

Bordeaux, 03/07/19

# Gertrude PLC protocol tests notebook

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This document is sent for :

☐ Information

☐ Validation



## Revisions

Version	Date of revision	Object of the Revision
0A	03/07/2019	English edition for Wrocław



## **1. OBJECT OF THE DOCUMENT**

The purpose of this document is to test all the features of the Gertrude protocol on a controller

For each test there is :

- An identification number
- The hardware configuration required
- The test object
- A description of the procedure to make to realize the test;
- The expected result

The tests made with this procedure can be adapted and the list of tests can be modified for checking specify implementation in the city.

## **2. DOCUMENTARY REFERENCES**

Załącznik\_07\_DP\_Podsystemu\_ITS\_Gertrude\_Protokół\_transmisji\_Podsystemu ITS Gertrude\_v\_6.4.pdf

Podsystem\_ITS\_Gertrude\_zabezpieczenia\_transmisji.pdf

## **3. ABBREVIATIONS**

Abbreviations	Definitions
<b>GTR</b>	<b>Gertrude</b>
<b>PC</b>	<b>Traffic control system</b>
<b>CMF</b>	<b>Operation mode command (sent by the PC)</b>
<b>RMF</b>	<b>Return of operation mode (received by the PC)</b>
<b>PBQ</b>	<b>Conflict type fault detected by the controller and sent by the latter by a RMF equal to 1</b>
<b>TDT</b>	<b>Fault time Transmission. Time beyond which the controller no longer obeys the PC request</b>
<b>LQ</b>	<b>Strategy Code given to a Sensor declaration</b>
<b>RI</b>	<b>Integral red</b>

## **4. CONFIGURATION TEST**

The test consists of a control unit Gertrude in version GTR 12.2.0 or newer.

A transmission line IP mono point with a Controller 80.211.197.121 transmission address 41.



## 5. BASIC PC CONNECTION

### 5.1 DEMAND OF CMF 0 (SWITCH TO PC MODE)

**IDENTIFICATION :** [T1.1]

PROG1 : CMF 2 during 2 minutes and CMF0

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

**INITIAL STATE OF TEST :**

Local mode RMF=2

Any parameter OK

Control Demand GTR ON

**PROCESS :**

Demand of CMF 0

**EXPECTED RESULTS :**

Progressive passage in PC with respect for minimum of green and red and respect for conflicts.

Finish cycle.

Expected RMF 42 transition.

Switch to PC mode with traffic light opening coherence

**TEST RESULT:**

**(OK / NOK)**

**COMMENTS :**



## 5.2 DEMAND OF CMF 0 (SWITCH TO PC MODE)

IDENTIFICATION : [T1.2]

PROG2 : CMF2 during 2 minutes and CMF0 without sequence start

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

### INITIAL STATE OF TEST :

Local mode

Control demand GTR ON

No green states programmed in the waiting sequence

### PROCESS :

Demand of cmf 0

### EXPECTED RESULTS :

The controller will stop all green groups and do the PC mode with all groups in red state.

### TEST RESULT:

(OK / NOK)

### COMMENTS :

### 5.3 DEMAND OF CMF 0

IDENTIFICATION : [T1.3]

Do not test for Wroclaw

INITIAL STATE OF TEST:

Absence of conflicts table

PROCESS :

EXPECTED RESULTS :

Controller does not start, major fault

TEST RESULT :

(OK / NOK)

COMMENTS :

### 5.4 DEMAND OF CMF 0 (IN PC)

IDENTIFICATION : [T1.4]

Do not test for Wroclaw

INITIAL STATE OF TEST :

No declaration of traffic lights.

Blocking of CPU

PROCESS :

EXPECTED RESULTS :

All connected traffic lights are flashing

TEST RESULT:

(OK / NOK)

COMMENTS :



## 5.5 DEMAND CMF 0 (IN PC)

**IDENTIFICATION :** [T1.5]

PROG 3 : CMF23 during 2 minutes and CMF0 with group 1 all the time green

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

**INITIAL STATE OF TEST :**

Local mode

Control demand GTR ON

No coherence between the traffic lights controlled green by the pc and those programmed green in the controller

**PROCESS :**

Modification CMF LOCAL at PC (0)

**EXPECTED RESULTS :**

Not switch in PC,

Unblocking after a security timeout

RMF1 and RMF15

**TEST RESULT :**

**(OK / NOK)**

**COMMENTS :**



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## 6. CONTROLLER START

### 6.1 CONTROLLER INITIALIZATION

IDENTIFICATION : [T2.1]

PROG4 : CMF2

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

INITIAL STATE OF TEST :

Controller Off

Functional communication with the PC

PROCESS :

Start

EXPECTED RESULTS :

Initialization then requested mode RMF24 to RMF2

TEST RESULT :

(OK / NOK) :

COMMENTS :



## 6.2 INITIALIZATION OF CONTROLLER

**IDENTIFICATION :** [T2.2]

PROG0 : CMF0

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

**INITIAL STATE OF TEST :**

Off

Demand CMF PC (CMF=0)

**PROCESS :**

Start

**EXPECTED RESULTS :**

Progressive passage in PC with respect for minimum of green and red and respect for conflicts.

Finish cycle.

Expected RMF 42 transition.

Switch to PC mode with traffic light opening coherence RMF0

**TEST RESULT :**

**(OK / NOK) :**

**COMMENTS :**



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### 6.3 INITIALIZATION OF CONTROLLER

IDENTIFICATION : [T2.3]

PROG0 : CMF0

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

INITIAL STATE OF TEST :

Off

Demand CMF pc

Control demand GTR OFF

PROCESS :

Start

EXPECTED RESULTS :

Initialization CMF 43 → local mode RMF 10

TEST RESULT:

(OK / NOK) :

COMMENTS :



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## 6.4 INITIALIZATION OF CONTROLLER

IDENTIFICATION : [T2.4]

PROG0 : CMF0

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

INITIAL STATE OF TEST :

Off

Control Demand GTR ON

Flashing positioned Agent

PROCESS :

Start

EXPECTED RESULTS :

Initialization → flashing Agent mode RMF 12

TEST RESULT:

(OK / NOK) :

COMMENTS :



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## 6.5 INITIALIZATION OF CONTROLLER

