

PRODUCT: Environmental Controller

SYSTEM TEST PLAN

TABLE OF CONTENTS

DOCUMENT CHANGE HISTORY	5
1. INTRODUCTION	6
1.1. PURPOSE AND SCOPE	6
1.2. OPEN POINTS	6
1.3. ASSUMPTIONS	6
1.4. DEFINITIONS, ACRONYMS & ABBREVIATIONS	6
1.5. REFERENCES	6
2. TEST ENVIRONMENT	7
2.1. SYSTEM DETAILS	7
2.2. TEST EQUIPMENT	7
2.3. SOFTWARE	7
2.4. TOOLS	7
2.5. GENERAL TEST SETUP	7
2.6. TEST STRATEGY	8
3. TEST SPECIFICATION	9
3.1. COMMON TEST STEPS	9
3.1.1. Power up EC System	9
3.2. BASIC TESTS	9
3.2.1. Build Test for EC Firmware	9
3.2.2. Build test for Mobile Application	9
3.3. EC FUNCTIONALITY	10
3.3.1. EC Provision (Configuration) Tests	10
3.3.1.1 Set Provision Test 1	10
3.3.1.2 Modify Provision Test 1	10
3.3.1.3 Get Provision Test 1	11
3.3.1.4 Erase Provision Test	11
3.3.2. EC Profile Tests	12
3.3.2.1 Set Profile Test 1	12
3.3.2.2 Modify Profile Test1	12
3.3.2.3 Modify Profile Test2	13
3.3.2.4 Get Profile Test 1	13
3.3.2.5 Erase Profile Test 1	14
3.3.3. EC Grow Cycle Tests	14
3.3.3.1 Start Grow Cycle Test 1	14
3.3.3.2 Start Grow Cycle Test 2	15
3.3.3.3 Start Grow Cycle Test 3	16
3.3.3.4 Start Grow Cycle Test 4	16
3.3.3.5 Start Grow Cycle Test 5	17

3.3.3.6	Stop Grow Cycle Test 1	18
3.3.3.7	Stop Grow Cycle Test 2	18
3.3.3.8	Status Grow Cycle Test 1	19
3.3.3.9	Status Grow Cycle Test 2	19
3.3.4.	EC Device outlet(s) Tests	20
3.3.4.1	Device Light Test 1	20
3.3.4.2	Flexi mode Tests	21
3.3.4.3	Device Hood Vent Test 1	25
3.3.4.4	Device Hood Vent Test 2	26
3.3.4.5	Device Circ Test 1	27
3.3.4.6	Device Fxp1 Test 1	28
3.3.4.7	Device Fxp2 Test 1	28
3.3.4.8	Device Vent Test 1	29
3.3.5.	EC Other Functional Tests	33
3.3.5.1	Wi-Fi Enterprise Test	33
3.3.5.2	Wi-Fi Mixed Security Test 1	33
3.3.5.3	Email Test	34
3.3.5.4	SD card Test	35
3.3.5.5	Backup Battery Voltage Test1	35
3.3.5.6	Backup Battery Voltage Test2	36
3.3.5.7	Backup Battery Voltage Test3	36
3.3.5.8	AC power fault Test 1	37
3.3.5.9	AC power fault Test 2	38
3.3.5.10	Hot Re-Strike fault Test 1	39
3.3.5.11	Hot Re-Strike fault Test 2	39
3.3.5.12	Fault Test 1	40
3.3.5.13	Fault Test 2	41
3.3.5.14	Suspend Grow Cycle Test 1	42
3.3.5.15	Suspend Grow Cycle Test 2	42
3.3.5.16	Suspend Idle mode Test 1	43
3.3.5.17	Forced Grow Cycle Test 1	43
3.3.5.18	Forced Grow Cycle Test 2	44
3.3.5.19	Forced Idle mode Test 1	44
3.3.5.20	Forced Idle mode Test 2	45
3.3.5.21	Panic Grow Cycle Test 1	45
3.3.5.22	Panic Grow Cycle Test 2	46
3.3.5.23	Panic Idle mode Test 1	46
3.3.6.	EC Firmware (Upgrade/Downgrade) Tests	46
3.3.6.1	Firmware Upgrade Test 1	46
3.3.6.2	Firmware Upgrade Test 2	47
3.3.7.	EC Web Provisioning Tests	47
3.3.7.1	Web Provisioning Test 1	47
3.3.7.2	Web Provisioning Test 2	48
3.4.	EC LONGEVITY TESTS	49
3.4.1.	Longevity Test1	49
3.4.2.	Longevity Test2	49
3.4.3.	Longevity Test3	50
3.4.4.	Longevity Test4	51
3.5.	EC NEGATIVE TESTS	51
3.5.1.	No Wifi network Tests	51
3.5.1.1	No Wifi network Test 1	51
3.5.1.2	No Wifi network Test 2	52
3.5.2.	No MQTT server Tests	52
3.5.2.1	No MQTT server Test 1	52
3.5.2.2	No MQTT server Test 2	53
3.5.3.	Un format SD card Test 1	54
3.5.4.	Firmware Upgrade Interruption Tests	54
3.5.4.1	Firmware Upgrade Interruption Test 1	54
3.5.4.2	Firmware Upgrade Interruption Test 2	55

3.5.5. EC Web provisioning empty field Test	55
3.6. MOBILE APP FUNCTIONALITY	56
APPENDIX A	57
APPENDIX B	62
APPENDIX C	93
APPENDIX D	97

DOCUMENT CHANGE HISTORY

Date (dd/mm/yyyy)	Person	Version	Reason
05/04/2021	QA team	0.1	Initial Creation
05/05/2021	QA team	0.2	Updated with review comments More tests added Appendix A added
05/06/2021	QA team	0.3	Appendix B added
02/09/2021	QA team	0.4	firmware interruption tests added Grow cycle start tests added
17/02/2022	QA team	0.5	Web provisioning tests added Wifi Enterprise tests added
29/03/2022	QA team	0.6	APPENDIX C, APPENDIX D added Erase provision 3.3.1.4 test added 3.3.2.5 Modified

1. INTRODUCTION

1.1. PURPOSE AND SCOPE

It describes all the necessary tests that need to be passed by product EC. This is a reference document for engineering team and QA team.

1.2. OPEN POINTS

1.3. ASSUMPTIONS

1.4. DEFINITIONS, ACRONYMS & ABBREVIATIONS

Definitions:

Component: - Software module having designated functionality

Acronyms:

Dir : - Directory

Firmware: - Software running EC Hardware

Mobile APP: - Mobile Application communicating with EC

Abbreviations:

EC :- Environmental Controller

HW :- Hardware

I/O :- Input /Output

SW :- Software

1.5. REFERENCES

[EC_product_spec_Vx (Scott)]	Specification Document
[sw_arch_design.doc]	Architecture Document

2. TEST ENVIRONMENT

This section describes about the necessary testing infrastructure details.

2.1. SYSTEM DETAILS

The following are the system details

H/W

- EC

S/W

- Source code for EC & Mobile App
- Mobile APP for IOS + Android
- Eclipse MQTT Mosquitto Client + Server

2.2. TEST EQUIPMENT

- Smart phone (Android /IOS)
- Linux PC running MQTT Mosquitto client

2.3. SOFTWARE

- Firmware Upgrade tool (Internal tool in git repository)

2.4. TOOLS

- Wireless Sniffer

2.5. GENERALTEST SETUP

The following is the basic setup for testing product EC.

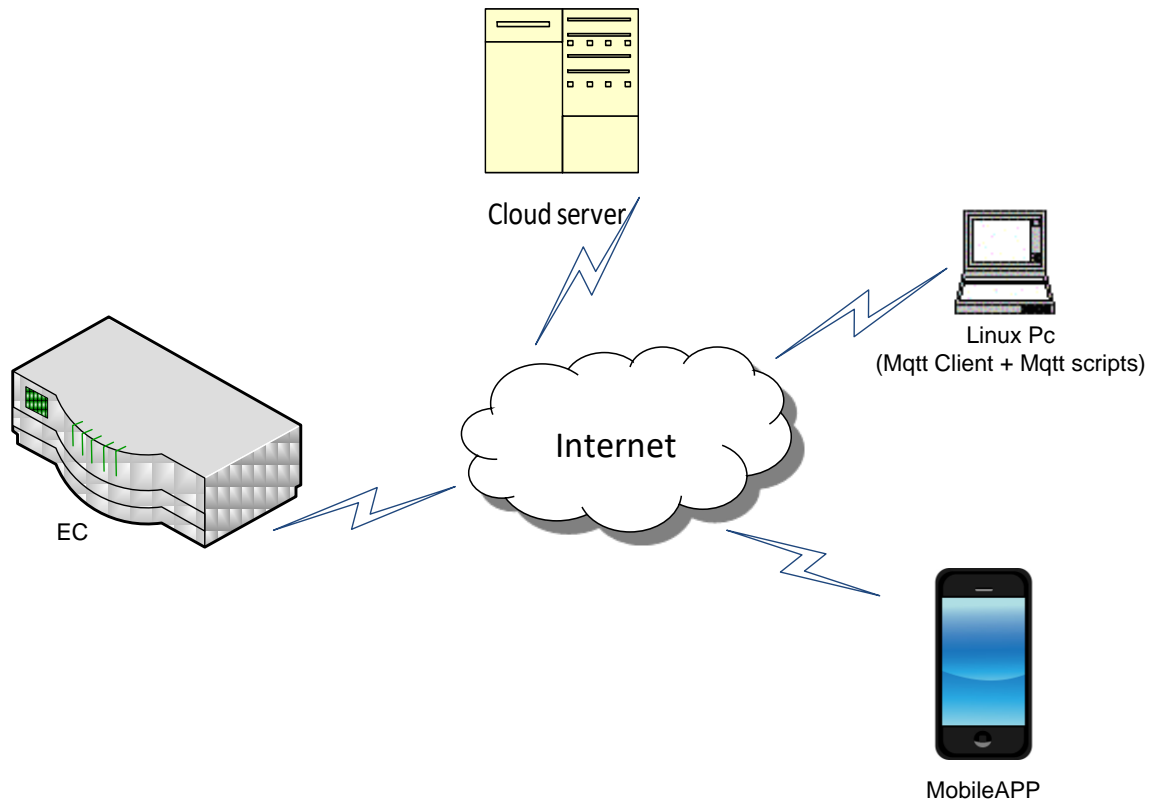


Figure 1: General Test Setup

Here Linux PC has two capabilities. It runs Mqtt client to show the message exchange. It also runs MQTT scripts in the absence of mobile APP.

2.6. TEST STRATEGY

The test cases are defined such a way to check the following system behaviour. Here the system represents EC + mobile APP together. Test cases are derived to do the following

- Sanity Check
- Feature/Functionality Check
- Longevity Check
- Negative Check
- Stress Check

Test cases more concerned with mobile APP functionality are tested with both Android & IOS platforms.

3. TEST SPECIFICATION

This section defines all the system test cases. All the tests use test set up mentioned in [Section 2.5](#). All the test steps mention the use of mobile APP. In the absence of mobile APP, tests are to run with MQTT script.

3.1. COMMON TEST STEPS

3.1.1. Power up EC System

1. Switch on EC with latest firmware
2. MQTT server is up
3. Mobile APP is installed (on Android or IOS) & ready. In the absence of mobile APP, get Linux PC is up to use MQTT scripts
4. Linux PC is up with MQTT client
5. Make sure EC & mobile APP (or MQTT script) are connected using factory settings.

3.2. BASIC TESTS

This section lists all build test cases.

3.2.1. Build Test for EC Firmware

TEST DESCRIPTION:

It is aimed to test EC firmware is buildable or not from the given release git tag .

TEST PROCEDURE:

1. Checkout the git tag on any windows machine having STM CUBE build environment
2. Open STM projects (for boot loader & Control Application) from the checked out code
3. Build boot loader & Control application

TEST PASS/FAIL CRITERIA:

Test case passes if

- Boot loader application is built successfully
- Environment application is built successfully.

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_EC_FW_BUILD_1_1	•	

3.2.2. Build test for Mobile Application

TEST DESCRIPTION:

It is aimed to test whether mobile application is buildable or not for both android /ios platforms.

