3.1 025_NET_054_PIS-Network Cabling Integrity Test

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		Amanda Ntuli - 526239	TC2
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		Amanda Ntuli - 526239	TC2
10003	I	The Cable Analyzer Module DSX-5000 will be used to validate cabling		OK		Amanda Ntuli - 526239	TC2
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		Amanda Ntuli - 526239	TC2
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_TC2_P01 for PACIS and TS021_TC2_T01 for TCMS.		OK		Amanda Ntuli - 526239	TC2
10006	I	Use the pictures below for coupler test.		OK		Amanda Ntuli - 526239	TC2
10007	I	Front coupler		OK		Amanda Ntuli - 526239	TC2
10008	I	DB9 connector		OK		Amanda Ntuli - 526239	TC2
10009	I	TCMS cabling		OK		Amanda Ntuli - 526239	TC2
10010	A	From: [25A15 Train Router Switch (Local: +LV1; Connector: 25XP15_ETH7)] to: [54A13 Train Router Switch (Local: +LV1; Connector: 54XP13_ETHCPU)] NOTE: Cable is crossed TSX_TC2_T01		OK		Amanda Ntuli - 526239	TC2
10011	A	From: [25A15 Train Router Switch (Local: +LV1; Connector: 25XP15_ETH4)] to: [25A11 Ethernet Switch (CRS2) (Local: +LV1; Connector: 25XP11_X4)] NOTE: Cable is crossed TSX_TC2_T02		OK		Amanda Ntuli - 526239	TC2
10012	A	From: [25A11 Ethernet Switch (Local: +LV1; Connector: 25XP11_X3)] to:		OK		Amanda Ntuli - 526239	TC2

		[25A12 Switch Ethernet (CRS3) (Local: +LV1; Connector: 25XP12_X4)] NOTE: Cable is crossed TSX_TC2_T03					
10013	A	From: [25A12 Ethernet Switch (CRS2) (Local: +LV1; Connector: 25XP12_X8)] to: [25A18 MAINTENANCE INTERFACE (Local: +LV1; Connector: 25XR18_ETH)] NOTE: Cable is crossed TSX_TC2_T04		OK		Amanda Ntuli - 526239	TC2
10014	A	From: [25A15 Train Router Switch (Local: +LV1; Connector: 25XP15_ETH3)] to: [25A14 Ethernet Repeater (TBR) (Local: +LV7; Connector: 25XP14_ETH0)] NOTE: Cable is crossed TSX_TC2_T05		OK		Amanda Ntuli - 526239	TC2
10015	A	From: [25A15 Train Router Switch (Local: +LV1; Connector: 25XP15_ETH5)] to: [25A10 Ethernet Switch (CRS1) (Local: +LV7; Connector: 25XP10_X3)] NOTE: Cable is crossed TSX_TC2_T06		OK		Amanda Ntuli - 526239	TC2
10016	A	From: [25A12 Switch Ethernet (CRS3) (Local: +LV1; Connector: 25XP12_X3)] to: [(Local: END2 ; Connector: 90XP12.all)] NOTE: Cable is crossed TSX_TC2_T07		OK		Amanda Ntuli - 526239	TC2
10017	A	From: [25A14 TBR (Local: +LV7; Connector: 25XP14_ETH1)] to: [Inter-car (Local: +END2; -90XP12.al)] NOTE: Cable is straight TSX_TC2_T08		OK		Amanda Ntuli - 526239	TC2
10018	A	From: [25A15 Train Router Switch (Local: +LV1; Connector: 25XP15_ETH1)] to: [Inter-car (Local: +END2; -90XP11.all)] NOTE: Cable is straight TSX_TC2_T09		OK		Amanda Ntuli - 526239	TC2
10019	A	From: [25A10 Ethernet Switch (CRS1) (Local: +LV7; Connector: 25XP10_X4)] to: [Inter-car (Local: +END2; -90XP11.al)] NOTE: Cable is straight		OK		Amanda Ntuli - 526239	TC2