**IDENTIFICATION :** [T2.5]

**PROG0 :** CMF0

**VISU1 :** hh:mn:se cmf rmf nsq tsq feu rvfeu

**INITIAL STATE OF TEST :**

Off

Demand CMF PC

Demand of positioned extinction

**PROCESS :**

Start

**EXPECTED RESULTS :**

Extinction (no ignition) RMF 31

**TEST RESULT :**

**(OK / NOK) :**

**COMMENTS :**



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## 6.6 INITIALIZATION OF CONTROLLER

IDENTIFICATION : [T2.6]

PROG6 : CMF14

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

INITIAL STATE OF TEST :

Off

Demand CMF 14 (initialization demand of the controller)

PROCESS :

Start

EXPECTED RESULTS :

Permanent initialization

TEST RESULT :

**(OK / NOK)**

COMMENTS :



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## 6.7 INITIALIZATION OF CONTROLLER

IDENTIFICATION : [T2.7]

PROG4 : CMF2

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

INITIAL STATE OF TEST :

Off

Demand CMF 2 (local)

PROCESS :

Start

EXPECTED RESULTS :

Initialization → local mode (RMF 2)

TEST RESULT:

(OK / NOK)

COMMENTS :



## 6.8 INITIALIZATION OF CONTROLLER

IDENTIFICATION : [T2.8]

PROG5 : CMF31

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

INITIAL STATE OF TEST :

Off

Demand CMF 31 (off)

PROCESS :

Start

EXPECTED RESULT:

Immediate extinction mode

TEST RESULT:

(OK / NOK)

COMMENTS :



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## 7. TAKING IN PC (CONTROL PC)

### 7.1 COMMUNICATIONS OPENING

IDENTIFICATION : [T3.1]

PROG0 : CMF0

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

INITIAL STATE OF TEST :

Local

Without modem communication

PROCESS :

Opening of series communications

EXPECTED RESULTS :

Respect of the procedure PC

TEST RESULT :

(OK / NOK)

COMMENTS :



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## 7.2 DEMAND FLASHING AGENT OFF

**IDENTIFICATION :** [T3.2]

**PROG0 :** CMF0

**VISU1 :** hh:mn:se cmf rmf nsq tsq feu rvfeu

**INITIAL STATE OF TEST :**

Flashing Agent (RMF=12)

**PROCESS :**

Demand flashing agent OFF

**EXPECTED RESULTS :**

Respect of the PC procedure

**TEST RESULT :**

**(OK / NOK)**

**COMMENTS :**



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### 7.3 DEMAND EXTINCTION OFF

IDENTIFICATION : [T3.3]

PROG0 : CMF0

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

INITIAL STATE OF TEST :

Demand of Extinction by Agent box (31)

PROCESS :

Demand extinction OFF

EXPECTED RESULTS :

Respect of PC procedure RMF 31

TEST RESULT :

(OK / NOK)

COMMENTS :



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#### 7.4 AUTHORIZATION CONTROL GTR PC ON

IDENTIFICATION : [T3.4]

PROG4 : CMF2

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

INITIAL STATE OF TEST :

Local asked

PROCEDURE :

Authorization GTR ON

EXPECTED RESULTS :

Respect of PC procedure

TEST RESULT :

(OK / NOK)

COMMENTS :



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## 7.5 TRANSITION INIT TO PC

**IDENTIFICATION :** [T3.5]

**PROG6 :** CMF14

**VISU1 :** hh:mn:se cmf rmf nsq tsq feu rvfeu

**INITIAL STATE OF TEST :**

CMF=RMF initialization

**PROCESS :**

Change CMF Init → PC

**EXPECTED RESULTS :**

Respect of PC procedure

**TEST RESULT :**

(OK / NOK)

**COMMENTS :**



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## 7.6 TRANSITION EXTINCTION TO PC

**IDENTIFICATION :** [T3.6]

PROG15 : CMF31 during 2 minutes and CMF0

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

**INITIAL STATE OF TEST :**

CMF=RMF Extinction

**PROCESS :**

Change CMF Extinction → PC

**EXPECTED RESULTS :**

Respect of PC procedure

**TEST RESULT :**

(OK / NOK)

**COMMENTS :**



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## 7.7 TRANSITION FLASHING TO PC

**IDENTIFICATION :** [T3.7]

PROG16 : CMF11 during 2 minutes and CMF0

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

**INITIAL STATE OF TEST :**

CMF=RMF flashing scheduled (11)

**PROCESS :**

Change CMF 11 → PC

**EXPECTED RESULTS :**

Respect of PC procedure

**TEST RESULT :**

(OK / NOK)

**COMMENTS :**



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## 7.8 TRANSITION LOCAL TO PC

**IDENTIFICATION :** [T3.8]

PROG17 : CMF23 during 2 minutes and CMF0

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

**INITIAL STATE OF TEST :**

CMF=RMF Local

**PROCESS :**

Change CMF Local → PC

**EXPECTED RESULTS :**

Respect of PC procedure

**TEST RESULT :**

(OK / NOK)

**COMMENTS :**



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## 8. EXIT OF PC MODE

### 8.1 BREAKING OF COMMUNICATIONS

IDENTIFICATION : [T4.1]

PROG0 : CMF0

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

INITIAL STATE OF TEST :

CMF=RMF PC

PROCESS :

Breaking of communications

EXPECTED RESULTS :

Waiting of TDT

Minimum respect of green

Integral red

Beginning local plan scheduled

TEST RESULT :

(OK / NOK)

COMMENTS :



## 8.2 PC TRANSITION TO INITIALIZATION

**IDENTIFICATION :** [T4.2]

PROG11 : CMF0 during 5 minutes and CMF14 (flashing)

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

**INITIAL STATE OF TEST :**

CMF=RMF PC

Or during a procedure taking in pc

**PROCESS :**

Change CMF PC → Init

**EXPECTED RESULTS :**

Immediate initialization

**TEST RESULT :**

**(OK / NOK)**

**COMMENTS :**



### 8.3 PC TRANSITION TO EXTINCTION

**IDENTIFICATION :** [T4.3]

PROG7 : CMF0 during 2 minutes and CMF31

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

**INITIAL STATE OF TEST :**

CMF=RMF PC

during a procedure taking in pc

**PROCESS :**

Change CMF PC → Extinction

**EXPECTED RESULTS :**

Immediate extinction

**TEST RESULT :**

**(OK / NOK)**

**COMMENTS :**



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#### 8.4 TRANSITION PC TO FLASHING SCHEDULED

**IDENTIFICATION :** [T4.4]

PROG8 : CMF0 during 2 minutes and CMF51 (flashing prog)

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

**INITIAL STATE OF TEST :**

CMF=RMF PC

Or during a procedure taking in pc

**PROCESS :**

Change CMF PC → PC flashing mode scheduled. RMF11

**EXPECTED RESULTS :**

Stop program and Transition RMF 42

PC flashing mode scheduled RMF11

**TEST RESULT :**

**(OK / NOK)**

**COMMENTS :**



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## 8.5 PC TRANSITION TO LOCAL 1.2.3....