TEST PROCEDURE:

1. Checkout git tag to build machine

2. Build the mobile application
3. Install the mobile application

TEST PASS/FAIL CRITERIA:

Test case passes if

- Mobile APP is built successfully.
- Mobile APP can install & un successfully

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_MOBILE_APP_BUILD_1_1	<ul style="list-style-type: none"> • Build for android 	Build machine is windows having latest android studio
TC_MOBILE_APP_BUILD_1_2	<ul style="list-style-type: none"> • Build for IOS 	Build machine is Apple PC having XCode

3.3. EC FUNCTIONALITY

The following are tests for EC functionality.

3.3.1. EC Provision (Configuration) Tests

3.3.1.1 Set Provision Test 1

TEST DESCRIPTION:

It is aimed to test that if EC is configurable with given provisioning information or not.

TEST PROCEDURE

1. Do #Power up EC System
2. Issue 'Set provisioning' command from mobile APP
3. Switch off & switch on the EC to start with new provision credentials.

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC takes new wifi credentials, see EC uses new wifi network
- EC takes MQTT server credentials, see EC connects to new MQTT server
- EC has new device parameters such as device name, device id , mobile app id etc ...
- EC has common grow parameters changed.
- EC has new Smtip (Email) credentials

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_PROVISION_SET_1_1		

3.3.1.2 Modify Provision Test 1

TEST DESCRIPTION:

It is aimed to test already provisioned EC is provisioned again for new credentials such as wifi or MQTT or device or common grow parameters.

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Set provisioning' command from mobile APP
3. Switch off & switch on the EC.
4. Modify any credentials & Issue 'Set provisioning' command from mobile APP
5. Switch off & switch on the EC

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC is up with modified credentials

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_PROVISION_MODIFY_1_1	<ul style="list-style-type: none"> • Change Wifi credentials 	See wifi network changed
TC_PROVISION_MODIFY_1_2	<ul style="list-style-type: none"> • Change MQTT credentials 	See MQTT server changed
TC_PROVISION_MODIFY_1_3	<ul style="list-style-type: none"> • Change Device credentials 	See device has new credentials
TC_PROVISION_MODIFY_1_4	<ul style="list-style-type: none"> • Change Grow credentials 	See grow parameters changed
TC_PROVISION_MODIFY_1_5	<ul style="list-style-type: none"> • Change Sntp(email) credentials 	See sntp parameters changed

3.3.1.3 Get Provision Test 1

TEST DESCRIPTION:

It is aimed to test EC sending provisioning information or not.

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Get provisioning' command from mobile APP

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC sends provisioning information correctly

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_PROVISION_GET_1_1	<ul style="list-style-type: none"> • Get factory provision information 	Refer EC data sheet, Test Step 2 is not required for this test
TC_PROVISION_GET_1_2	<ul style="list-style-type: none"> • Get user provision information 	

3.3.1.4 Erase Provision Test

TEST DESCRIPTION:

It is aimed to test EC whether it erases user configured provision or not.

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Set provisioning' command from mobile APP

3. Issue 'Get provisioning' command from mobile APP
4. Issue 'Erase provisioning' command from mobile APP
5. Issue 'Get provisioning' command from mobile APP

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC send junk data when issued 'Get Provisioning' after erasing(after Test Step 5)

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_PROVISION_ERASE_1_1	<ul style="list-style-type: none"> • User provision 	

3.3.2. EC Profile Tests

The section mentions about tests concerned with profile functionality.

3.3.2.1 Set Profile Test 1

TEST DESCRIPTION:

It is aimed to test whether EC accepts any user profile (1...20)

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set profile' command from mobile APP after choosing profile parameters
3. Issue 'Get profile' command from mobile APP

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC is set for profile & sends profile when it is requested with correct information.

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_PROFILE_SET_1_1	<ul style="list-style-type: none"> • Set only one profile. 	
TC_PROFILE_SET_1_2	<ul style="list-style-type: none"> • Set more than one profile 	Repeat Test Steps 2–3, for the profiles
TC_PROFILE_SET_1_3	<ul style="list-style-type: none"> • Set all profiles. 	Repeat Test Steps 2–3, for all 20 profiles

3.3.2.2 Modify Profile Test1

TEST DESCRIPTION:

It is aimed to test EC whether configure user profile is modifiable for any change of parameters.

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set profile' command from mobile APP after choosing profile parameters
3. Issue 'Get profile' command from mobile APP
4. Modify some parameters of profile & Issue 'Modify profile' command from mobile APP
5. Issue 'Get profile' command from mobile APP

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC is set for profile with modified parameters & sends profile when it is requested with correct information (check for the modified parameters).

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_PROFILE_MODIFY_1_1	<ul style="list-style-type: none"> • Change only one parameter of one device outlet 	
TC_PROFILE_MODIFY_1_2	<ul style="list-style-type: none"> • Change all parameter of one device outlet 	
TC_PROFILE_MODIFY_1_3	<ul style="list-style-type: none"> • Change one parameter of all device outlets 	
TC_PROFILE_MODIFY_1_4	<ul style="list-style-type: none"> • Change multi parameters of all device outlets 	
TC_PROFILE_MODIFY_1_5	<ul style="list-style-type: none"> • Change multi parameters of a few device outlets 	

3.3.2.3 Modify Profile Test2**TEST DESCRIPTION:**

It is aimed to test EC whether configured user profiles (more than one user profile) are modifiable for any change of parameters.

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set profile' command from mobile APP after choosing profile parameters for different profiles
3. Issue 'Get profile' command from mobile APP for different profiles
4. Modify some parameters of profiles & Issue 'Modify profile' command from mobile APP for different profiles
5. Issue 'Get profile' command from mobile APP for different profiles

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC is set for profiles with modified parameters & sends profiles when it is requested with correct information (check for the modified parameters).

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_PROFILE_MODIFY_2_1	<ul style="list-style-type: none"> • Change only one parameter of one device outlet for 1st profile • Change one parameter of all device outlets for 2nd profile 	

3.3.2.4 Get Profile Test 1**TEST DESCRIPTION:**

It is aimed to test EC whether it sends profile when it is requested.

TEST PROCEDURE:

1. Do #Power up EC System

2. Issue 'Set profile' command from mobile APP after choosing profile parameters for different profiles
3. Issue 'Get profile' command from mobile APP for different profiles

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC sends profiles when it is requested with correct information

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_PROFILE_GET_1_1	<ul style="list-style-type: none"> • Get Factory profile 	Test Steps 2-3 not required
TC_PROFILE_GET_1_2	<ul style="list-style-type: none"> • Get User Profile 	
TC_PROFILE_GET_1_3	<ul style="list-style-type: none"> • Get User profile (more than one) 	Repeat Test Steps 2-3 ,for the profiles

3.3.2.5 Erase Profile Test 1

TEST DESCRIPTION:

It is aimed to test EC whether it erases user configure profiles or not.

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set profile' command from mobile APP after choosing profile parameters
3. Issue 'Get profile' command from mobile APP
4. Issue 'Profile Erase' or 'Erase' command from mobile APP
5. Issue 'Get profile' command from mobile APP

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC send junk data when issued 'Get Profile' after erasing(after Test Step 5)

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_PROFILE_ERASE_1_1	<ul style="list-style-type: none"> • One user profile 	The command is "profile erase"
TC_PROFILE_ERASE_1_2	<ul style="list-style-type: none"> • All user profile including user provisioning 	The command is "erase"

3.3.3. EC Grow Cycle Tests

The section mentions about tests concerned with grow cycle functionality.

3.3.3.1 Start Grow Cycle Test 1

TEST DESCRIPTION:

It is aimed to test EC whether it is able to start grow cycle with chosen profile or not.

TEST PROCEDURE:

1. Do #Power up EC System

2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile' command from mobile APP after choosing profile parameters
4. Issue 'Get profile' command from mobile APP
5. Issue 'Grow cycle start request' command from mobile APP

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC sends grow cycle status information as per given interval

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_GROW_CYCLE_START_1_1	<ul style="list-style-type: none"> • Start with factory profile 	Test Steps 2-3 not required
TC_GROW_CYCLE_START_1_2	<ul style="list-style-type: none"> • Start with user profile 	

3.3.3.2 Start Grow Cycle Test 2

TEST DESCRIPTION:

It is aimed to test EC whether it is able to start grow cycle with chosen profile with date & time.

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile' command from mobile APP after choosing profile parameters
4. Issue 'Get profile' command from mobile APP
5. Issue 'Grow cycle start request' command from mobile APP with correct date & time settings

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC starts grow cycle as per the given date, time & sends status information as per given interval.
- Validate grow status parameters (grow calendar values) such as grow time , no of days elapsed , week day , no of days pending etc ...

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_GROW_CYCLE_START_2_1	<ul style="list-style-type: none"> • Start with factory profile • Past date as a day 	Test Steps 2-3 not required. Grow cycle started in past
TC_GROW_CYCLE_START_2_2	<ul style="list-style-type: none"> • Start with user profile • Past date as a day 	
TC_GROW_CYCLE_START_2_3	<ul style="list-style-type: none"> • Start with user profile • Past date as a week 	
TC_GROW_CYCLE_START_2_4	<ul style="list-style-type: none"> • Start with user profile • Past date as a month 	
TC_GROW_CYCLE_START_2_5	<ul style="list-style-type: none"> • Start with user profile • Past date as two months 	

TC_GROW_CYCLE_START_2_6	<ul style="list-style-type: none"> Start with user profile Current date , future time 	Grow cycle same day but with future time
TC_GROW_CYCLE_START_2_7	<ul style="list-style-type: none"> Start with factory profile Current date , past time 	Test Steps 2–3 not required. Grow cycle same day but past time
TC_GROW_CYCLE_START_2_8	<ul style="list-style-type: none"> Start with user profile Current date ,without time 	Grow cycle should start immediately
TC_GROW_CYCLE_START_2_9	<ul style="list-style-type: none"> Start with user profile Future date , future time 	Grow cycle in future date+ time

3.3.3.3 Start Grow Cycle Test 3

TEST DESCRIPTION:

It is aimed to test EC whether started grow cycle is able to adopt changed profile.

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile' command from mobile APP after choosing profile parameters
4. Issue 'Get profile' command from mobile APP
5. Issue 'Grow cycle start request' command from mobile APP
6. Let EC start grow cycle & wait for some time or days
7. Issue 'Apply profile' command from mobile APP

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC adopts changed profile
- Validate grow status parameters such as light cycle info, device outlets status as per new profile or not. etc ...

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_GROW_CYCLE_START_3_1	<ul style="list-style-type: none"> Start with factory profile Wait time one hour Apply User profile 	
TC_GROW_CYCLE_START_3_2	<ul style="list-style-type: none"> Start with User profile Wait time one hour Apply factory profile 	
TC_GROW_CYCLE_START_3_3	<ul style="list-style-type: none"> Start with User profile 1 Wait time one hour Apply user profile 2 	Repeat Test Steps 2–3 for both user profiles

3.3.3.4 Start Grow Cycle Test 4

TEST DESCRIPTION:

It is aimed to test EC whether started grow cycle is able to adopt changed profile with date & time.

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile' command from mobile APP after choosing profile parameters
4. Issue 'Get profile' command from mobile APP
5. Issue 'Grow cycle start request' command from mobile APP
6. Issue 'Apply profile' command from mobile APP with date & time settings
7. Wait till date & time occurs.

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC adopts changed profile
- Validate grow status parameters(grow calendar) such as light cycle info, device outlets status as per new profile or not. etc ...

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_GROW_CYCLE_START_4_1	<ul style="list-style-type: none"> • Start with factory profile • Apply User profile with current date, with current time 	Grow cycle adopting profile immediately
TC_GROW_CYCLE_START_4_2	<ul style="list-style-type: none"> • Start with factory profile • Apply User profile with current date, with future time 	Grow cycle adopting profile in future time on the same day
TC_GROW_CYCLE_START_4_3	<ul style="list-style-type: none"> • Start with User profile 1 • Apply User profile 2 with future date & time 	Repeat Test Steps 2–3 for both user profiles. Grow cycle adopting profile in future time on the future data

3.3.3.5 Start Grow Cycle Test 5

TEST DESCRIPTION:

It is aimed to test EC whether it is able to send current working profile or not.