		TSX_TC2_T10					
10020	A	From: [25A15 Train Router Switch (Local: +LV1; Connector: 25XP15_ETH0)] to: [Coupler 041 (Local: CLP; Connector: 90XR120_LC14)] TSX_TC1_T11 NOTE: Cable is crossed NOTE: For this test, use the male coupler connector provided. Please refer to the picture for the correct location of connector.		OK		Amanda Ntuli - 526239	TC2
10021	A	From: [25A15 Train Router Switch (Local: +LV1; Connector: 25XP15_ETH2)] to: [Coupler 141 (Local: +CLP; Connector: 90XR120_RC14)] TSX_TC1_T12 NOTE: Cable is Straight NOTE: For this test use the female coupler connector provided. Please refer to the above picture for correct location for the connector.		OK		Amanda Ntuli - 526239	TC2
10022	I	Pacis cabling		OK		Amanda Ntuli - 526239	TC2
10023	A	From: [TRS 54A13 (Local: +LV1; Connector: 54XP13_ETH7)] to: [Inter-car (Local: +END2; -90XP12.ell)] NOTE: Cable is straight TSX_TC2_P01		OK		Amanda Ntuli - 526239	TC2
10024	A	From: [54A10 CRS1 (Local: +LV7; Connector: 54XP10_X7)] to: [Inter-car (Local: +END2; -90XP11.ell)] NOTE: Cable is crossed TSX_TC2_P02		OK		Amanda Ntuli - 526239	TC2
10025	A	From: [54A13 TRS (Local: +LV1; Connector: 54XP13_ETH6)] to: [54A10 CRS1 (Local: +LV7; Connector: 54XP10_X8)] NOTE: Cable is crossed TSX_TC2_P03		OK		Amanda Ntuli - 526239	TC2
10026	A	From: [54A42 RACK UMC (EBM) (Local: +LV1; Connector: 54XP42_X2) to: [Coupler 042 (Local: +CLP; Connector: 90XR120_LE12)] TSX_TC1_P04		OK		Amanda Ntuli - 526239	TC2

10027	A	From: [54A42 RACK UMC (EBM) (Local: +LV1;Connector: 54XP42_X8) to: [Coupler 142 (Local: +CLP; Connector: 90XR120_RE12)] TSX_TC1_P05 NOTE: Cable is straight NOTE: For this test use the female coupler connector and the DB9 connector provided. Refer to the picture above for the correct location of the connector.		OK		Amanda Ntuli - 526239	TC2
10028	A	All cables have been validated on TC2		OK		Amanda Ntuli - 526239	TC2
10029	R	Download all the results from Fluke and save them on PC with folder name "TC2_TSxx"		OK		Tshegofatso Setshogwe - 404572	TC2

Section 5 – Config

5.3 Instructions list

5.3.1 CONF-Car 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		Mlungisi Madela - 529927	TC2
10002	A	Check continuity between 93XT104_1 pin 50 and Ground point		OK		Mlungisi Madela - 529927	TC2
10003	R	There is no continuity		OK		Mlungisi Madela - 529927	TC2
10004	I	If there is continuity above, the wire 19203LE is pinched on the compressor isolation cock.		OK		Mlungisi Madela - 529927	TC2
10005	A	Check continuity on all pins of connector 90XP15 & 90XP14 to ground		OK		Mlungisi Madela - 529927	TC2
10006	R	There is no continuity except pin 62 of connector 90XP15		OK		Mlungisi Madela - 529927	TC2
10007	A	Check continuity on all pins of the coupler to ground.		OK		Mlungisi Madela - 529927	TC2
10008	R	There is no continuity		OK		Mlungisi Madela - 529927	TC2
10009	I	Smoke Detector Address Configuration		OK		Mlungisi Madela - 529927	TC2
10010	A	Remove and configure the Smoke Detector 67A4 in the cabin, according to the figure attached.		OK		Mlungisi Madela - 529927	TC2
10011	A	Reconnect Smoke Detector 67A4		OK		Mlungisi Madela - 529927	TC2
10012	A	Remove and configure the Smoke Detector 67A2 (+PA1) according to the figure attached.		OK		Mlungisi Madela - 529927	TC2
10013	A	Reconnect Smoke Detector 67A2		OK		Mlungisi Madela - 529927	TC2
10014	A	Remove and configure the Smoke Detector 67A3 (+PA3) according to the figure attached.		OK		Mlungisi Madela - 529927	TC2
10015	R	Measure the resistance (LHD- Line Heat Detection from Static Converter Box) between point 1 and point 4 of the		OK	626	Mlungisi Madela - 529927	TC2