**IDENTIFICATION :** [T4.5]

PROG9 : CMF=0 during 2 minutes and CMF16 (first local plan)

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

**INITIAL STATE OF TEST :**

CMF=RMF PC

Or during a procedure taking in pc

**PROCESS :**

Change CMF PC → local 1

**EXPECTED RESULTS :**

Minimum respect of green

RI

Beginning of first local plan with coordination

**TEST RESULT :**

**(OK / NOK)**

**COMMENTS :**



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## 8.6 PC TRANSITION TO UNKNOWN CMF

**IDENTIFICATION :** [T4.6]

PROG10 : CMF0 during 2 minutes and CMF35

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

**INITIAL STATE OF TEST :**

CMF=RMF PC

Or during a procedure taking in pc

**PROCESS :**

Change CMF PC → CMF unknown (for example 35)

**EXPECTED RESULTS :**

Stay in previous state disconnect after a programmable time

**TEST RESULT :**

**(OK / NOK)**

**COMMENTS :**



## 8.7 ACTIVATION FLASHING AGENT ON

IDENTIFICATION : [T4.7]

PROG0 : CMF0

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

Test of pushing button on the controller to go in flashing yellow

INITIAL STATE OF TEST :

CMF=RMF PC

Or during a procedure taking in pc

PROCESS :

Demand flashing agent on

EXPECTED RESULTS :

Immediate extinction (RMF 12)

TEST RESULT:

(OK / NOK)

COMMENTS :



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## 8.8 ACTIVATION EXTINCTION DEMAND ON

IDENTIFICATION : [T4.8]

Do not test for Wroclaw

INITIAL STATE OF TEST:

CMF=RMF PC or during a procedure taking in pc

PROCESS :

Demand extinction agent on

EXPECTED RESULTS :

Immediate extinction (RMF 31)

TEST RESULT:

(OK / NOK)

COMMENTS :



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## 8.9 CONTROL DEMAND GTR OFF

IDENTIFICATION : [T4.9]

PROG0 : CMF0

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

### INITIAL STATE OF TEST:

CMF=RMF pc or during a procedure taking in pc

### PROCEDURE:

Control demand GTR OFF

### EXPECTED RESULTS :

Minimum respect of green

RI

Begin Start prog

and local program scheduled (RMF10)

### TEST RESULT:

(OK / NOK)

### COMMENTS :



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## 8.10 LIGHT FAILURE IN PC DEMAND

**IDENTIFICATION :** [T4.10]

**PROG0 :** CMF0

**VISU1 :** hh:mn:se cmf rmf nsq tsq feu rvfeu

**INITIAL STATE OF TEST :**

CMF=RMF PC or during a procedure taking in pc

**PROCESS :**

Light failure

**EXPECTED RESULTS :**

Passage in flashing of security immediately (RMF 13)

**TEST RESULT:**

(OK / NOK)

**COMMENTS :**



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### 8.11 PC DEMAND TO LOCAL 1.2.3...

**IDENTIFICATION :** [T4.11]

PROG12 : CMF0 during 2 minutes and CMF3

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

**INITIAL STATE OF TEST :**

The controller is in pc.

CMF=RMF PC.

**PROCESS :**

Change of CMF Pc in local 1

**EXPECTED RESULTS :**

Begin local plan

**TEST RESULT:**

**(OK / NOK)**

**COMMENTS :**



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## 8.12 PC DEMAND OFF

**IDENTIFICATION :** [T4.12]

PROG18 : CMF0 during 2 minutes and CMF23 (local)

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

### INITIAL STATE OF TEST:

The controller is in PC.

CMF=RMF PC.

### PROCESS :

PC demand OFF

### EXPECTED RESULTS :

Starting the program plan

### TEST RESULT:

**(OK / NOK)**

### COMMENTS :



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### 8.13 TRANSMISSION CUT

IDENTIFICATION : [T4.13]

PROG0 : CMF0

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

#### INITIAL STATE OF TEST:

The controller is in PC.

CMF=RMF PC.

#### PROCESS :

Transmission cut

#### EXPECTED RESULTS :

Waiting for TDT starting the program plan (RMF23)

#### TEST RESULT:

**(OK / NOK)**

#### COMMENTS :

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## 9. CONFLICTS TESTS

### 9.1 IGNITION OF 1 SECOND TRAFFIC LIGHT

IDENTIFICATION : [T5.1]

PROG13 : CMF0 sk75 with only 2 seconds of green for the group1

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

INITIAL STATE OF TEST:

CMF=RMF PC

PROCESS :

Ignition of 1 second traffic light by the pc

EXPECTED RESULTS :

PBQ Incorrect pc during the minimum respect of green

TEST RESULT :

(OK / NOK)

COMMENTS :



## 9.2 IGNITION OF TRAFFIC LIGHTS IN CONFLICT

**IDENTIFICATION :** [T5.2]

PROG14 : CMF0 sk75 with traffic light 1 prolong of 8 seconds

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

**INITIAL STATE OF TEST :**

CMF=RMF PC

**PROCESS :**

Ignition of traffic lights in conflict

**EXPECTED RESULTS :**

During conflict RMF1

Ignition in end of red for conflict, group 5-6-7 offbeat green

**TEST RESULT:**

**(OK / NOK)**

**COMMENTS :**



### 9.3 GENERATION OF CONFLICTS BY TRANSMISSION CUT

**IDENTIFICATION :** [T5.3]

PROG0 : CMF0

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

Check on the controller

**INITIAL STATE OF TEST :**

CMF=RMF PC

**PROCESS :**

Generation of conflict transmission cut inferior to TDT

**EXPECTED RESULTS :**

Detection of conflicts

**TEST RESULT:**

**(OK / NOK)**

**COMMENTS :**



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## 10. MINIMUM OF GREEN TESTS