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile' command from mobile APP after choosing profile parameters
4. Issue 'Get profile' command from mobile APP
5. Issue 'Grow cycle start request' command from mobile APP
6. Issue 'Get profile' command from mobile APP with parameter as working profile

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC sends working profile when it is requested

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
--------------	-------------------------	---------

TC_GROW_CYCLE_START_5_1	<ul style="list-style-type: none"> Start with factory profile 	Test Steps 2–3 not required
TC_GROW_CYCLE_START_5_2	<ul style="list-style-type: none"> Start with user profile 	

3.3.3.6 Stop Grow Cycle Test 1

TEST DESCRIPTION:

It is aimed to test EC whether it is able to stop current grow cycle or not.

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile' command from mobile APP after choosing profile parameters
4. Issue 'Get profile' command from mobile APP
5. Issue 'Grow cycle start request' command from mobile APP
6. Wait for some time/days
7. Issue 'Grow cycle stop request' command from mobile APP

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC stops grow cycle when it is requested
- All device outlets as well as corresponding LEDs are off

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_GROW_CYCLE_STOP_1_1	<ul style="list-style-type: none"> Start with factory profile Wait for an hour 	Test Steps 2–3 not required
TC_GROW_CYCLE_START_1_2	<ul style="list-style-type: none"> Start with user profile Wait for a day 	

3.3.3.7 Stop Grow Cycle Test 2

TEST DESCRIPTION:

It is aimed to test EC whether it is able to stop current grow cycle after expiration of grow days (182).

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile' command from mobile APP after choosing profile parameters
4. Issue 'Get profile' command from mobile APP
5. Issue 'Grow cycle start request' command from mobile APP
6. Wait for some grow days to expire

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC stops grow cycle after expiration of grow cycle days i.e 182
- All device outlets as well as corresponding LEDs are off

TEST MATRIX:

Test case Id	Parameters variation	of	Remarks
TC_GROW_CYCLE_STOP_2_1			For test purpose make days as 1 or 2 instead of 182 days

3.3.3.8 Status Grow Cycle Test 1

TEST DESCRIPTION:

It is aimed to test EC whether it is able to start grow cycle with chosen profile. It is able to perform light cycle on/off , device outlets on/off , sensor readings , fault statues etc ...

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile' command from mobile APP after choosing profile parameters
4. Issue 'Get profile' command from mobile APP
5. Issue 'Grow cycle start request' command from mobile APP
6. Wait for 3 days & check grow cycle status at different times

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC sends grow cycle status information as per given interval
- Check the following parameters as per the profile
 - Grow cycle parameters(grow calendar parameters)
 - Correct light cycle on/off
 - Device outlets on/off , corresponding LEDs on/off
 - Validate Sensor readings
 - Faults

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_GROW_CYCLE_STATUS_1_1	<ul style="list-style-type: none"> • Start with factory profile 	Test Steps 2-3 not required
TC_GROW_CYCLE_STATUS_1_2	<ul style="list-style-type: none"> • Start with user profile 	

3.3.3.9 Status Grow Cycle Test 2

TEST DESCRIPTION:

It is aimed to test EC whether it is able to start grow cycle with chosen profile. It is able to perform light cycle on/off , device outlets on/off , sensor readings , fault statues etc ... It is able to write status information to SD card .

TEST PROCEDURE:

1. Do #Power up EC System

2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile' command from mobile APP after choosing profile parameters
4. Issue 'Get profile' command from mobile APP
5. Make sure that SD card inserted
6. Issue 'Grow cycle start request' command from mobile APP
7. Wait for 3 days
8. Issue 'Grow cycle stop request' command from mobile APP
9. Remove SD card
10. Insert SD card into Windows PC.

TEST PASS/FAIL CRITERIA:

Test case passes if

- SD card has directory with grow cycle name
- SD card has three different files with dates.
- Each file has status records of that day.
- Check status parameters as per the profile
 - Grow cycle parameters(grow calendar parameters)
 - Correct light cycle on/off
 - Device outlets on/off
 - Validate Sensor readings
 - Faults

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_GROW_CYCLE_STATUS_2_1	<ul style="list-style-type: none"> • Start with factory profile 	Test Steps 2-3 not required
TC_GROW_CYCLE_STATUS_2_1	<ul style="list-style-type: none"> • Start with user profile 	

3.3.4. EC Device outlet(s) Tests

The section mentions about tests concerned with each device outlet(s) for its operating modes

3.3.4.1 Device Light Test 1

TEST DESCRIPTION:

It is aimed to test functionality of light device outlet status for all operational modes (always ON , always OFF , Normal)

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile' command from mobile APP after choosing profile parameters(see TEST MATRIX)
4. Issue 'Get profile' command from mobile APP
5. Issue 'Grow cycle start request' command from mobile APP
6. Wait for One day
7. Observe the light device outlet's (LED , socket on/off) throughout the test randomly

TEST PASS/FAIL CRITERIA:

Test case passes if

- Device light outlet operates as per its configured mode.
- Verify for the correctness of parameters such as 'Elapsed Time' and 'Time Remain' are accurately sent in Status record & displayed in mobile APP.

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_DEVICE_LIGHT_1_1	• ALWAYS On	
TC_DEVICE_LIGHT_1_2	• ALWAYS Off	
TC_DEVICE_LIGHT_1_3	• Normal Light on time / off time are evenly distributed (12hrs on , 12 hrs Off)	
TC_DEVICE_LIGHT_1_4	• Normal • Light on time minimal i.e 1 second , remaining light off time	
TC_DEVICE_LIGHT_1_5	• Normal • Light on time maximum(i.e 23:59:59), remaining light off time	

3.3.4.2 Flexi mode Tests

Following are the Flexi mode tests described for Devices Hood Vent, Circ , Fxp1, Fxp2

Test case Id	Parameters of variation	Remarks
TC_DEVICE_#NAME#_1_1	• Follow	Follow Light device
TC_DEVICE_#NAME#_1_2	• Flip	Flip with Light device
TC_DEVICE_#NAME#_1_3	<ul style="list-style-type: none"> • RPT timer • Lc On • Lc Default "Start Delay" : 00:05:00 • Lc Default "Cycle Time" :00:05:00 • Lc Default "Repeat After ":03:00:00 • Dc On • Dc Default "Start Delay" : 00:05:00 • Dc Default "Cycle Time" :00:05:00 • Dc Default "Repeat After ":03:00:00 	
TC_DEVICE_#NAME#_1_4	<ul style="list-style-type: none"> • RPT timer • Lc On • Lc Min "Start Delay" : 00:00:00 • Lc "Cycle Time" : Light Cycle Duration-Start Delay • Lc "Repeat After ":Light Cycle Duration-(Cycle Time +Start Delay) 	Light Cycle Duration/Dark Cycle Duration calculated from device light outlet parameters

	<ul style="list-style-type: none"> • Dc On • Dc Min "Start Delay" : 00:00:00 • Dc "Cycle Time" : Dark Cycle Duration-Start Delay • Dc "Repeat After " : Dark Cycle Duration-(Cycle Time +Start Delay) 	
TC_DEVICE_#NAME#_1_5	<ul style="list-style-type: none"> • RPT timer • Lc On • Lc Max "Start Delay" : Light Cycle Duration- 00:00:01 • Lc "Cycle Time" : Light Cycle Duration-Start Delay • Lc "Repeat After " : Light Cycle Duration-(Cycle Time +Start Delay) • Dc On • Dc Max "Start Delay" : Dark Cycle Duration- 00:00:01 • Dc "Cycle Time" : Dark Cycle Duration-Start Delay • Dc "Repeat After " : Dark Cycle Duration-(Cycle Time +Start Delay) 	Light Cycle Duration/Dark Cycle Duration calculated from device light outlet parameters
TC_DEVICE_#NAME#_1_6	<ul style="list-style-type: none"> • RPT timer • Lc On • Lc Default "Start Delay" : 01:00:00 • Lc Default "Cycle Time" :02:00:00 • Lc Default "Repeat After " :03:00:00 • Dc Off 	
TC_DEVICE_#NAME#_1_7	<ul style="list-style-type: none"> • RPT timer • Lc Off • Dc On • Dc Default "Start Delay" : 01:00:00 • Dc Default "Cycle Time" :02:00:00 • Dc Default "Repeat After " :03:00:00 	
TC_DEVICE_#NAME#_1_8	<ul style="list-style-type: none"> • RPT timer • Lc On • Lc Default "Start Delay" : 01:00:00 • Lc Default "Cycle Time" :02:00:00 • Lc Default "Repeat After " :03:00:00 • Dc On • Dc Default "Start Delay" : 01:00:00 • Dc Default "Cycle Time" :02:00:00 • Dc Default "Repeat After " :03:00:00 	
TC_DEVICE_#NAME#_1_9	<ul style="list-style-type: none"> • Heater Mode • Lc On • Lc Default "Temp On Val": 65°F (18°C) • Lc Default "Temp Off Val": 70°F (-21°C) • Dc On • Dc Default "Temp On Val": 65°F (18°C) • Dc Default "Temp Off Val": 70°F (-21°C) 	
TC_DEVICE_#NAME#_1_10	<ul style="list-style-type: none"> • Heater Mode • Lc On • Lc Min "Temp On Val": 0°F (-17.5°C) • Lc Min "Temp Off Val": 2°F (-16.6°C) • Dc On • Dc Min "Temp On Val": 2°F (-17.5°C) • Dc Min "Temp Off Val": 2°F (-16.6°C) 	
TC_DEVICE_#NAME#_1_11	<ul style="list-style-type: none"> • Heater Mode • Lc On • Lc Max "Temp On Val": 118°F (47.7°C) • Lc Max "Temp Off Val": 122°F (50°C) • Dc On • Dc Min "Temp On Val": 118°F (47.7°C) • Dc Min "Temp Off Val": 122°F (-50°C) 	

TC_DEVICE_#NAME#_1_12	<ul style="list-style-type: none"> • Heater Mode • Lc On • Lc Default "Temp On Val": 65°F (18°C) • Lc Default "Temp Off Val": 70°F (21°C) • Dc Off 	
TC_DEVICE_#NAME#_1_13	<ul style="list-style-type: none"> • Heater Mode • Lc Off • Dc On • Dc Default "Temp On Val": 65°F (18°C) • Dc Default "Temp Off Val": 70°F (21°C) 	
TC_DEVICE_#NAME#_1_14	<ul style="list-style-type: none"> • Cooler Mode • Lc On • Lc Default "Temp On Val": 70°F (21°C) • Lc Default "Temp Off Val": 65°F (-18°C) • Dc On • Dc Default "Temp On Val": 70°F (21°C) • Dc Default "Temp Off Val": 65°F (18°C) 	
TC_DEVICE_#NAME#_1_15	<ul style="list-style-type: none"> • Cooler Mode • Lc On • Lc Min "Temp On Val": 0°F (-17.7°C) • Lc Min "Temp Off Val": -2°F (-18.8°C) • Dc On • Dc Min "Temp On Val": 0°F (-17.7°C) • Dc Min "Temp Off Val": -2°F (-18.8°C) 	
TC_DEVICE_#NAME#_1_16	<ul style="list-style-type: none"> • Cooler Mode • Lc On • Lc Max "Temp On Val": 122°F (50°C) • Lc Max "Temp Off Val": 120°F (48.8°C) • Dc On • Dc Max "Temp On Val": 122°F (50°C) • Dc Max "Temp Off Val": 120°F (48.8°C) 	
TC_DEVICE_#NAME#_1_17	<ul style="list-style-type: none"> • Cooler Mode • Lc On • Lc Default "Temp On Val": 70°F (21°C) • Lc Default "Temp Off Val": 65°F (18°C) • Dc Off 	
TC_DEVICE_#NAME#_1_18	<ul style="list-style-type: none"> • Cooler Mode • Lc Off • Dc On • Dc Default "Temp On Val": 70°F (21°C) • Dc Default "Temp Off Val": 65°F (18°C) 	
TC_DEVICE_#NAME#_1_19	<ul style="list-style-type: none"> • Humidifier Mode • Lc On • Lc Default "Humidity On Val": 50% • Lc Default "Humidity Off Val": 60% • Dc On • Dc Default "Humidity On Val": 50% • Dc Default "Humidity Off Val": 60% 	
TC_DEVICE_#NAME#_1_20	<ul style="list-style-type: none"> • Humidifier Mode • Lc On • Lc Min "Humidity On Val": 20% • Lc Min "Humidity Off Val": 25% • Dc On • Dc Min "Humidity On Val": 20% • Dc Min "Humidity Off Val": 25% 	
TC_DEVICE_#NAME#_1_21	<ul style="list-style-type: none"> • Humidifier Mode • Lc On • Lc Max "Humidity On Val": 90% • Lc Max "Humidity Off Val": 95% • Dc On • Dc Max "Humidity On Val": 90% • Dc Max "Humidity Off Val": 95% 	
TC_DEVICE_#NAME#_1_22	<ul style="list-style-type: none"> • Humidifier Mode 	

