



Test Plan Execution Report

Test Project: MATeF

Test Plan: Integrated UPRA Thermal Test

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Test Project: MATeF

MATeF – 2 Qualification Tests.

Date	Testers
2018.01.06	Bence Góczán Márk Németh Levente Pápay

Configuration:

MATeF - 2 mod 3 - EM

OBC

Bootloader: Arduino/Genuino uno18v (1.8V brownout)
Firmware: 2017_12_12_2203 (sdFat library)

COM

Bootloader: ATmega328 on a breadboard (8 MHz internal clock, 1.8 V BrownOut)
Firmware: 2017_11_28_2308 (RFM69 library)

GPS

uBlox NEO 6M

APRS

DARPS default firmware
Callsign: HA3PL

EPS

EPS Proto

Test type:

Thermal test

Summary

Test Suite	Test Case	Result	Notes
OBC.mega328	matef-1:Startup	Passed	
OBC.mega328	matef-3:Outgoing Telemetry	Passed	
OBC.mega328	matef-3:Outgoing Telemetry	Passed	Altitude Variable overflow over 33000m Not Thermal related!
OBC.mega328	matef-4:Outgoing COM-housekeeping request	Passed	
OBC.mega328	matef-5:Incoming COM-housekeeping	Passed	
OBC.mega328	matef-22:Internal Temperature	Passed	
OBC.mega328	matef-6:Timing	Passed	
COM.RFxxx	matef-9:Startup	Passed	
COM.RFxxx	matef-10:Incoming Telemetry message	Passed	
COM.RFxxx	matef-11:Incoming Housekeeping request	Passed	
COM.RFxxx	matef-23:Internal Temperature	Passed	
OBC.mega328	matef-24:External Temperature	Passed	
Main GPS	matef-26:Below 18K	Passed	
Main GPS	matef-27:Over 18K	Passed	
Integrated Flight System/Flight Operations	matef-30:Telemetry - Valid GPS	Passed	
Integrated Flight System/Flight Operations	matef-32:House keeping	Passed	
Integrated Flight System/Flight Operations	matef-33:Environmental Data	Passed	
Integrated Flight System/Flight Operations	matef-34:Radio Downlink	Passed	
Integrated Flight System/Flight Operations	matef-82:Telemetry - No GPS Connection	Passed	
Integrated Flight System/Flight Operations	matef-93:BEACON mode	Passed	
Preconditions	matef-85:Inegrated Tests	Passed	
Preconditions	matef-86:UPRA Thermal	Passed	
Thermal	matef-94:Low Temperature Operation	Passed	
Thermal	matef-95:COOL DOWN test	Passed	
Thermal	matef-96:SYSTEM COLD OUT test	Passed	
Thermal	matef-97:COLD START test	Passed	
Thermal	matef-98:WARM UP test	Passed	

Test Suite : Preconditions

Test Case matef-85: Inegrated Tests	
<u>Summary:</u> <ol style="list-style-type: none">1. Place and connect the prepared modules on the testboard2. Place and connect diagnostic cards on the testboard3. Connect additional wiring4. Properly fix the modules and cables	
ALWAYS USE DUMMY LOAD OR ANTENNA ON RF COMPONENTS!	
<u>Execution type:</u>	Manual
<u>Estimated exec. duration (min):</u>	
<u>Priority:</u>	Medium
Execution Details	
Build	MATeF - 2 mod 3 - EM
Tester	Bence Góczán
<u>Execution Result:</u>	Passed
<u>Execution Mode:</u>	Manual
<u>Execution duration (min):</u>	

Test Case matef-86: UPRA Thermal

Summary:

COOL DOWN test

1. Start system at room temperature
2. Start thermal chamber (TC)
3. Decrease temperature to the designated value while the system is running

SYSTEM COLD OUT test

1. Stop the system
2. Leave at the designated temperature for at least 30mins while not running

COLD START test

1. Start the previously cooled down system
2. Decrease the temperature to the designated value
3. Leave the system running for at least 30mins

WARM UP test

1. Stop the TC and open the door
2. Increase the temperature to room temperature while the system is running

#:	<u>Step actions:</u>	<u>Expected Results:</u>	<u>Execution Status:</u>
1	Temperature		Passed
<u>Execution type:</u>	Manual		
<u>Estimated exec. duration (min):</u>			
<u>Priority:</u>	Medium		
Execution Details			
Build	MATeF - 2 mod 3 - EM		
Tester	Bence Góczán		
<u>Execution Result:</u>	Passed		
<u>Execution Mode:</u>	Manual		
<u>Execution duration (min):</u>			