### 10.1 NON-RESPECT OF MINIMUM OF GREEN

IDENTIFICATION : [T6.1]

PROG19 : CMF0 sk75 with all group at 1 second of green

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

INITIAL STATE OF TEST :

CMF=RMF PC

PROCESS :

Order of traffic lights

Non respect minimum of green

EXPECTED RESULTS :

Return rmf=pbq

Forced respect of minimums

TEST RESULT:

(OK / NOK)

COMMENTS :



## 10.2 NO RESPECT OF SECURITY TIME

**IDENTIFICATION :** [T6.2]

PROG20 : CMF0 sk75 with 2 seconds of green more for the group 1

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

**INITIAL STATE OF TEST :**

CMF=RMF PC

**PROCESS :**

No respect of security time

**EXPECTED RESULTS :**

Return RMF= PBQ

Respect of security time

**TEST RESULT:**

**(OK / NOK)**

**COMMENTS :**



### 10.3 NON-RESPECT OF MINIMUM GREEN BY TRANS CUT

**IDENTIFICATION :** [T6.3]

PROG13 : CMF0 CC75 with only 2 seconds of green for the group 1

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

Cut the transmission in the first second of the green of traffic light 1 and connect again

**INITIAL STATE OF TEST :**

CMF=RMF PC

**PROCESS :**

Non-respect of minimum of green by transmission cut

**EXPECTED RESULTS :**

Return RMF=PBQ

Forced respect of minimums

**TEST RESULT:**

**(OK / NOK)**

**COMMENTS :**



#### 10.4 NON-RESPECT OF MINIMUM WHEN IN PC

**IDENTIFICATION :** [T6.4]

PROG1 : CMF 2 during 2 minutes and CMF0

VISU1 : hh:mn:se cmf rmf nsq tsq feu rvfeu

In local mode PLC open selected group for only 1 second (the end of cycle) and then go to PC mode and prolong green for minimal time of green (RMF42) and after goes to PC mode (RMF0).

**INITIAL STATE OF TEST :**

CMF=RMF pc since 1 second

**PROCESS :**

Non-respect of minimums of green or red after the first second pc

**EXPECTED RESULTS :**

The calculation of minimums must integrate the time realized before pc mode

**TEST RESULT :**

(OK / NOK)

**COMMENTS :**



## 11. SECURITY MESSAGE TESTS

Do not test for Wroclaw

### 11.1 DOWNLOAD WRITING

IDENTIFICATION : [T7.1]

Do not test for Wroclaw

INITIAL STATE OF TEST :

Indifferent

PROCESS :

Download writing . Under pc before downloading

EXPECTED RESULTS :

Default return - change memory

TEST RESULT:

(OK / NOK)

COMMENTS :

### 11.2 CORRUPTED MEMORY

IDENTIFICATION : [T7.2]

Do not test for Wroclaw

INITIAL STATE OF TEST :

Indifferent

PROCESS :

Corrupted memory

EXPECTED RESULTS :

Default return - corrupted memory

TEST RESULT:

(OK / NOK)

COMMENTS :

### 11.3 LIGHT FAILURE

IDENTIFICATION : [T7.3]

Do not test for Wroclaw

INITIAL STATE OF TEST :

Indifferent

PROCESS :

Light failure

EXPECTED RESULTS :

Default return – light failure

TEST RESULT:

(OK / NOK)

COMMENTS :

### 11.4 POWER DEFAULT

IDENTIFICATION : [T7.4]

Do not test for Wroclaw

INITIAL STATE OF TEST :

Indifferent

PROCESS :

Power default

EXPECTED RESULTS :

Default return - power

TEST RESULT:

(OK / NOK)

COMMENTS :



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## 12. COUNTERS TESTS

### 12.1 SINGLE LOOP COUNTER

**IDENTIFICATION :** [T8.1]

**PROG0 :** CMF0

**VISU2:** hh:mn:se cmf rmf C\_CT (counter 4 values)

**INITIAL STATE OF TEST :**

Indifferent

**PROCESS :**

1 loop by counter mac1

**EXPECTED RESULTS :**

Correct counting

**TEST RESULT:**

**(OK / NOK)**

**COMMENTS :**



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## 12.2 SINGLE LOOP COUNTER AND TRANSMISSION CUT

**IDENTIFICATION :** [T8.2]

**PROG0 :** CMF0

**VISU2:** hh:mn:se cmf rmf C\_CT (counter 4 values)

**INITIAL STATE OF TEST :**

Indifferent

**PROCESS :**

1 loop by counter mac1

Transmission cut inferior to tdt

**EXPECTED RESULTS :**

Memorizing counting during the cut

**TEST RESULT:**

**(OK / NOK)**

**COMMENTS :**



### 12.3 MULTI-LOOP COUNTER

**IDENTIFICATION :** [T8.3]

**PROG0 :** CMF0

**VISU2:** hh:mn:se cmf rmf C\_CT (counter 4 values)

**INITIAL STATE OF TEST :**

Indifferent

**PROCESS :**

1, 2 to 3 loops by counter mac2

**EXPECTED RESULTS :**

Correct counting

**TEST RESULT:**

**(OK / NOK)**

**COMMENTS :**



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## 12.4 MULTI-LOOP COUNTER AND TRANSMISSION CUT

**IDENTIFICATION :** [T8.4]

**PROG0 :** CMF0

**VISU2:** hh:mn:se cmf rmf C\_CT (counter 4 values)

**INITIAL STATE OF TEST :**

Indifferent

**PROCESS :**

1, 2 to 3 loop by counter mac2  
Transmission cut inferior to tdt

**EXPECTED RESULTS :**

Memorizing counting during the cut

**TEST RESULT:**

**(OK / NOK)**

**COMMENTS :**

## 12.5 MULTIPLE AFFECTATION OF LOOPS 1

IDENTIFICATION : [T8.5]