	<ul style="list-style-type: none"> • Lc On • Lc Default "Humidity On Val": 50% • Lc Default "Humidity Off Val": 60% • Dc Off 	
TC_DEVICE_#NAME#_1_23	<ul style="list-style-type: none"> • Humidifier Mode • Lc Off • Dc On • Dc Default "Humidity On Val": 50% • Dc Default "Humidity Off Val": 60% 	
TC_DEVICE_#NAME#_1_24	<ul style="list-style-type: none"> • Dehumidifier Mode • Lc On • Lc Default "Humidity On Val": 60% • Lc Default "Humidity Off Val": 50% • Dc On • Dc Default "Humidity On Val": 60% • Dc Default "Humidity Off Val": 50% 	
TC_DEVICE_#NAME#_1_25	<ul style="list-style-type: none"> • Dehumidifier Mode • Lc On • Lc Min "Humidity On Val": 25% • Lc Min "Humidity Off Val": 20% • Dc On • Dc Min "Humidity On Val": 25% • Dc Min "Humidity Off Val": 20% 	
TC_DEVICE_#NAME#_1_26	<ul style="list-style-type: none"> • Dehumidifier Mode • Lc On • Lc Max "Humidity On Val": 95% • Lc Max "Humidity Off Val": 90% • Dc On • Dc Max "Humidity On Val": 95% • Dc Max "Humidity Off Val": 90% 	
TC_DEVICE_#NAME#_1_27	<ul style="list-style-type: none"> • Dehumidifier Mode • Lc On • Lc Default "Humidity On Val": 60% • Lc Default "Humidity Off Val": 50% • Dc Off 	
TC_DEVICE_#NAME#_1_28	<ul style="list-style-type: none"> • Dehumidifier Mode • Lc Off • Dc On • Dc Default "Humidity On Val": 60% • Dc Default "Humidity Off Val": 50% 	
TC_DEVICE_#NAME#_1_29	<ul style="list-style-type: none"> • Leak Mode 	
TC_DEVICE_#NAME#_1_30	<ul style="list-style-type: none"> • CO2 mode • Generator mode • Default On Threshold 1400 PPM • Default Off Threshold 1600 PPM • Make sure Light cycle running & Vent Device off 	
TC_DEVICE_#NAME#_1_31	<ul style="list-style-type: none"> • CO2 mode • Generator mode • Min On Threshold 500 PPM • Min Off Threshold 700 PPM • Make sure Light cycle running & Vent Device off 	
TC_DEVICE_#NAME#_1_32	<ul style="list-style-type: none"> • CO2 mode • Generator mode • Max On Threshold 1800 PPM • Max Off Threshold 2000 PPM • Make sure Light cycle running & Vent Device off 	
TC_DEVICE_#NAME#_1_33	<ul style="list-style-type: none"> • CO2 mode • Generator mode • Default On Threshold 1400 PPM 	CO2 mode should not be kicked in

	<ul style="list-style-type: none"> • Default Off Threshold 1600 PPM • Make sure Dark cycle running 	
TC_DEVICE_#NAME#_1_34	<ul style="list-style-type: none"> • CO2 mode • Generator mode • Default On Threshold 1400 PPM • Default Off Threshold 1600 PPM • Make sure Light cycle running & Vent Device on 	CO2 mode should not be kicked in
TC_DEVICE_#NAME#_1_35	<ul style="list-style-type: none"> • CO2 mode • Generator mode • Default On Threshold 1400 PPM • Default Off Threshold 1600 PPM • Make sure Light cycle running & Vent Device in transition from On to Off 	CO2 mode kicked in after device Vent off with the programmed delay.
TC_DEVICE_#NAME#_1_36	<ul style="list-style-type: none"> • CO2 mode • Cylinder mode • Default On Threshold 1500 PPM • Make sure Light cycle running & Vent Device off 	
TC_DEVICE_#NAME#_1_37	<ul style="list-style-type: none"> • CO2 mode • Cylinder mode • Set Threshold 500 PPM • Make sure Light cycle running & Vent Device off 	
TC_DEVICE_#NAME#_1_38	<ul style="list-style-type: none"> • CO2 mode • Cylinder mode • Set Threshold 2000PPM • Make sure Light cycle running & Vent Device off 	
TC_DEVICE_#NAME#_1_39	<ul style="list-style-type: none"> • CO2 mode • Cylinder mode • Set Threshold 1500 PPM • Make sure Dark cycle running 	CO2 mode should not be kicked in
TC_DEVICE_#NAME#_1_40	<ul style="list-style-type: none"> • CO2 mode • Cylinder mode • Set Threshold 1500 PPM • Make sure Light cycle running , Vent device ON 	CO2 mode should not be kicked in
TC_DEVICE_#NAME#_1_41	<ul style="list-style-type: none"> • CO2 mode • Cylinder mode • Set Threshold 1500 PPM • Make sure Light cycle running & Vent Device in transition from On to Off 	CO2 mode kicked in after device Vent off with the programmed delay.

3.3.4.3 Device Hood Vent Test 1

TEST DESCRIPTION:

It is aimed to test functionality of Hood vent device outlet status for all operational modes (native, follow, flip, flexi)

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile' command from mobile APP after choosing profile parameters(see TEST MATRIX)
4. Issue 'Get profile' command from mobile APP

5. Issue 'Grow cycle start request' command from mobile APP
6. Wait for One day
7. Observe the hood vent device outlet's (LED, socket on/off) throughout the test randomly

TEST PASS/FAIL CRITERIA:

Test case passes if

- Device Hood Vent outlet operates as per its configured mode

TEST MATRIX:

PI note that all tests mentioned in the table will be executed by keeping Light device outlet in "Normal", "Always ON", "Always OFF" modes (repeating all tests in all modes).

Test case Id	Parameters of variation	Remarks
TC_DEVICE_HOOD_VENT_1_1	<ul style="list-style-type: none"> • Native • Delay value default 5 minutes 	
TC_DEVICE_HOOD_VENT_1_2	<ul style="list-style-type: none"> • Native • Delay value max i.e 1 hour 	
TC_DEVICE_HOOD_VENT_1_3 To TC_DEVICE_HOOD_VENT_1_43		PI refer 3.3.4.2

3.3.4.4 Device Hood Vent Test 2

TEST DESCRIPTION:

It is aimed to test functionality of Hood vent device outlet status during light restrike fault mode

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile' command from mobile APP after choosing profile parameters(see TEST MATRIX)
4. Issue 'Get profile' command from mobile APP
5. Issue 'Grow cycle start request' command from mobile APP
6. Wait for a few minutes
7. Create hot re-strike fault (TBD)
8. Wait for 10 minutes
9. Restore the fault
10. Wait for 10 minutes

TEST PASS/FAIL CRITERIA:

Test case passes if

- Device Hood Vent outlet is on during hot re-strike fault mode

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_DEVICE_HOOD_VENT_2_1	<ul style="list-style-type: none"> Native mode 	

3.3.4.5 Device Circ Test 1

TEST DESCRIPTION:

It is aimed to test functionality of Circ device outlet status for all operational modes (native , follow , flip , flexi)

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile' command from mobile APP after choosing profile parameters(see TEST MATRIX)
4. Issue 'Get profile' command from mobile APP
5. Issue 'Grow cycle start request' command from mobile APP
6. Wait for One day
7. Observe the Circ device outlet's (LED , socket on/off) throughout the test randomly

TEST PASS/FAIL CRITERIA:

Test case passes if

- Device Hood Vent outlet operates as per its configured mode

TEST MATRIX:

PI note that all tests mentioned in the table will be executed by keeping Light device outlet in "Normal" , "Always ON" , "Always OFF" modes (repeating all tests in all modes).

Test case Id	Parameters of variation	Remarks
TC_DEVICE_CIRC_1_1	<ul style="list-style-type: none"> Native Lc On Lc Default "Start Delay" Dc On Dc Default "Start Delay" 	
TC_DEVICE_CIRC_1_2	<ul style="list-style-type: none"> Native Lc On Lc Min "Start Delay": 00:00:00 Dc On Dc Min "Start Delay" : 00:00:00 	
TC_DEVICE_CIRC_1_3	<ul style="list-style-type: none"> Native Lc On Lc Max "Start Delay": LC duration – 00:00:01 Dc On Dc Max "Start Delay":DC duration – 00:00:01 	
TC_DEVICE_CIRC_1_4	<ul style="list-style-type: none"> Native Lc On Lc Default "Start Delay" Dc Off 	
TC_DEVICE_CIRC_1_5	<ul style="list-style-type: none"> Native Lc Off Dc On 	

	• Dc Default "Start Delay"	
TC_DEVICE_CIRC_1_6 To TC_DEVICE_CIRC_1_46		PI refer 3.3.4.2

3.3.4.6 Device Fxp1 Test 1

TEST DESCRIPTION:

It is aimed to test functionality of Fxp1 device outlet status for all operational modes (follow , flip , flexi)

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile' command from mobile APP after choosing profile parameters(see TEST MATRIX)
4. Issue 'Get profile' command from mobile APP
5. Issue 'Grow cycle start request' command from mobile APP
6. Wait for One Fxp1 device outlet's (LED , socket on/off) throughout the test randomly

TEST PASS/FAIL CRITERIA:

Test case passes if

- Device Fxp1 outlet operates as per its configured mode

TEST MATRIX:

PI note that all tests mentioned in the table will be executed by keeping Light device outlet in "Normal" , "Always ON" , "Always OFF" modes (repeating all tests in all modes).

Test case Id	Parameters of variation	Remarks
TC_FXP1_1_1 To TC_FXP1_1_41		PI refer 3.3.4.2

3.3.4.7 Device Fxp2 Test 1

TEST DESCRIPTION:

It is aimed to test functionality of Fxp2 device outlet status for all operational modes (follow , flip , flexi)

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile' command from mobile APP after choosing profile parameters(see TEST MATRIX)
4. Issue 'Get profile' command from mobile APP

5. Issue 'Grow cycle start request' command from mobile APP
6. Wait for One Fxp2 device outlet's (LED , socket on/off) throughout the test randomly

TEST PASS/FAIL CRITERIA:

Test case passes if

- Device Fxp2 outlet operates as per its configured mode

TEST MATRIX:

PI note that all tests mentioned in the table will be executed by keeping Light device outlet in "Normal", "Always ON", "Always OFF" modes (repeating all tests in all modes).

Test case Id	Parameters of variation	Remarks
TC_FXP2_1_1 To TC_FXP2_1_41		PI refer 3.3.4.2

3.3.4.8 Device Vent Test 1

TEST DESCRIPTION:

It is aimed to test functionality of Vent device outlet status for all operational modes..

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile' command from mobile APP after choosing profile parameters(see TEST MATRIX)
4. Issue 'Get profile' command from mobile APP
5. Issue 'Grow cycle start request' command from mobile APP
6. Wait for some duration
7. Observe the vent device outlet's (LED , socket on/off) throughout the test randomly

TEST PASS/FAIL CRITERIA:

Test case passes if

- Device Vent outlet operates as per its configured mode

TEST MATRIX:

PI note that all tests mentioned in the table will be executed by keeping Light device outlet in "Normal", "Always ON", "Always OFF" modes (repeating all tests in all modes).