Test Suite : OBC.mega328

Test Case matef-1: Startup	
<u>Summary:</u> Check if module starts up properly after Vcc-ON <ul style="list-style-type: none"> • Wait for COM-ready • Buzzer test • SD-card init • LOG created • Default values before GPS fix 	
<u>Execution type:</u>	Manual
<u>Estimated exec. duration (min):</u>	
<u>Priority:</u>	Medium
Execution Details	
Build	MATeF - 2 mod 3 - EM
Tester	Bence Góczán
<u>Execution Result:</u>	Passed
<u>Execution Mode:</u>	Manual
<u>Execution duration (min):</u>	
Test Case matef-3: Outgoing Telemetry	
<u>Summary:</u> Check if proper telemetry message is sent by OBC <ul style="list-style-type: none"> • TMLTM message in correct format 	
<u>Execution type:</u>	Manual
<u>Estimated exec. duration (min):</u>	
<u>Priority:</u>	Medium
Execution Details	
Build	MATeF - 2 mod 3 - EM
Tester	Bence Góczán
<u>Execution Result:</u>	Passed
<u>Execution Mode:</u>	Manual
<u>Execution duration (min):</u>	
<u>Execution notes</u>	Altitude Variable overflow over 33000m Not Thermal related!

Test Case matef-4: Outgoing COM-housekeeping request

Summary:

Check if proper COM-housekeeping request message is sent by OBC

- TMHKR

<u>Execution type:</u>	Manual
<u>Estimated exec. duration (min):</u>	
<u>Priority:</u>	Medium
Execution Details	
Build	MATeF - 2 mod 3 - EM
Tester	Bence Góczán
<u>Execution Result:</u>	Passed
<u>Execution Mode:</u>	Manual
<u>Execution duration (min):</u>	

Test Case matef-5: Incoming COM-housekeeping

Summary:

Check if incoming COM-housekeeping message is processed properly

- TCHKD (sent by PC simulator)

<u>Execution type:</u>	Manual
<u>Estimated exec. duration (min):</u>	
<u>Priority:</u>	Medium
Execution Details	
Build	MATeF - 2 mod 3 - EM
Tester	Bence Góczán
<u>Execution Result:</u>	Passed
<u>Execution Mode:</u>	Manual
<u>Execution duration (min):</u>	

Test Case matef-22: Internal Temperature

Summary:

COM returns with proper internal module temperature

<u>Execution type:</u>	Manual
<u>Estimated exec. duration (min):</u>	
<u>Priority:</u>	Medium
Execution Details	
Build	MATeF - 2 mod 3 - EM
Tester	Bence Góczán
<u>Execution Result:</u>	Passed
<u>Execution Mode:</u>	Manual
<u>Execution duration (min):</u>	

Test Case matef-24: External Temperature

Summary:

OBC reads proper external temperature from MCP9700

<u>Execution type:</u>	Manual
<u>Estimated exec. duration (min):</u>	
<u>Priority:</u>	Medium
Execution Details	
Build	MATeF - 2 mod 3 - EM
Tester	Bence Góczán
<u>Execution Result:</u>	Passed
<u>Execution Mode:</u>	Manual
<u>Execution duration (min):</u>	

Test Case matef-6: Timing

Summary:

Check if timing for automated functions is properly set

<u>Execution type:</u>	Manual
<u>Estimated exec. duration (min):</u>	
<u>Priority:</u>	Medium
Execution Details	
Build	MATeF - 2 mod 3 - EM
Tester	Bence Góczán
<u>Execution Result:</u>	Passed
<u>Execution Mode:</u>	Manual
<u>Execution duration (min):</u>	

Test Suite : COM.RFxxx

Test Case matef-9: Startup	
<u>Summary:</u> Check if module startup properly <ul style="list-style-type: none">Startup message	
<u>Execution type:</u>	Manual
<u>Estimated exec. duration (min):</u>	
<u>Priority:</u>	Medium
Execution Details	
Build	MATeF - 2 mod 3 - EM
Tester	Bence Góczán
<u>Execution Result:</u>	Passed
<u>Execution Mode:</u>	Manual
<u>Execution duration (min):</u>	

Test Case matef-10: Incoming Telemetry message	
<u>Summary:</u> Incoming Telemetry message: <ul style="list-style-type: none">TMLTM processedTelemetry radio packet created in proper formatRadio pacet sent via RF transciever	
<u>Execution type:</u>	Manual
<u>Estimated exec. duration (min):</u>	
<u>Priority:</u>	Medium
Execution Details	
Build	MATeF - 2 mod 3 - EM
Tester	Bence Góczán
<u>Execution Result:</u>	Passed
<u>Execution Mode:</u>	Manual
<u>Execution duration (min):</u>	

Test Case matef-11: Incoming Housekeeping request

Summary:

Incoming Housekeeping request message:

- TMHKR processed
- Housekeeping data read properly
- TCHKD messages sent in proper format

<u>Execution type:</u>	Manual
<u>Estimated exec. duration (min):</u>	
<u>Priority:</u>	Medium
Execution Details	
Build	MATeF - 2 mod 3 - EM
Tester	Bence Góczán
<u>Execution Result:</u>	Passed
<u>Execution Mode:</u>	Manual
<u>Execution duration (min):</u>	

Test Case matef-23: Internal Temperature

Summary:

OBC returns with proper internal module temperature

<u>Execution type:</u>	Manual
<u>Estimated exec. duration (min):</u>	
<u>Priority:</u>	Medium
Execution Details	
Build	MATeF - 2 mod 3 - EM
Tester	Bence Góczán
<u>Execution Result:</u>	Passed
<u>Execution Mode:</u>	Manual
<u>Execution duration (min):</u>	

Test Suite : Flight Operations

Test Case matef-34: Radio Downlink	
<p><u>Summary:</u></p> <p>Check radio downlink, message format, message data</p> <ul style="list-style-type: none"> • OBC+COM+EPS+GPS • Battery Powered • GPS bypass, PC simulator, valid GPS data, short, controlled datastream • Radio link to GND <p>Output</p> <ul style="list-style-type: none"> • GND Logs • DIAG Logs 	
<u>Execution type:</u>	Manual
<u>Estimated exec. duration (min):</u>	
<u>Priority:</u>	Medium
Execution Details	
Build	MATeF - 2 mod 3 - EM
Tester	Bence Góczán
<u>Execution Result:</u>	Passed
<u>Execution Mode:</u>	Manual
<u>Execution duration (min):</u>	

Test Case matef-30: Telemetry - Valid GPS

Summary:

Check telemetry processing with PC-GPS Simulator providing valid GPS messages.

- OBC+COM+EPS+GPS
- Battery Powered
- GPS bypass, PC simulator, valid GPS data, short, controlled datastream
- Radio link to GND

Output

- SD Log
- GND Logs
- DIAG Logs

<u>Execution type:</u>	Manual
<u>Estimated exec. duration (min):</u>	
<u>Priority:</u>	Medium
Execution Details	
Build	MATeF - 2 mod 3 - EM
Tester	Bence Góczán
<u>Execution Result:</u>	Passed
<u>Execution Mode:</u>	Manual
<u>Execution duration (min):</u>	

Test Case matef-82: Telemetry - No GPS Connection

Summary:

Check telemetry processing with PC-GPS Simulator providing invalid GPS messages with no fix

- OBC+COM+EPS+GPS
- Battery Powered
- GPS bypass, PC simulator, no GPS data (signal off), short, controlled datastream
- Radio link to GND

Output

- SD Log
- GND Logs
- DIAG Logs

<u>Execution type:</u>	Manual
<u>Estimated exec. duration (min):</u>	
<u>Priority:</u>	Medium
Execution Details	
Build	MATeF - 2 mod 3 - EM
Tester	Bence Góczán
<u>Execution Result:</u>	Passed
<u>Execution Mode:</u>	Manual
<u>Execution duration (min):</u>	

Test Case matef-32: House keeping

Summary:

Check collected house keeping data: COM module temperature, OBC module temperature

- OBC+COM+EPS+GPS
- Battery Powered
- GPS bypass, PC simulator, valid GPS data, short, controlled datastream
- Radio link to GND

Output

- SD Log
- GND Logs
- DIAG Logs

<u>Execution type:</u>	Manual
<u>Estimated exec. duration (min):</u>	
<u>Priority:</u>	Medium
Execution Details	
Build	MATeF - 2 mod 3 - EM
Tester	Bence Góczán
<u>Execution Result:</u>	Passed
<u>Execution Mode:</u>	Manual
<u>Execution duration (min):</u>	

Test Case matef-33: Environmental Data

Summary:

Check collected environmental data: External Temperature

- OBC+COM+EPS+GPS
- Battery Powered
- GPS bypass, PC simulator, valid GPS data, short, controlled datastream
- Radio link to GND

Output

- SD Log
- GND Logs
- DIAG Logs

<u>Execution type:</u>	Manual
<u>Estimated exec. duration (min):</u>	
<u>Priority:</u>	Medium
Execution Details	
Build	MATeF - 2 mod 3 - EM
Tester	Bence Góczán
<u>Execution Result:</u>	Passed
<u>Execution Mode:</u>	Manual
<u>Execution duration (min):</u>	

Test Case matef-93: BEACON modeSummary:

Test BEACON mode activation:

In NORMAL mode:

- Increase altitude over 1000m
- Decrease altituder under 300m

In BEACON mode:

- Increase altitude over 500m
- Decrease altitude under 300m

#:	<u>Step actions:</u>	<u>Expected Results:</u>	<u>Execution Status:</u>
1	Increase altitude over 1000m	Stays in NORMAL mode	Passed
2	Decrease altitude under 300m	BEACON mode activates under 500m	Passed
3	Increase altitude in BEACON mode over 500m	Automatic switch to NORMAL mode over 500m	Passed
4	Decrease altitude under 300m	BEACON modes activates under 500m	Passed
<u>Execution type:</u>	Manual		
<u>Estimated exec. duration (min):</u>			
<u>Priority:</u>	Medium		
Execution Details			
Build	MATeF - 2 mod 3 - EM		
Tester	Bence Góczán		
<u>Execution Result:</u>	Passed		
<u>Execution Mode:</u>	Manual		
<u>Execution duration (min):</u>			

Test Suite : Main GPS

Test Case matef-26: Below 18K	
<u>Summary:</u> Test GPS module with GPS Simulator <ul style="list-style-type: none"> Altitudes below 18000m 	
<u>Execution type:</u>	Manual
<u>Estimated exec. duration (min):</u>	
<u>Priority:</u>	Medium
Execution Details	
Build	MATeF - 2 mod 3 - EM
Tester	Bence Góczán
<u>Execution Result:</u>	Passed
<u>Execution Mode:</u>	Manual
<u>Execution duration (min):</u>	

Test Case matef-27: Over 18K	
<u>Summary:</u> Test GPS module with GPS simulator <ul style="list-style-type: none"> Altitudes over 18000m 	
<u>Execution type:</u>	Manual
<u>Estimated exec. duration (min):</u>	
<u>Priority:</u>	Medium
Execution Details	
Build	MATeF - 2 mod 3 - EM
Tester	Bence Góczán
<u>Execution Result:</u>	Passed
<u>Execution Mode:</u>	Manual
<u>Execution duration (min):</u>	

Test Suite : Thermal

Test Case matef-95: COOL DOWN test	
<u>Summary:</u> <ol style="list-style-type: none"> 1. Start system at room temperature 2. Start thermal chamber (TC) 3. Decrease temperature to the designated value while the system is running 	
<u>Execution type:</u>	Manual
<u>Estimated exec. duration (min):</u>	
<u>Priority:</u>	Medium
Execution Details	
<u>Build</u>	MATeF - 2 mod 3 - EM
<u>Tester</u>	Bence Góczán
<u>Execution Result:</u>	Passed
<u>Execution Mode:</u>	Manual
<u>Execution duration (min):</u>	

Test Case matef-96: SYSTEM COLD OUT test	
<u>Summary:</u> <ol style="list-style-type: none"> 1. Stop the system 2. Leave at the designated tepmerature for at least 30mins while not running 	
<u>Execution type:</u>	Manual
<u>Estimated exec. duration (min):</u>	35.00
<u>Priority:</u>	Medium
Execution Details	
<u>Build</u>	MATeF - 2 mod 3 - EM
<u>Tester</u>	Bence Góczán
<u>Execution Result:</u>	Passed
<u>Execution Mode:</u>	Manual
<u>Execution duration (min):</u>	

Test Case matef-97: COLD START testSummary:

1. Start the previously cooled down system
2. Decrease the temperature to the designated value
3. Leave the system running for at least 30mins

Execution type: Manual

Estimated exec. duration (min): 50.00

Priority: Medium

Execution Details

Build MATeF - 2 mod 3 - EM

Tester Bence Góczán

Execution Result: **Passed**

Execution Mode: **Manual**

Execution duration (min):

Test Case matef-98: WARM UP testSummary:

1. Stop the TC and open the door
2. Increase the temperature to room temperature while the system is running

Execution type: Manual

Estimated exec. duration (min): 40.00

Priority: Medium

Execution Details

Build MATeF - 2 mod 3 - EM

Tester Bence Góczán

Execution Result: **Passed**

Execution Mode: **Manual**

Execution duration (min):

Test Case matef-94: Low Temperature Operation			
<u>Summary:</u>			
Test system operation in low temperature conditions!			
#:	<u>Step actions:</u>	<u>Expected Results:</u>	<u>Execution Status:</u>
1	Ambient temperature		Passed
2	OBC operation		Passed
3	COM operation		Passed
4	Main GPS operation		Passed
5	APRS operation		Passed
6	EPS operation		Passed
<u>Execution type:</u>	Manual		
<u>Estimated exec. duration (min):</u>			
<u>Priority:</u>	Medium		
Execution Details			
Build	MATeF - 2 mod 3 - EM		
Tester	Bence Góczán		
<u>Execution Result:</u>	Passed		
<u>Execution Mode:</u>	Manual		
<u>Execution duration (min):</u>			