Do not test for Wrocław

INITIAL STATE OF TEST :

Indifferent

PROCESS :

1, 2 to 3 loops by counter

1 or several loops also assigned in adaptative or lq

EXPECTED RESULTS :

Correct counting

TEST RESULT:

(OK / NOK)

COMMENTS :

## 12.6 MULTIPLE AFFECTATION OF LOOPS 2

IDENTIFICATION : [T8.6]

Do not test for Wrocław

INITIAL STATE OF TEST :

Indifferent

PROCESS :

Assignment of the same loop on 2 counters

EXPECTED RESULTS :

Correct counting

TEST RESULT:

(OK / NOK)

COMMENTS :



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### 13. TESTS OF QUEUES AND ADAPTATIVE

#### 13.1 ORDERED ASSIGNMENT

IDENTIFICATION : [T9.1]

PROG0 : CMF0

VISU3: hh:mn:se cmf rmf cab cas ( 64 values)

INITIAL STATE OF TEST :

Indifferent

PROCESS :

Ordered assignment ex : logical entry 1 physical entry 1

EXPECTED RESULTS :

Correct detection

TEST RESULT:

(OK / NOK)

COMMENTS :



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### 13.2 DISORDELY ASSIGNMENT

**IDENTIFICATION :** [T9.2]

**PROG0 :** CMF0

**VISU3:** hh:mn:se cmf rmf cab cas ( 64 values)

**INITIAL STATE OF TEST :**

Indifferent

**PROCESS :**

Disorderly assignment

**EXPECTED RESULTS :**

Correct detection

**TEST RESULT:**

**(OK / NOK)**

**COMMENTS :**



### 13.3 DISORDELY AND MULTIPLE ASSIGNMENT

**IDENTIFICATION :** [T9.3]

PROG0 : CMF0

VISU3: hh:mn:se cmf rmf cab cas ( 64 values)

**INITIAL STATE OF TEST :**

Indifferent

**PROCESS :**

Disorderly and multiple assignment ex: logical entries 8 and 22 → physical entry 2

**EXPECTED RESULTS :**

Correct detection

**TEST RESULT:**

**(OK / NOK)**

**COMMENTS :**



---

### 13.4 PERMANENT CALL

**IDENTIFICATION :** [T9.4]

**PROG0 :** CMF0

**VISU3:** hh:mn:se cmf rmf cab cas ( 64 values)

**INITIAL STATE OF TEST :**

Permanent call

**PROCESS :**

Test in duration (4 hours)

**EXPECTED RESULTS :**

Uninterrupted detections

**TEST RESULT :**

**(OK / NOK)**

**COMMENTS :**



---

### 13.5 GENERATION OF IMPULSIONS

**IDENTIFICATION :** [T9.5]

**PROG0 :** CMF0

**VISU3:** hh:mn:se cmf rmf cab cas ( 64 values)

**INITIAL STATE OF TEST :**

Indifferent

**PROCESS :**

Test with generator of impulsions

**EXPECTED RESULTS :**

Correct detection

**TEST RESULT :**

**(OK / NOK)**

**COMMENTS :**



---

### 13.6 TRANSMISSIONS CUT

**IDENTIFICATION :** [T9.6]

**PROG0 :** CMF0

**VISU3:** hh:mn:se cmf rmf cab cas ( 64 values)

**INITIAL STATE OF TEST :**

Indifferent

**PROCESS :**

Transmission cut inferior to TDT

**EXPECTED RESULTS :**

Memorizing

**TEST RESULT :**

**(OK / NOK)**

**COMMENTS :**

## 14. OUTPUT TESTS

Do not test for Wroclaw

### 14.1 LOGICAL COMMAND 16 OUTPUT

IDENTIFICATION : [T10.1]

Do not test for Wroclaw

INITIAL STATE OF TEST :

Indifferent

PROCESS :

Positioned output requested

EXPECTED RESULTS :

Correct detection

TEST RESULT:

(OK / NOK)

COMMENTS :

### 14.2 DISORDERLY ASSIGNMENT OF OUTPUTS

IDENTIFICATION : [T10.2]

Do not test for Wroclaw

INITIAL STATE OF TEST :

Indifferent

PROCESS :

Disorderly assignment

EXPECTED RESULTS :

Positioned output requested

TEST RESULT :

(OK / NOK)

COMMENTS :



---

### 14.3 ASSIGNMENT OF OUTPUTS & TRANSMISSION CUT

IDENTIFICATION : [T10.3]

Do not test for Wroclaw

INITIAL STATE OF TEST :

Indifferent

PROCESS :

Transmissions cut inferior to tdt

EXPECTED RESULTS :

Sortie maintained in the state before the cut

TEST RESULT :

(OK / NOK)

COMMENTS :



---

## 15. [CYFRA TESTS](#)

### 15.1 CYFRA ITS "STRAIGHT ON" SIGNAL

**IDENTIFICATION:** [T11.1]

PROG21 : CMF0 cyfra 24 STRAIGHT ON group 22 each cycle

VISU4 : hh:mn:se cmf rmf nsq tsq C\_CYFRA (way1) feu rvfeu

**INITIAL STATE OF TEST :**

Demand CMF 0 - PC mode

**PROCESS :**

This phase runs continuously and open the CYFRA group (24) and tram group (22) associate each cycle.

**EXPECTED RESULTS :**

The direction to control the CYFRA in this mode is "STRAIGHT ON"

RMF 0

**TEST RESULT :**

(OK / NOK)

**COMMENTS:**



## 15.2 CYFRA ITS PRIORITY "STRAIGHT ON" SIGNAL

**IDENTIFICATION:** [T11.2]

PROG22 : CMF0 cyfra 24 STRAIGHT ON group 22 each cycle with priority

VISU4 : hh:mn:se cmf rmf nsq tsq C\_CYFRA (way1) feu rvfeu

**INITIAL STATE OF TEST :**

Demand CMF 0 - PC mode

**PROCESS :**

This phase runs continuously and open the CYFRA group (24) and tram group (22) associate each cycle.