Test case Id	Parameters of variation	Remarks
TC_DEVICE_VENT_1_1	<ul style="list-style-type: none"> • RPT timer • Lc On • Lc Default "Start Delay" : 00:00:00 • Lc Default "Cycle Time" :00:05:00 • Lc Default "Repeat After ":01:30:00 • Dc On • Dc Default "Start Delay" : 00:00:00 • Dc Default "Cycle Time" :00:05:00 • Dc Default "Repeat After ":01:30:00 	
TC_DEVICE_VENT_1_2	<ul style="list-style-type: none"> • RPT timer 	Light Cycle Duration/Dark

	<ul style="list-style-type: none"> • Lc On • Lc Min "Start Delay" : 00:00:01 • Lc "Cycle Time" : Light Cycle Duration-Start Delay • Lc "Repeat After " :Light Cycle Duration-(Cycle Time +Start Delay) • Dc On • Dc Min "Start Delay" : 00:00:01 • Dc "Cycle Time" : Dark Cycle Duration-Start Delay • Dc "Repeat After " :Dark Cycle Duration-(Cycle Time +Start Delay) 	Cycle Duration calculated from device light outlet parameters
TC_DEVICE_VENT_1_3	<ul style="list-style-type: none"> • RPT timer • Lc On • Lc Max "Start Delay" : Light Cycle Duration- 00:00:01 • Lc "Cycle Time" : Light Cycle Duration-Start Delay • Lc "Repeat After " :Light Cycle Duration-(Cycle Time +Start Delay) • Dc On • Dc Max "Start Delay" : Dark Cycle Duration- 00:00:01 • Dc "Cycle Time" : Dark Cycle Duration-Start Delay • Dc "Repeat After " :Dark Cycle Duration-(Cycle Time +Start Delay) 	Light Cycle Duration/Dark Cycle Duration calculated from device light outlet parameters
TC_DEVICE_VENT_1_4	<ul style="list-style-type: none"> • RPT timer • Lc On • Lc Default "Start Delay" : 01:00:00 • Lc Default "Cycle Time" :02:00:00 • Lc Default "Repeat After " :03:00:00 • Dc Off 	
TC_DEVICE_VENT_1_5	<ul style="list-style-type: none"> • RPT timer • Lc Off • Dc On • Dc Default "Start Delay" : 01:00:00 • Dc Default "Cycle Time" :02:00:00 • Dc Default "Repeat After " :03:00:00 	
TC_DEVICE_VENT_1_6	<ul style="list-style-type: none"> • RPT timer • Lc On • Lc Default "Start Delay" : 01:00:00 • Lc Default "Cycle Time" :02:00:00 • Lc Default "Repeat After " :03:00:00 • Dc On • Dc Default "Start Delay" : 01:00:00 • Dc Default "Cycle Time" :02:00:00 • Dc Default "Repeat After " :03:00:00 	
TC_DEVICE_VENT_1_7	<ul style="list-style-type: none"> • Temp Check • Lc On • Lc Default "Temp On Val": 70°F (21°C) • Lc Default "Temp Off Val": 65°F (18°C) • Dc On • Dc Default "Temp On Val": 70°F (21°C) • Dc Default "Temp Off Val": 65°F (18°C) 	
TC_DEVICE_VENT_1_8	<ul style="list-style-type: none"> • Temp Check • Lc On • Lc Min "Temp On Val": 2°F (0°C) • Lc Min "Temp Off Val": 0°F (-1°C) • Dc On • Dc Min "Temp On Val": 2°F (0°C) • Dc Min "Temp Off Val": 0°F (-1°C) 	
TC_DEVICE_VENT_1_9	<ul style="list-style-type: none"> • Temp Check 	

	<ul style="list-style-type: none"> • Lc On • Lc Max "Temp On Val": 122°F (50°C) • Lc Max "Temp Off Val": 120°F (49°C) • Dc On • Dc Max "Temp On Val": 122°F (50°C) • Dc Max "Temp Off Val": 120°F (49°C) 	
TC_DEVICE_VENT_1_10	<ul style="list-style-type: none"> • Temp Check • Lc On • Lc Default "Temp On Val": 70°F (21°C) • Lc Default "Temp Off Val": 65°F (18°C) • Dc Off 	
TC_DEVICE_VENT_1_11	<ul style="list-style-type: none"> • Temp Check • Lc Off • Dc On • Dc Default "Temp On Val": 70°F (21°C) • Dc Default "Temp Off Val": 65°F (18°C) 	
TC_DEVICE_VENT_1_12	<ul style="list-style-type: none"> • Humidity Check • Lc On • Lc Default "Humidity On Val": 60% • Lc Default "Humidity Off Val": 50% • Dc On • Dc Default "Humidity On Val": 60% • Dc Default "Humidity Off Val": 50% 	
TC_DEVICE_VENT_1_13	<ul style="list-style-type: none"> • Humidity Check • Lc On • Lc Min "Humidity On Val": 5% • Lc Min "Humidity Off Val": 0% • Dc On • Dc Min "Humidity On Val": 5% • Dc Min "Humidity Off Val": 0% 	
TC_DEVICE_VENT_1_14	<ul style="list-style-type: none"> • Humidity Check • Lc On • Lc Max "Humidity On Val": 95% • Lc Max "Humidity Off Val": 90% • Dc On • Dc Max "Humidity On Val": 95% • Dc Default "Humidity Off Val": 90% 	
TC_DEVICE_VENT_1_15	<ul style="list-style-type: none"> • Humidity Check • Lc On • Lc Default "Humidity On Val": 60% • Lc Default "Humidity Off Val": 50% • Dc Off 	
TC_DEVICE_VENT_1_16	<ul style="list-style-type: none"> • Humidity Check • Lc Off • Dc On • Dc Default "Humidity On Val": 60% • Dc Default "Humidity Off Val": 50% 	
TC_DEVICE_VENT_1_17	<ul style="list-style-type: none"> • RPT timer + Temp Check • RPT timer • Lc On • Lc Default "Start Delay" : 01:00:00 • Lc Default "Cycle Time" :02:00:00 • Lc Default "Repeat After ":03:00:00 • Dc On • Dc Default "Start Delay" : 01:00:00 • Dc Default "Cycle Time" :02:00:00 • Dc Default "Repeat After ":03:00:00 • Temp Check • Lc On • Lc Default "Temp On Val": 70°F (21°C) • Lc Default "Temp Off Val": 65°F (18°C) • Dc On • Dc Default "Temp On Val": 70°F (21°C) 	

	<ul style="list-style-type: none"> • Dc Default "Temp Off Val": 65°F (18°C) 	
TC_DEVICE_VENT_1_18	<ul style="list-style-type: none"> • RPT timer + Humidity Check • RPT timer • Lc On • Lc Default "Start Delay" : 01:00:00 • Lc Default "Cycle Time" :02:00:00 • Lc Default "Repeat After ":03:00:00 • Dc On • Dc Default "Start Delay" : 01:00:00 • Dc Default "Cycle Time" :02:00:00 • Dc Default "Repeat After ":03:00:00 • Humidity Check • Lc On • Lc Default "Humidity On Val": 60% • Lc Default "Humidity Off Val": 50% • Dc On • Dc Default "Humidity On Val": 60% • Dc Default "Humidity Off Val": 50% 	
TC_DEVICE_VENT_1_19	<ul style="list-style-type: none"> • Humidity Check + Temp Check • Temp Check • Lc On • Lc Default "Temp On Val": 70°F (21°C) • Lc Default "Temp Off Val": 65°F (18°C) • Dc On • Dc Default "Temp On Val": 70°F (21°C) • Dc Default "Temp Off Val": 65°F (18°C) • Humidity Check • Lc On • Lc Default "Humidity On Val": 60% • Lc Default "Humidity Off Val": 50% • Dc On • Dc Default "Humidity On Val": 60% • Dc Default "Humidity Off Val": 50% 	
TC_DEVICE_VENT_1_20	<ul style="list-style-type: none"> • RPT Timer + Temp Check + Humidity Check • RPT timer • Lc On • Lc Default "Start Delay" : 01:00:00 • Lc Default "Cycle Time" :02:00:00 • Lc Default "Repeat After ":03:00:00 • Dc On • Dc Default "Start Delay" : 01:00:00 • Dc Default "Cycle Time" :02:00:00 • Dc Default "Repeat After ":03:00:00 • Temp Check • Lc On • Lc Default "Temp On Val": 70°F (21°C) • Lc Default "Temp Off Val": 65°F (18°C) • Dc On • Dc Default "Temp On Val": 70°F (21°C) • Dc Default "Temp Off Val": 65°F (18°C) • Humidity Check • Lc On • Lc Default "Humidity On Val": 60% • Lc Default "Humidity Off Val": 50% • Dc On • Dc Default "Humidity On Val": 60% • Dc Default "Humidity Off Val": 50% 	

3.3.5. EC Other Functional Tests

The section mentions about other functional tests concerned with faults, email, SD card and wifi connection etc...

3.3.5.1 Wi-Fi Enterprise Test

TEST DESCRIPTION:

It is aimed to test whether EC is able to associate with all EAP securities (TLS, TTLS, PEAP)

TEST PROCEDURE:

1. Do #Power up EC System
2. Configure AP with SSID, channel, security parameters for appropriate EAP methods with free radius server
3. Configure EC with the same SSID, channel and security parameters (use web provisioning page or regular MQTT script /Mobile APP)
4. See that EC connected to AP and MQTT connection is up(sniffer capture)

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC connected to AP successfully

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_WIFI_WPA2_1_1	<ul style="list-style-type: none">• Wifi security as PEAP• Credentials given using Web Provision	
TC_WIFI_WPA2_1_2	<ul style="list-style-type: none">• Wifi security as TLS• Credentials given using Web Provision	
TC_WIFI_WPA2_1_3	<ul style="list-style-type: none">• Wifi security as TTLS• Credentials given using Web Provision	
TC_WIFI_WPA2_1_4	<ul style="list-style-type: none">• Wifi security as PEAP• Credentials given using mobile APP (or MQTT script)	
TC_WIFI_WPA2_1_5	<ul style="list-style-type: none">• Wifi security as TLS• Credentials given using mobile APP (or MQTT script)	
TC_WIFI_WPA2_1_6	<ul style="list-style-type: none">• Wifi security as TTLS• Credentials given using mobile APP (or MQTT script)	

3.3.5.2 Wi-Fi Mixed Security Test 1

TEST DESCRIPTION:

It is aimed to test whether EC able to connect different wifi networks of different securities when configured using web provisioning mode or Mobile APP(or MQTT script)

TEST PROCEDURE:

1. Power up EC with factory settings only (no user data present) & see that EC started web provisioning mode (EC starts wifi network in psk mode with mac address as SSID EC_xx_xx_xx_xx_xx_xx, pass phrase as “adminpass”)
2. Connect mobile phone/ laptop to EC , Access web provision page & provision EC for wifi settings as TLS
3. Make sure desired TLS wifi network is available
4. Wait for some time EC is connected to TLS wifi network as well as MQTT connection established
5. Use Mobile APP (or MQTT script) to change user provisioning for wifi as PEAP network
6. Make sure that PEAP wireless network is available
7. Wait for some time EC is connected to PEAP wifi network as well as MQTT connection established
8. Use Mobile APP (or MQTT script) to change user provisioning for wifi as PSK network
9. Make sure that PSK wireless network is available
10. Wait for some time EC is connected to PSK wifi network as well as MQTT connection established

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC connected to different types of wifi network successfully

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_WIFI_MIXED_SECURITY_1_1	•	

3.3.5.3 Email Test

TEST DESCRIPTION:

It is aimed to test EC for checking email functionality for different email accounts.

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile 1' command from mobile APP after choosing profile parameters
4. Issue 'Grow cycle start request' for profile 1 command from mobile APP
5. Create any fault
6. Wait for 10 minutes
7. Restore the fault
8. Wait for 10 minutes

TEST PASS/FAIL CRITERIA:

Test case passes if

- Email is sent with appropriate fault messages
- When the fault is cleared, Email is sent with appropriate fault restored messages

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_EMAIL_1_1	• Use Gmail account	
TC_EMAIL_1_2	• Use Hot mail account	
TC_EMAIL_1_3	• Use any other email account	

3.3.5.4 SD card Test

TEST DESCRIPTION:

It is aimed to test EC works properly for different formats of SD card.