		connector 67XP3_11. Result Min/Max : 550<= x<= 700 (Ohms)					
10016	R	About 600 Ohms measured		OK		Mlungisi Madela - 529927	TC2
10017	A	Reconnect Smoke Detector 67A3		OK		Mlungisi Madela - 529927	TC2
10018	I	Speed Sensor Continuity		OK		Mlungisi Madela - 529927	TC2
10019	A	Check continuity between Speed Sensor 1 (connector -41XP5) and MCE (connector - 40XP1_X314):		OK		Mlungisi Madela - 529927	TC2
10020	R	There is continuity between (Pin A and Pin z4), (Pin B and b4), (Pin D and Pin d4)		OK		Mlungisi Madela - 529927	TC2
10021	A	Check continuity between Speed Sensor 2 (connector -41XP2_D2) and MCE (connector - 40XP1_X314):		OK		Mlungisi Madela - 529927	TC2
10022	R	There is continuity between (Pin A and Pin z8), (Pin B and b8), (Pin D and Pin d8)		OK		Mlungisi Madela - 529927	TC2
10023	A	Check continuity between Speed Sensor 2 (connector -41XP2_D2) and OTDR (connector -61XP1_D2_TAC):		OK		Mlungisi Madela - 529927	TC2
10024	R	There is continuity between (Pin F and Pin a14), (Pin G and a12), (Pin H and Pin a10)		OK		Mlungisi Madela - 529927	TC2
10025	A	Check continuity between Speed Sensor 3 (connector -41XP3_D2) and MCE (connector - 40XP1_X314):		OK		Mlungisi Madela - 529927	TC2
10026	R	There is continuity between (Pin A and Pin z6), (Pin B and b6), (Pin D and Pin d6)		OK		Mlungisi Madela - 529927	TC2
10027	A	Check continuity between Speed Sensor 3 (connector -41XP3_D2) and OTDR (connector - 61XP1_D2_TAC):		OK		Mlungisi Madela - 529927	TC2
10028	R	There is continuity between (Pin F and Pin c2), (Pin G and a8), (Pin H and Pin e2)		OK		Mlungisi Madela - 529927	TC2
10029	A	Check continuity between Speed Sensor 4 (connector -41XP4_D2) and MCE (connector - 40XP1_X314):		OK		Mlungisi Madela - 529927	TC2
10030	R	There is continuity between (Pin A and Pin z10), (Pin B and b10), (Pin D and Pin d10)		OK		Mlungisi Madela - 529927	TC2

10031	I	OTDR LOOP		OK		Mlungisi Madela - 529927	TC2
10032	I	Check continuity between the following points:		OK		Mlungisi Madela - 529927	TC2
10033	A	From: [61A1 Tach Board (local: +LV2 connector -61XP1_D2_TAC (pin c26))] to: [61A2 speed indicator IN+(local: DD4)].		OK		Mlungisi Madela - 529927	TC2
10034	A	From: [61A1 Tach Board (local: +LV2 connector -61XP1_D2_TAC (pin e26))] to: [61A2 speed indicator OUT- (local: DD4)]		OK		Mlungisi Madela - 529927	TC2
10035	A	From: [61A1 Tach Board (local: +LV2 connector -61XP1_D2_TAC (pin a26))] to: [Local(+END2) Connector: -90XP13.b pin2]		OK		Mlungisi Madela - 529927	TC2
10036	A	From: [61A1 Tach Board (local: +LV2 connector -61XP1_D2_TAC (pin e28))] to: [Local(+END2) Connector: -90XP13.b pin1]		OK		Mlungisi Madela - 529927	TC2

Section 4 – Report summaries

4.2 Results status

Test Instruction Sheet	Compliant	Incomplete	Non-compliant
Reflectometry	X		
Protective Bonding	X		
Config	X		

Vehicle	Equipment	Expected version	Version loaded
TC2			