**EXPECTED RESULTS :**

The direction to control the CYFRA in this mode is flashing "STRAIGHT ON"

RMF 0

**TEST RESULT :**

(OK / NOK)

**COMMENTS:**



### 15.3 CYFRA ITS "RIGHT" SIGNAL

**IDENTIFICATION:** [T11.3]

PROG23 : CMF0 cyfra 24 RIGHT group 22 each cycle

VISU4 : hh:mn:se cmf rmf nsq tsq C\_CYFRA (way1) feu rvfeu

**INITIAL STATE OF TEST :**

Demand CMF 0 - PC mode

**PROCESS :**

This phase runs continuously and open the CYFRA group (24) and tram group (22) associate each cycle.

**EXPECTED RESULTS :**

The direction to control the CYFRA in this mode is "RIGHT"

RMF 0

**TEST RESULT :**

**(OK / NOK)**

**COMMENTS :**



#### 15.4 CYFRA ITS PRIORITY"RIGHT" SIGNAL

**IDENTIFICATION:** [T11.4]

PROG24 : CMF0 cyfra 24 RIGHT group 22 each cycle with priority

VISU4 : hh:mn:se cmf rmf nsq tsq C\_CYFRA (way1) feu rvfeu

**INITIAL STATE OF TEST :**

Demand CMF 0 - PC mode

**PROCESS :**

This phase runs continuously and open the CYFRA group (24) and tram group (22) associate each cycle.

**EXPECTED RESULTS :**

The direction to control the CYFRA in this mode is flashing "RIGHT"

RMF 0

**TEST RESULT :**

(OK / NOK)

**COMMENTS :**



## 15.5 CYFRA ITS "LEFT" SIGNAL

**IDENTIFICATION:** [T11.5]

PROG25 : CMF0 cyfra 24 LEFT group 22 each cycle

VISU4 : hh:mn:se cmf rmf nsq tsq C\_CYFRA (way1) feu rvfeu

**INITIAL STATE OF TEST :**

Demand CMF 0 - PC mode

**PROCESS :**

This phase runs continuously and open the CYFRA group (24) and tram group (22) associate each cycle.

**EXPECTED RESULTS :**

The direction to control the CYFRA in this mode is "LEFT"

RMF 0

**TEST RESULT :**

(OK / NOK)

**COMMENTS :**



## 15.6 CYFRA ITS PRIORITY "LEFT" SIGNAL

**IDENTIFICATION:** [T11.6]

PROG26 : CMF0 cyfra 24 LEFT group 22 each cycle with priority

VISU4 : hh:mn:se cmf rmf nsq tsq C\_CYFRA (way1) feu rvfeu

**INITIAL STATE OF TEST :**

Demand CMF 0 - PC mode

**PROCESS :**

This phase runs continuously and open the CYFRA group (24) and tram group (22) associate each cycle.

**EXPECTED RESULTS :**

The direction to control the CYFRA in this mode is flashing "LEFT"

RMF 0

**TEST RESULT :**

(OK / NOK)

**COMMENTS :**



## 15.7 CYFRA ITS "DIAMOND" SIGNAL

**IDENTIFICATION:** [T11.7]

PROG27 : CMF0 cyfra 24 DIAMOND group 22 each cycle

VISU4 : hh:mn:se cmf rmf nsq tsq C\_CYFRA (way1) feu rvfeu

**INITIAL STATE OF TEST :**

Demand CMF 0 - PC mode

**PROCESS :**

This phase runs continuously and open the CYFRA group (24) and tram group (22) associate each cycle.

**EXPECTED RESULTS :**

The direction to control the CYFRA this mode is "Diamond".

RMF 0

**TEST RESULT :**

(OK / NOK)

**COMMENTS :**



## 15.8 CYFRA ITS "COUNTING" SIGNAL

**IDENTIFICATION:** [T11.8]

PROG28 : CMF0 cyfra 24 STRAIGHT ON group 22 each cycle and counting from 6 seconds

VISU4 : hh:mn:se cmf rmf nsq tsq C\_CYFRA (way1) feu rvfeu

**INITIAL STATE OF TEST :**

Demand CMF 0 - PC mode

**PROCESS :**

This phase runs continuously and open counting from 6 for CYFRA group (24) and open tram group (22) associate each cycle.

**EXPECTED RESULTS :**

The controller show on the CYFRA correct "Counting" signals.

RMF 0

**TEST RESULT :**

**(OK / NOK)**

**COMMENTS :**



## 15.9 CYFRA ITS "K" SIGNAL

**IDENTIFICATION:** [T11.9]

PROG29 : CMF0 cyfra 24 STRAIGHT ON group 22 each cycle and signal K at the end

VISU4 : hh:mn:se cmf rmf nsq tsq C\_CYFRA (way1) feu rvfeu

**INITIAL STATE OF TEST :**

Demand CMF 0 - PC mode

**PROCESS :**

This phase runs continuously and open the CYFRA group (24) and tram group (22) associate each cycle.

**EXPECTED RESULTS :**

The controller show the "K" signal on the CYFRA.

RMF 0

**TEST RESULT :**

(OK / NOK)

**COMMENTS :**



---

### 15.10 CYFRA ITS "COUNTING" SIGNAL WITHOUT OPENING TRAM GROUP

**IDENTIFICATION:** [T11.10]

PROG30 : CMF0 cyfra 24 STRAIGHT ON, counting from 6, no opening group 22

VISU4 : hh:mn:se cmf rmf nsq tsq C\_CYFRA (way1) feu rvfeu

**INITIAL STATE OF TEST :**

Demand CMF 0 – PC mode

**PROCESS :**

This phase runs continuously and open counting from 6 for CYFRA group (24) and not open group (22) associate each cycle.

**EXPECTED RESULTS :**

The controller open group 22 after counting or doesn't start counting and not open the group or modified the counting and then open tram group in the right time.

RMF 49

**TEST RESULT :**

**(OK / NOK)**

**COMMENTS :**



---

### 15.11 CYFRA ITS TOO SHORT "COUNTING" SIGNAL

**IDENTIFICATION:** [T11.11]

PROG31 : CMF0 cyfra 24 STRAIGHT ON, counting from 6, open group 22 after 4 seconds

VISU4 : hh:mn:se cmf rmf nsq tsq C\_CYFRA (way1) feu rvfeu

**INITIAL STATE OF TEST :**

Demand CMF 0 – PC mode

**PROCESS :**

This phase runs continuously and open counting from 6 for CYFRA group (24) and open tram group (22) after 4 second of counting.