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile 1' command from mobile APP after choosing profile parameters
4. Issue 'Grow cycle start request' for profile 1 command from mobile APP
5. Wait for 10 minutes
6. Switch off EC
7. Takeout SD card & insert in windows computer.

TEST PASS/FAIL CRITERIA:

Test case passes if

- SD card has proper grow status data files.

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_SD_CARD_1_1	• SD card formatted cluster size 512 bytes	
TC_SD_CARD_1_2	• SD card formatted cluster size 4K bytes	
TC_SD_CARD_1_3	• SD card formatted cluster size 16K bytes	

3.3.5.5 Backup Battery Voltage Test1

TEST DESCRIPTION:

It is aimed to test whether EC is reporting correct battery voltage or not.

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile' command from mobile APP after choosing profile parameters
4. Issue 'Get profile' command from mobile APP
5. Issue 'Grow cycle start request' command from mobile APP
6. Wait for a few minutes

TEST PASS/FAIL CRITERIA:

Test case passes if

- Correct battery voltage reported or not in grow status message, pl see TEST MATRIX
- “BATT TEST PULSE” GPIO port B pin 1 (PB1) is on for 2 seconds when the battery measurement is being measured.
- For remaining pass criteria, pl see remarks in TEST MATRIX

TEST MATRIX:

Test case Id	Parameters variation of	Remarks
TC_BACKUP_BATTERY_VOLTAGE_1_1	• Power up EC using fresh batteries	The voltage should be 4.8 V
TC_BACKUP_BATTERY_VOLTAGE_1_2	• Power up EC using used batteries	The voltage should be less than 4.8 V

3.3.5.6 Backup Battery Voltage Test2**TEST DESCRIPTION:**

It is aimed to test whether EC is reporting battery voltage fault when the battery voltage is low

TEST PROCEDURE:

1. Do **#Power up EC System** using battery which has very low voltage
2. Issue ‘Set provisioning’ command from mobile APP
3. Issue ‘Set profile’ command from mobile APP after choosing profile parameters
4. Issue ‘Get profile’ command from mobile APP
5. Issue ‘Grow cycle start request’ command from mobile APP
6. Wait for a few minutes
7. Switch off EC
8. Take out SD card & insert in PC/Desktop/Laptop

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC sends Battery voltage fault message, Email is sent & SD card records battery voltage fault message. Grow status shows Battery voltage fault occurred

TEST MATRIX:

Test case Id	Parameters variation of	Remarks
TC_BACKUP_BATTERY_VOLTAGE_2_1	• Low threshold voltage 2.7V	

3.3.5.7 Backup Battery Voltage Test3**TEST DESCRIPTION:**

It is aimed to test whether EC is reporting battery voltage fault restored back or not

TEST PROCEDURE:

1. Do **#Power up EC System** using battery which has very low voltage
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile' command from mobile APP after choosing profile parameters
4. Issue 'Get profile' command from mobile APP
5. Issue 'Grow cycle start request' command from mobile APP
6. Wait for a few minutes
7. Switch off EC
8. Do **#Power up EC System** with new batteries
9. Repeat steps 2 -6
10. Wait for a few minutes
11. Switch off EC
12. Take out SD card & insert in PC/Desktop/Laptop

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC sends Battery voltage fault message, Email is sent & SD card records battery voltage fault message. Grow status shows Battery voltage fault occurred
- EC sends Battery voltage fault restored message, Email is sent & SD card records battery voltage fault restored message. Grow status shows Battery voltage fault occurred

TEST MATRIX:

Test case Id	Parameters variation of	Remarks
TC_BACKUP_BATTERY_VOLTAGE_3_1	<ul style="list-style-type: none"> • Low threshold voltage 2.7V • High Threshold voltage 3.8V 	

3.3.5.8 AC power fault Test 1

TEST DESCRIPTION:

It is aimed to test EC for reporting AC power fault or not.

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile' command from mobile APP after choosing profile parameters
4. Issue 'Get profile' command from mobile APP
5. Issue 'Grow cycle start request' command from mobile APP
6. Wait for a few minutes
7. Create AC power fault by pulling the AC detector IC MCU input high to simulate an AC power failure.
8. Wait for a few minutes
9. Switch off EC
10. Take out SD card

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC sends AC power fault message flag, Email is sent & SD card records ac power fault message. grow status shows AC power fault occurred
- All device outlets are off when the fault occurred.

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_AC_POWER_FAULT_1_1	•	

3.3.5.9 AC power fault Test 2**TEST DESCRIPTION:**

It is aimed to test EC for reporting AC power fault or not.

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set provisioning' command from mobile APP such that "Hot Re-Strike fault" switched off
3. Issue 'Set profile' command from mobile APP after choosing profile parameters
4. Issue 'Get profile' command from mobile APP
5. Issue 'Grow cycle start request' command from mobile APP
6. Wait for a few minutes
7. Create AC power fault by pulling the AC detector IC MCU input high to simulate an AC power failure.
8. Wait for a few minutes
9. Restore AC power fault.
10. Wait for a few minutes
11. Switch off EC
12. Take out SD card

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC sends AC power fault message is sent, Email is sent & SD card records ac power fault message. grow status shows AC power fault occurred
- All device outlets are off when the fault occurred.
- EC sends AC power fault restored message is sent Email is sent & SD card records ac power fault restored message. grow status shows AC power fault restored
- All device outlets are on/off as per profile configured state at that time

TEST MATRIX:

Test case Id	Parameters variation of	Remarks
TC_AC_POWER_FAULT_2_1	•	Run this test during light cycle .when the fault is restored, light outlet is ON automatically. Here the light device does not use any hot re strike

3.3.5.10 Hot Re-Strike fault Test 1

TEST DESCRIPTION:

It is aimed to test EC's behaviour when Hot Re strike fault enabled.

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Set provisioning' command from mobile APP such that "Hot Re-Strike fault" switched on
3. Issue 'Set profile' command from mobile APP after choosing profile parameters
4. Issue 'Get profile' command from mobile APP
5. Issue 'Grow cycle start request' command from mobile APP
6. Wait for a few minutes
7. Create AC power fault by pulling the AC detector IC MCU input high to simulate an AC power failure
8. Wait for a few minutes
9. Restore AC power fault so that hot re-strike fault occurred
10. Wait till Hot-re-strike time elapsed
11. Switch off EC
12. Take out SD card

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC sends Hot Re-Strike fault message is sent, Email is sent & SD card records ac power fault message. grow status shows AC power fault occurred
- Light device outlet is off when the fault occurred.
- Hood vent device outlet is on when it is configured for native mode when the fault occurred.
- EC sends Hot Re-Strike fault restored message is sent, Email is sent & SD card records Hot Re-Strike fault restored message. Grow status shows Hot Re-Strike fault restored
- Light device outlet is ON when the fault is restored.

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_HOT_RE_STRIKE_FAULT_1_1	• Default delay value	Run the test in light cycle
TC_HOT_RE_STRIKE_FAULT_1_2	• Min delay value	Run the test in light cycle
TC_HOT_RE_STRIKE_FAULT_1_3	• Max delay value	Run the test in light cycle

3.3.5.11 Hot Re-Strike fault Test 2

TEST DESCRIPTION:

It is aimed to test EC's behaviour when Hot Re strike fault enabled when the fault occurred for different conditions

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Set provisioning' command from mobile APP such that "Hot Re-Strike fault" switched on
3. Issue 'Set profile' command from mobile APP after choosing profile parameters
4. Issue 'Get profile' command from mobile APP
5. Issue 'Grow cycle start request' command from mobile APP
6. Wait for a few minutes
7. Create AC power fault by pulling the AC detector IC MCU input high to simulate an AC power failure
8. Wait for a few minutes
9. Restore AC power fault so that hot re-strike fault occurred
10. Wait till Hot-re-strike time elapsed
11. Switch off EC
12. Take out SD card

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC sends Hot Re-Strike fault message is sent, Email is sent & SD card records ac power fault message. grow status shows AC power fault occurred
- EC sends Hot Re-Strike fault restored message is sent, Email is sent & SD card records Hot Re-Strike fault restored message. Grow status shows Hot Re-Strike fault restored

For remaining pass criteria, pl see remarks

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_HOT_RE_STRIKE_FAULT_2_1	• EC in Dark Cycle	Light device off & ignores re strike fault timer
TC_HOT_RE_STRIKE_FAULT_2_2	• EC in transition from dark cycle to Light cycle	Light device on & ignores re strike fault timer
TC_HOT_RE_STRIKE_FAULT_2_3	• EC in transition from light cycle to dark cycle	Light device off & ignores re strike fault timer

3.3.5.12 Fault Test 1

TEST DESCRIPTION:

It is aimed to test EC for reporting faults as well as sending email when it is occurred & when it is addressed in idle mode.

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Set provisioning' command from mobile APP
3. Create appropriate fault (how to create TBD)

4. Wait for 10 minutes
5. Restore the fault
6. Wait for 10 minutes

TEST PASS/FAIL CRITERIA:

Test case passes if

- When fault occurs ,EC sends appropriate fault message flag set & Email is sent
- When the fault is cleared, EC sends appropriate fault message flag set & Email is sent

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_FAULTS_1_1	• Emr fuse fault	
TC_FAULTS_1_2	• RS485 fuse fault	
TC_FAULTS_1_3	• Sensor fault	

3.3.5.13 Fault Test 2

TEST DESCRIPTION:

It is aimed to test EC for reporting faults as well as sending email when it is occurred & when it is addressed in active grow cycle mode

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile 1' command from mobile APP after choosing profile parameters
4. Issue 'Grow cycle start request' for profile 1 command from mobile APP
5. Create appropriate fault (how to create TBD)
6. Wait for 10 minutes
7. Restore the fault
8. Wait for 10 minutes

TEST PASS/FAIL CRITERIA:

Test case passes if

- When fault occurs ,EC sends appropriate fault message flag set & Email is sent
- When the fault is cleared, EC sends appropriate fault message flag set & Email is sent
- Grow cycle status information fields for faults will be set /reset according to fault occurred/cleared.

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_FAULTS_2_1	• Emr fuse fault	
TC_FAULTS_2_2	• RS485 fuse fault	
TC_FAULTS_2_3	• Sensor fault	

3.3.5.14 Suspend Grow Cycle Test 1

TEST DESCRIPTION:

It is aimed to test EC whether it is able to switch of device outlet(s) when asked to suspended

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set profile' command from mobile APP after choosing profile parameters
3. Issue 'Get profile' command from mobile APP
4. Issue 'Grow cycle start request' command from mobile APP
5. Wait for 10 minutes
6. Issue 'Suspend request' command from mobile APP

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC sends grow cycle status information as per given interval
- Suspended device outlet(s) off , LED(s) are blinking slowly

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_GROW_CYCLE_SUSPEND_1_1	<ul style="list-style-type: none">• Start with user profile• Suspend one device outlet	
TC_GROW_CYCLE_SUSPEND_1_2	<ul style="list-style-type: none">• Start with user profile• Suspend all device outlet	

3.3.5.15 Suspend Grow Cycle Test 2

TEST DESCRIPTION:

It is aimed to test EC whether it is able to resume device outlet(s) status as per profile after suspension is removed .