**EXPECTED RESULTS :**

The controller start counting from 6 and open tram group 22 after counting (not earlier).

RMF 49

**TEST RESULT :**

**(OK / NOK)**

**COMMENTS :**



## 15.12 CYFRA ITS TOO EARLY"COUNTING" SIGNAL

**IDENTIFICATION:** [T11.12]

PROG32 : CMF0 cyfra 24 straight on, counting from 2, open group 22

VISU4 : hh:mn:se cmf rmf nsq tsq C\_CYFRA (way1) feu rvfeu

**INITIAL STATE OF TEST :**

Demand CMF 0 – PC mode

**PROCESS :**

This phase runs continuously and open counting from 2 for CYFRA group (24). The start counting is too early to open the tram group (22) (2 seconds not respect the delays conflict).

**EXPECTED RESULTS :**

The controller not starting counting or modified the counting and then open tram group in the right time.

RMF 49

**TEST RESULT :**

**(OK / NOK)**

**COMMENTS :**



### 15.13 CYFRA ITS "K" SIGNAL WITHOUT TRAM GROUP

**IDENTIFICATION:** [T11.14]

PROG33 : CMF0 cyfra 24 straight on, signal K not open group 22

VISU4 : hh:mn:se cmf rmf nsq tsq C\_CYFRA (way1) feu rvfeu

**INITIAL STATE OF TEST :**

Demand CMF 0 – PC mode

**PROCESS :**

This phase runs continuously and open “K” signal on CYFRA group (24) while tram group (22) is not open.

**EXPECTED RESULTS :**

The controller not open “K” signal on CYFRA.

RMF 49

**TEST RESULT :**

**(OK / NOK)**

**COMMENTS :**



---

#### 15.14 CYFRA ITS "K" SIGNAL NOT CLOSE FROM GTR

**IDENTIFICATION:** [T11.15]

PROG34 : CMF0 cyfra 24 straight on, signal K not close at the end of group 22

VISU4 : hh:mn:se cmf rmf nsq tsq C\_CYFRA (way1) feu rvfeu

**INITIAL STATE OF TEST :**

Demand CMF 0 – PC mode

**PROCESS :**

This phase runs continuously and open “K” signal on CYFRA group (24) and prolong signal while tram group (22) is closed.

**EXPECTED RESULTS :**

The controller close the “K” signal on CYFRA while tram group is closed.

RMF 49

**TEST RESULT :**

**(OK / NOK)**

**COMMENTS :**



---

### 15.15 CYFRA ITS DIRECTION SIGNAL - LOST COMMUNICATION WITH PLC

**IDENTIFICATION:** [T11.16]

PROG21 : CMF0 cyfra 24 STRAIGHT ON group 22 each cycle

VISU4 : hh:mn:se cmf rmf nsq tsq C\_CYFRA (way1) feu rvfeu

**INITIAL STATE OF TEST :**

Demand CMF 0 – PC mode

**PROCESS :**

This phase runs continuously and open direction signal on CYFRA group (24) then the connection with PLC is lost.

**EXPECTED RESULTS :**

The controller change the signal to “C” and goes to local mode.

RMF 24

**TEST RESULT :**

**(OK / NOK)**

**COMMENTS :**



---

#### 15.16 CYFRA ITS DIRECTION PRIORITY SIGNAL - LOST COMMUNICATION WITH PLC

**IDENTIFICATION:** [T11.17]

PROG22 : CMF0 cyfra 24 STRAIGHT ON group 22 each cycle with priority

VISU4 : hh:mn:se cmf rmf nsq tsq C\_CYFRA (way1) feu rvfeu

**INITIAL STATE OF TEST :**

Demand CMF 0 – PC mode

**PROCESS :**

This phase runs continuously and open direction with pulsing signal on CYFRA group (24) then the connection with PLC is lost.

**EXPECTED RESULTS :**

The controller change the signal to “C” and goes to local mode.

RMF 24

**TEST RESULT :**

**(OK / NOK)**

**COMMENTS :**



---

### 15.17 CYFRA ITS "COUNTING" SIGNAL - LOST COMMUNICATION WITH PLC

**IDENTIFICATION:** [T11.18]

PROG28 : CMF0 cyfra 24 STRAIGHT ON group 22 each cycle and counting from 6 seconds

VISU4 : hh:mn:se cmf rmf nsq tsq C\_CYFRA (way1) feu rvfeu

**INITIAL STATE OF TEST :**

Demand CMF 0 – PC mode

**PROCESS :**

This phase runs continuously and open counting from 6 for CYFRA group (24) and open the tram group (22) then the connection with PLC is lost.

**EXPECTED RESULTS :**

The controller prolong the counting CYFRA group (24) and open the tram group (22) then goes to local mode.

RMF 24

**TEST RESULT :**

**(OK / NOK)**

**COMMENTS :**



## 16. DIALOGUE TESTS RESULTS

Type of Message	Test	Comments
Message traffic lights		
Message green return		
Message setting the time		
Message security default		
Message memory reading		Not exist
Message memory writing		Not exist
Message memory erasing		Not exist

## 17. [SUMMARY](#)

### 17.1 TABLE OF TEST

The table below list all the tests carried out to validate the Gertrude protocol to the controller

login	Description	Result
<b>TAKING IN PC BASIC</b>		
T1.1	Demand of CMF 0 (taking in PC) Test 1	
T1.2	Demand of CMF 0 (taking in PC) Test 2	
T1.3	Demand of CMF 0 (taking in PC) Test 3	Not exist
T1.4	Demand of CMF 0 (taking in PC) Test 4	Not exist
T1.5	Demand of CMF 0 (taking in PC) Test 5	
<b>START OF CONTROLLER</b>		
T2.1	Initialization of controller Test 1	
T2.2	Initialization of controller Test 2	
T2.3	Initialization of controller Test 3	
T2.4	Initialization of controller Test 4	
T2.5	Initialization of controller Test 5	
T2.6	Initialization of controller Test 6	
T2.7	Initialization of controller Test 7	
T2.8	Initialization of controller Test 8	
<b>TAKING IN PC (CONTROL IN PC)</b>		
T3.1	Communications opening	
T3.2	Demand flashing agent off	
T3.3	Demand flashing extinction off	
T3.4	Demand PC on	
T3.5	Transition INIT to PC	
T3.6	Transition extinction to PC	
T3.7	Transition flashing to PC	
T3.8	Transition local to PC	
<b>OUTPUT OF PC MODE</b>		
T4.1	Breaking of communications	
T4.2	Transition PC to initialization	
T4.3	Transition PC to extinction	
T4.4	Transition PC to flashing scheduled	
T4.5	Transition PC to local 1,2,3...	
T4.6	Transition PC to unknown CMF	
T4.7	Demand agent ON	
T4.8	Demand extinction ON	Not exist
T4.9	Demand control GTR OFF	
T4.10	Light failure in demand PC	
T4.11	Demand PC to local 1,2,3...	
T4.12	Demand PC OFF	
T4.12	Transmission cut	