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set profile' command from mobile APP after choosing profile parameters
3. Issue 'Get profile' command from mobile APP
4. Issue 'Grow cycle start request' command from mobile APP
5. Wait for 10 minutes
6. Issue 'Suspend request start ' command from mobile APP
7. Wait for 10 minutes
8. Issue 'Suspend request stop ' command from mobile APP

TEST PASS/FAIL CRITERIA:

Test case passes if

- Suspended device outlet(s) resume the normal operation as per profile

- Validate device outlets' information from grow cycle status before suspended state , during suspended state , after suspended state

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_GROW_CYCLE_SUSPEND_2_1	<ul style="list-style-type: none"> • Start with user profile • one device outlet 	
TC_GROW_CYCLE_SUSPEND_2_2	<ul style="list-style-type: none"> • Start with user profile • all device outlet 	

3.3.5.16 Suspend Idle mode Test 1

TEST DESCRIPTION:

It is aimed to test EC whether it is able to switch of device outlet(s) when asked to suspended when EC is in idle mode

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Suspend request start' command from mobile APP

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC sets device outlet(s) off , LED(s) are blinking slowly

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_IDLE_SUSPEND_1_1	<ul style="list-style-type: none"> • 	

3.3.5.17 Forced Grow Cycle Test 1

TEST DESCRIPTION:

It is aimed to test EC whether it is able to switch on device outlet(s) when asked to forced state

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set profile' command from mobile APP after choosing profile parameters
3. Issue 'Get profile' command from mobile APP
4. Issue 'Grow cycle start request' command from mobile APP
5. Wait for 10 minutes
6. Issue 'Forced request Start' command from mobile APP

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC sends grow cycle status information as per given interval
- Forced device outlet(s) on, LED(s) are blinking slowly.

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_GROW_CYCLE_FORCED_1_1	<ul style="list-style-type: none"> Start with user profile One device outlet 	
TC_GROW_CYCLE_FORCED_1_2	<ul style="list-style-type: none"> Start with user profile All device outlets 	

3.3.5.18 Forced Grow Cycle Test 2

TEST DESCRIPTION:

It is aimed to test EC whether it is able to resume device outlet(s) status as per profile after forced is removed.

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set profile' command from mobile APP after choosing profile parameters
3. Issue 'Get profile' command from mobile APP
4. Issue 'Grow cycle start request' command from mobile APP
5. Wait for 10 minutes
6. Issue 'Forced request start' command from mobile APP
7. Wait for 10 minutes
8. Issue 'Forced request stop' command from mobile APP

TEST PASS/FAIL CRITERIA:

Test case passes if

- Suspended device outlet(s) resume the normal operation as per profile
- Validate device outlets' information from grow cycle status before forced state , during forced state , after forced state.

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_GROW_CYCLE_FORCED_2_1	<ul style="list-style-type: none"> Start with user profile one device outlet 	
TC_GROW_CYCLE_FORCED_2_2	<ul style="list-style-type: none"> Start with user profile all device outlet 	

3.3.5.19 Forced Idle mode Test 1

TEST DESCRIPTION:

It is aimed to test EC whether it is able to switch of device outlet(s) when asked to forced on when EC is in idle mode

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue "Forced request start" command from mobile APP

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC sets device outlet(s) off , LED(s) are blinking slowly

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_IDLE_FORCED_1_1	•	

3.3.5.20 Forced Idle mode Test 2**TEST DESCRIPTION:**

It is aimed to test EC whether it is able to switch of device outlet(s) are off or not when EC forced mode is off in idle mode

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Forced request start' command from mobile APP
3. Wait for 10 minutes
4. Issue 'Forced request stop' command from mobile APP

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC sets device outlet(s) on, LED(s) are blinking slowly
- After forced mode off , all device outlet(s) are off.

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_IDLE_SUSPEND_2_1	•	

3.3.5.21 Panic Grow Cycle Test 1**TEST DESCRIPTION:**

It is aimed to test EC whether it is able to switch off device outlet(s) when panic switch is pressed

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Set profile' command from mobile APP after choosing profile parameters
3. Issue 'Get profile' command from mobile APP
4. Issue 'Grow cycle start request' command from mobile APP
5. Wait for 10 minutes
6. Switch on panic button on EC

TEST PASS/FAIL CRITERIA:

Test case passes if

- All device outlets' off , LEDs' off

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_GROW_CYCLE_PANIC_1_1	• Start with user profile	

3.3.5.22 Panic Grow Cycle Test 2

TEST DESCRIPTION:

It is aimed to test EC whether it is able to resume device outlets' status as per profile after panic button switched off .

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set profile' command from mobile APP after choosing profile parameters
3. Issue 'Get profile' command from mobile APP
4. Issue 'Grow cycle start request' command from mobile APP
5. Wait for 10 minutes
6. Switch on panic button on EC
7. Wait for 10 minutes
8. Switch off panic button on EC

TEST PASS/FAIL CRITERIA:

Test case passes if

- All device outlets' resume the normal operation as per profile
- Validate device outlets' information from grow cycle status before panic button on , during panic button , after panic button off

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_GROW_CYCLE_PANIC_2_1	<ul style="list-style-type: none">• Start with user profile• one device outlet	

3.3.5.23 Panic Idle mode Test 1

TEST DESCRIPTION:

It is aimed to test EC whether it is able to switch off device outlet(s) when panic button is on idle mode

TEST PROCEDURE:

1. Do #Power up EC System
2. Switch on panic button on EC

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC sets device outlet(s) off , LED(s) are off

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_IDLE_PANIC_1_1	<ul style="list-style-type: none">•	

3.3.6. EC Firmware (Upgrade/Downgrade) Tests

3.3.6.1 Firmware Upgrade Test 1

TEST DESCRIPTION:

It is aimed to test EC whether it is able to upgrade firmware or not in idle mode.

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Firmware upgrade Request' command from mobile APP
3. Wait for some time

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC sends firmware upgrade request message to mobile APP.

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_FW_UG_1_1		

3.3.6.2 Firmware Upgrade Test 2

TEST DESCRIPTION:

It is aimed to test EC whether it is able to upgrade firmware or not in grow cycle mode.

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Set profile' command from mobile APP after choosing profile parameters
3. Issue 'Get profile' command from mobile APP
4. Issue 'Grow cycle start request' command from mobile APP
5. Wait for some time
6. Issue 'Firmware upgrade Request' command from mobile APP
7. Wait for some time

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC sends firmware upgrade request message to mobile APP.
- EC's grow cycle resumed & EC sends grow cycle status.

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_FW_UG_2_1		Check compatibility of APP versions to resume grow cycle,. if profile structures are changed , grow cycle cannot resume. Pl check release notes

3.3.7. EC Web Provisioning Tests

3.3.7.1 Web Provisioning Test 1

TEST DESCRIPTION:

It is aimed to test whether EC is configurable with web provisioning mode using different phones/laptops

TEST PROCEDURE:

1. Power up EC with factory settings only (no user data present) & see that EC started web provisioning mode (EC starts wifi network in psk mode with mac address as SSID EC_xx_xx_xx_xx_xx_xx, pass phrase as “adminpass”)
2. Connect mobile phone/ laptop to EC , Access web provision page & provision EC (wifi settings , mqtt settings device settings , grow settings etc ..)
3. Make sure desired wifi network is available
4. Wait for some time

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC adopts new wifi , mqtt , device , grow , smtp parameters (whatever is applicable) & able to connect to new wifi network with new MQTT/device settings

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_EC_WEB_PROVISIONING_1_1	• Use mobile phone as android(use browser to open page)	
TC_EC_WEB_PROVISIONING_1_2	• Use mobile phone as IOS(use browser to open page)	
TC_EC_WEB_PROVISIONING_1_3	• Use mobile APP on Android phone	
TC_EC_WEB_PROVISIONING_1_4	• Use mobile APP on IOS phone	
TC_EC_WEB_PROVISIONING_1_5	• Use windows PC(use browser to open page)	
TC_EC_WEB_PROVISIONING_1_6	• Use Linux PC (use browser to open page)	

3.3.7.2 Web Provisioning Test 2

TEST DESCRIPTION:

It is aimed to test whether EC is further configurable using mobile APP(MQTT scripts) after EC is provisioned using web provision.

TEST PROCEDURE:

1. Power up EC with factory settings only (no user data present) & see that EC started web provisioning mode (EC starts wifi network in psk mode with mac address as SSID EC_xx_xx_xx_xx_xx_xx, pass phrase as “adminpass”)
2. Connect mobile phone/ laptop to EC , Access web provision page & provision EC (wifi settings , mqtt settings device settings , grow settings etc ..)
3. Make sure desired wifi network is available
4. Wait for some time EC is connected
5. Use mobile APP change any provision settings of interest such as “device id” etc...
6. Wait for some time
7. Access provision parameters using get provision

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC adopts modified provision parameters

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_EC_WEB_PROVISIONING_2_1	<ul style="list-style-type: none">•	

3.4. EC LONGEVITY TESTS

3.4.1. Longevity Test1

TEST DESCRIPTION:

It is aimed to test the stability of EC in idle mode

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Set provisioning' command from mobile APP
3. Wait for 10 days
4. Send 'any command like getting profile/provisioning : from mobile APP

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC keeps on connected & established MQTT connection
- Mobile APP is able to establish the communication with EC

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_LONGEVITY_1_1	<ul style="list-style-type: none">• EC in Idle mode	

3.4.2. Longevity Test2

TEST DESCRIPTION:

It is aimed to test the stability of EC in active grow mode

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile' command from mobile APP after choosing profile parameters
4. Issue 'Grow cycle start request' command from mobile APP
5. Wait for 10 days
6. Send 'any command like getting profile/provisioning : from mobile APP
7. Issue 'Grow cycle stop request' command from mobile APP
8. Switch off EC
9. Take out SD card

10. Insert SD card in any windows/linux PC

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC keeps on connected & established MQTT connection
- Mobile APP is able to establish the communication with EC
- EC sends grow status interval as per , grow status parameters are verified
- All 10 days status records are stored in SD card

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_ LONGEVITY_2_1	•	

3.4.3. Longevity Test3

TEST DESCRIPTION:

It is aimed to test the stability of EC in active grow mode

TEST PROCEDURE:

- 3 Do #Power up EC System
- 4 Issue 'Set provisioning' command from mobile APP
- 5 Issue 'Set profile 1' command from mobile APP after choosing profile parameters
- 6 Issue 'Set profile 2' command from mobile APP after choosing profile parameters
- 7 Issue 'Grow cycle start request' for profile 1 command from mobile APP
- 8 Wait for 3 days
- 9 Issue "Apply profile2 "
- 10 Wait for 3 days
- 11 Issue 'Set/Apply profile 3' command from mobile APP after choosing profile parameters
- 12 Wait for 4 days
- 13 Send 'any command like getting profile/provisioning : from mobile APP
- 14 Issue 'Grow cycle stop request' for profile 1 command from mobile APP
- 15 Switch off EC
- 16 Take out SD card
- 17 Insert SD card in any windows/linux PC

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC keeps on connected & established MQTT connection
- Mobile APP is able to establish the communication with EC
- EC sends grow status as per interval , grow status parameters/device outlets functionality as per applied profile are verified
- All 10 days status records are stored in SD card

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_ LONGEVITY_3_1	•	

3.4.4. Longevity Test4

TEST DESCRIPTION:

It is aimed to test the stability of EC in active grow mode with grow period as 10 days (182 days is ideal to test)

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set provisioning' command from mobile APP
3. Issue 'Set profile 1' command from mobile APP after choosing profile parameters
4. Issue 'Grow cycle start request' for profile 1 command from mobile APP , here grow period is 10 days
5. Wait for 11 days
6. Switch off EC
7. Take out SD card
8. Insert SD card in any windows/linux PC

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC keeps on connected & established MQTT connection
- Mobile APP is able to establish the communication with EC
- EC sends grow status as per interval , grow status parameters/device outlets functionality as per the profile are verified
- EC stops grow cycle after 10 days automatically
- SD card has all data records of grow cycle

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_ LONGEVITY_4_1	•	

3.5. EC NEGATIVE TESTS

This section describes the tests to check EC behaviour in unusual conditions.

3.5.1. No Wifi network Tests

3.5.1.1 No Wifi network Test 1

TEST DESCRIPTION:

It is aimed to test EC whether it is able to work properly when there is no wifi network present

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set profile' command from mobile APP after choosing profile parameters
3. Issue 'Grow cycle start request' command from mobile APP
4. Wait for 10 minutes
5. Make sure Wifi network off (or not available)

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC keeps on trying to search/connect for wifi network
- If EC is in active grow mode, it continues grow cycle, writes status information to SD card & keeps on trying to send grow status .