login	Description	Result
<b>Tests OF conflits</b>		
T5.1	Traffic light ignition 1 second	
T5.2	Ignition of traffic lights in conflicts	
T5.3	Generation of conflicts by transmission cut	
<b>Tests of minimums of green</b>		
T6.1	Non-respect of minimums of green	
T6.2	Non-respect of barrage time	
T6.3	Non-respect of minimums of green by transmission cut	
T6.4	Non-respect of minimums when in PC	
<b>Tests security message</b>		
T7.1	Writing downloading	Not exist
T7.2	Corrupted memory	Not exist
T7.3	Light failure	Not exist
T7.4	Power default	Not exist
<b>Counters Tests</b>		
T8.1	Mono loop counter	
T8.2	Mono loop counter and trans. cut	
T8.3	multi loop counter	
T8.4	Multi loop counter and trans. Cut	
T8.5	Multiple assignment of loops 1	Not exist
T8.6	Multiple assignment of loops 2	Not exist
<b>Queues and adaptative tests</b>		
T9.1	Ordered assignment	
T9.2	Disorderly assignment	
T9.3	Disorderly and multiple assignment	
T9.4	Permanent call	
T9.5	Generation of impulsions	
T9.6	Transmissions cut	
<b>Outputs Tests</b>		
T10.1	Logical Command 16 outputs	Not exist
T10.2	Disorderly assignment of outputs	Not exist
T10.3	Outputs assignment & transmission cut	Not exist
T11.1	Cyfra ITS "Straight on" signal	
T11.2	Cyfra ITS priority "Straight on" signal	
T11.3	Cyfra ITS "Right" signal	
T11.4	Cyfra ITS priority "Right" signal	
T11.5	Cyfra ITS "Left" signal	
T11.6	Cyfra ITS priority "Left" signal	
T11.7	Cyfra ITS "diamond" signal	
T11.8	Cyfra ITS "Counting" signal	
T11.9	Cyfra ITS "K" signal	
T11.10	Cyfra ITS "Counting" signal without opening tram group	
T11.11	Cyfra ITS too short "Counting" signal	
T11.12	Cyfra ITS too early "Counting" signal	



---

login	Description	Result
T11.13	Cyfra ITS "Counting" signal and too fast opening group	
T11.14	Cyfra ITS "K" signal without tram group	
T11.15	Cyfra ITS "K" signal not close from GTR	
T11.16	Cyfra ITS direction signal - lost communication with PLC	
T11.17	Cyfra ITS direction priority signal - lost communication with PLC	
T11.18	Cyfra ITS "Counting" signal - lost communication with PLC	



## 17.2 TABLE OF PROGRAM DESCRIPTION

PROG0	CMF0
PROG1	CMF 2 during 2 minutes and CMF0
PROG2	CMF2 during 2 minutes and CMF0 without sequence start
PROG 3	CMF23 during 2 minutes and CMF0 with group 1 all the time green
PROG4	CMF2
PROG5	CMF31
PROG6	CMF14
PROG7	CMF0 during 2 minutes and CMF31
PROG8	CMF0 during 2 minutes and CMF51 (flashing prog)
PROG9	CMF=0 during 2 minutes and CMF16 (first local plan)
PROG10	CMF0 during 2 minutes and CMF35
PROG11	CMF0 during 5 minutes and CMF14 (flashing
PROG12	CMF0 during 2 minutes and CMF3
PROG13	CMF0 CC75 with only 2 seconds of green for the group 1
PROG14	CMF0 sk75 with traffic light 1 prolong of 8 seconds
PROG15	CMF31 during 2 minutes and CMF0
PROG16	CMF11 during 2 minutes and CMF0
PROG17	CMF23 during 2 minutes and CMF0
PROG18	CMF0 during 2 minutes and CMF23 (local)
PROG19	CMF0 sk75 with all group at 1 second of green
PROG20	CMF0 sk75 with 2 seconds of green more for the group 1
PROG21	CMF0 cyfra 24 straight on group 22 each cycle
PROG22	CMF0 cyfra 24 straight on group 22 each cycle with priority
PROG23	CMF0 cyfra 24 right group 22 each cycle
PROG24	CMF0 cyfra 24 right group 22 each cycle with priority
PROG25	CMF0 cyfra 24 left group 22 each cycle
PROG26	CMF0 cyfra 24 left group 22 each cycle with priority
PROG27	CMF0 cyfra 24 diamond group 22 each cycle
PROG28	CMF0 cyfra 24 straight on group 22 each cycle and counting from 6 seconds
PROG29	CMF0 cyfra 24 straight on group 22 each cycle and signal K at the end



PROG30	CMF0 cyfra 24 straight on, counting from 6, no opening group 22
PROG31	CMF0 cyfra 24 straight on, counting from 6, open group 22 after 4 seconds
PROG32	CMF0 cyfra 24 straight on, counting from 2, open group 22
PROG33	CMF0 cyfra24 straight on, signal K not open group 22
PROG34	CMF0 cyfra24 straight on, signal K not close at the end of group 22

### 17.3 TABLE OF VISUALIZATION

VISU1	hh:mn:se cmf rmf nsq tsq feu rvfeu
VISU2	hh:mn:se cmf rmf C_CT (counter 4 values)
VISU3	hh:mn:se cmf rmf cab cas ( 64 values)
VISU4	hh:mn:se cmf rmf nsq tsq C_CYFRA (way1) feu rvfeu



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