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_NO_NETWORK_1_1	• EC in Idle mode	Test Steps 2–3 not required
TC_NO_NETWORK_1_2	• EC in active grow mode	

3.5.1.2 No Wifi network Test 2**TEST DESCRIPTION:**

It is aimed to test EC whether it is able to work properly when the wifi network is restored after disruption.

TEST PROCEDURE:

1. Do #Power up EC System
2. Issue 'Set profile' command from mobile APP after choosing profile parameters
3. Issue 'Grow cycle start request' command from mobile APP
4. Wait for 10 minutes
5. Make sure Wifi network off (or not available)
6. Wait for 5 minutes
7. Make sure Wifi network is available

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC establishes connection after Wifi network is restored.
- If EC is in active grow mode, EC sends grow status as usual after wifi network is restored.

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_NO_NETWORK_2_1	• EC in Idle mode	Test Steps 2–3 not required
TC_NO_NETWORK_2_2	• EC in active grow mode	

3.5.2. No MQTT server Tests**3.5.2.1 No MQTT server Test 1****TEST DESCRIPTION:**

It is aimed to test EC whether it is able to work properly when there is no MQTT server present

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Set profile' command from mobile APP after choosing profile parameters
3. Issue 'Grow cycle start request' command from mobile APP
4. Wait for 10 minutes
5. Make sure MQTT server off (or not available)

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC keeps on trying to establishing connection with MQTT server
- If EC is in active grow mode, it continues grow cycle, writes status information to SD card & keeps on trying to send grow status.

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_NO_MQTT_1_1	<ul style="list-style-type: none">• EC in Idle mode	Test Steps 2–3 not required
TC_NO_MQTT_1_2	<ul style="list-style-type: none">• EC in active grow mode	

3.5.2.2 No MQTT server Test 2

TEST DESCRIPTION:

It is aimed to test EC whether it is able to work properly when the MQTT server is restored after disruption.

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Set profile' command from mobile APP after choosing profile parameters
3. Issue 'Grow cycle start request' command from mobile APP
4. Wait for 10 minutes
5. Make sure MQTT server off (or not available)
6. Wait for 5 minutes
7. Make sure MQTT server is available

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC establishes connection after MQTT server is restored.
- If EC is in active grow mode, EC sends grow status as usual after MQTT server is restored.

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_NO_MQTT_2_1	<ul style="list-style-type: none">• EC in Idle mode	Test Steps 2–3 not required

3.5.3. Un format SD card Test 1

TEST DESCRIPTION:

It is aimed to test EC whether it is able to work properly when Unformatted SD card is inserted.

TEST PROCEDURE:

1. Do **#Power up EC System** with unformatted SD card
2. Issue 'Set profile' command from mobile APP after choosing profile parameters
3. Issue 'Grow cycle start request' command from mobile APP
4. Wait for 10 minutes
5. Switch off EC
6. Take out SD card

TEST PASS/FAIL CRITERIA:

Test case passes if

- SD card formatted
- SD card contains proper grow status data files in grow cycle

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_UNFORMAT_SD_CARD_1_1	<ul style="list-style-type: none"> • EC in Idle mode 	Test Steps 2–3 not required
TC_UNFORMAT_SD_CARD_1_2	<ul style="list-style-type: none"> • EC in active grow mode 	

3.5.4. Firmware Upgrade Interruption Tests

3.5.4.1 Firmware Upgrade Interruption Test 1

TEST DESCRIPTION:

It is aimed to test EC whether it is able to handle the interruption during firmware upgrade in idle mode.

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Firmware upgrade Request' command from mobile APP
3. Make sure that any interruption occurs.
4. Wait for Some time

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC continues working with old firmware.

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_FW_UG_INTERRUPT_1_1	• Wifi network off during firmware upgrade	
TC_FW_UG_INTERRUPT_1_2	• MQTT server off while sending the packets	
TC_FW_UG_INTERRUPT_1_3	• Mobile app off (fwug tool off)	

3.5.4.2 Firmware Upgrade Interruption Test 2

TEST DESCRIPTION:

It is aimed to test EC whether it is able to handle the interruption during firmware upgrade in grow cycle mode.

TEST PROCEDURE:

1. Do **#Power up EC System**
2. Issue 'Set profile' command from mobile APP after choosing profile parameters
3. Issue 'Get profile' command from mobile APP
4. Issue 'Grow cycle start request' command from mobile APP
5. Wait for some time
6. Issue 'Firmware upgrade Request' command from mobile APP
7. Make sure that any interruption occurs.
8. Wait for some time

TEST PASS/FAIL CRITERIA:

Test case passes if

- EC continues working with old firmware and continues grow cycle
- Check for grow cycle status

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_FW_UG_INTERRUPT_2_1	• Wifi network is off during firmware upgrade	
TC_FW_UG_INTERRUPT_2_2	• MQTT server is off while sending the packets	
TC_FW_UG_INTERRUPT_2_3	• Mobile app is off (fwug tool off)	

3.5.5. EC Web provisioning empty field Test

TEST DESCRIPTION:

It is aimed to test EC web provisioning whether the submission of form fields successful or not with some fields not given (or null or empty)

TEST PROCEDURE:

1. Power up EC with factory settings only (no user data present) & see that EC started web provisioning mode (EC starts wifi network in psk mode with mac address as SSID EC_xx_xx_xx_xx_xx_xx, pass phrase as “adminpass”)
2. Connect mobile phone/ laptop to EC , Access web provision page & provision EC (wifi settings , mqtt settings device settings , grow settings etc ..)
3. Make sure desired wifi network is available
4. Edit web provisioning page with some fields as empty & submit

TEST PASS/FAIL CRITERIA:

Test case passes if

- Web provision page shows error message after clicking submission.

TEST MATRIX:

Test case Id	Parameters of variation	Remarks
TC_EC_WEB_PROVISION_EMPTY_FIELD_1_1	•	

3.6. MOBILE APP FUNCTIONALITY

APPENDIX A

This section describes the details about “**Mosquitto**” test server used for testing. Mosquitto is an open source message server that implements MQTT protocols.

This server can be run from any ubuntu linux machine. Currently this server is placed at server machine i.e “**localveggy.com** “ at port no **1883**. All the tests uses this server.

To setup the new instance of this server, the following commands can be used.

Prerequisites of Linux machine

- An Ubuntu 16.04 server with root access
- Open port TCP:1883 on firewall

Step 1: Install Mosquitto Server

Update Ubuntu's package list and install the latest Mosquitto Server available from it.

```
sudo apt-get update
sudo apt-get install mosquitto
```

Step 2: Install the Clients and Test

```
sudo apt-get install mosquitto-clients
```

Mosquitto clients help us easily test MQTT through a command line utility. We will use two command windows, one to subscribe to a topic named "test" and one to publish a message to it. Topics are labels used by the broker to filter messages for each connected client. A client program subscribed to a specific topic will only listen to messages published to the same topic by other clients.

Subscribe to topic "test"

```
mosquitto_sub -t "test"
```

`mosquitto_sub` is a subscribe client we installed in the previous command. Here topic is specified using "`-t`" followed by a topic name.

Publish a message to topic "test"

Login to the terminal as a second instance and publish a message to the "`test`" topic.

```
mosquitto_pub -m "message from mosquitto_pub client" -t "test"
```

Here message is specified using "`-m`" is followed by the message to publish. After hitting "Enter" key the message from `mosquitto_pub` client is displayed in other terminal where `mosquitto_sub` client is running.

Step 3: Secure with a Password

Mosquitto comes with a password file generating utility called `mosquitto_passwd`.

```
sudo mosquitto_passwd -c /etc/mosquitto/passwd UserName
Password:
```

Create a configuration file for Mosquitto pointing to the password file we have just created.

```
sudo vim /etc/mosquitto/conf.d/default.conf
```

This will open an empty file. Paste the following into it. Save it & exit.

```
allow_anonymous false
password_file /etc/mosquitto/passwd
```

Now restart Mosquitto server and test our changes.

```
sudo systemctl restart mosquitto
```

Restart subscribe client with following command.

```
mosquitto_sub -t "test" -u "Username" -P "Password"
```

Restart publish client window, try to publish a message without a password.

```
mosquitto_pub -t "test" -m "message from mosquitto_pub client"
```

The message will be rejected with following error message.

```
Connection Refused: not authorised.
Error: The connection was refused.
```

Now publish a message with the username and password.

```
mosquitto_pub -t "test" -m "message from mosquitto_pub client" -u "Username"
-P "Password"
```

After hitting "Enter" key the message from mosquitto_pub client is displayed in other terminal where mosquitto_sub client is running

Pl refer the given below web link to know further

<https://www.vultr.com/docs/how-to-install-mosquitto-mqtt-broker-server-on-ubuntu-16-04>

Restarting mosquitto broker

To stop the mosquitto broker.

```
sudo systemctl stop mosquitto.service
or
sudo service mosquitto stop
```

Delete the mosquitto.db containing all the stored message data in the persistence. By default, located in /var/lib/mosquitto/mosquitto.db

```
sudo rm /var/lib/mosquitto/mosquitto.db
```

Restart the mosquitto broker

```
sudo systemctl start mosquitto.service
or
sudo service mosquitto start
```

Configure the mosquitto MQTT broker to use **SSL** security and portno. 1885:

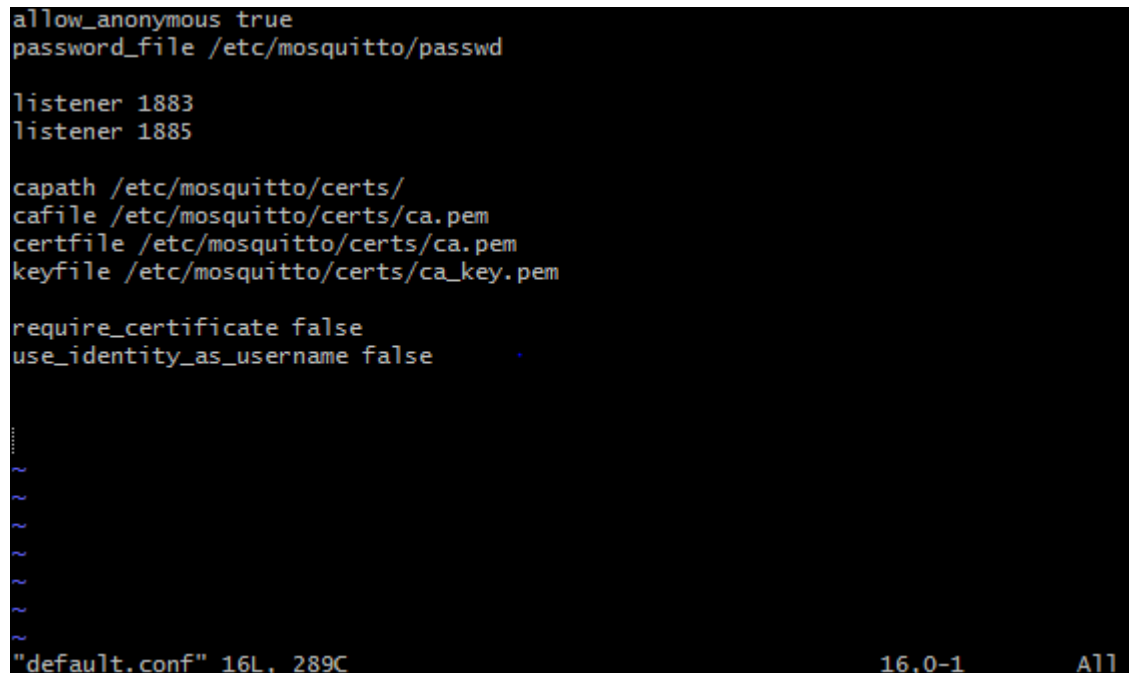
1) MQTT SSL with server certification check only :

Create server (CA or chain of certificates) certificates using openssl command given below:

```
openssl req -x509 -nodes -days 365 -newkey rsa:1024 -keyout ca_key.pem  
-out ca.pem
```

Add certificates (path) to default configuration file

```
cd /etc/mosquitto/conf.d~$ sudo vi default.conf
```



```
allow_anonymous true  
password_file /etc/mosquitto/passwd  
  
listener 1883  
listener 1885  
  
capath /etc/mosquitto/certs/  
cafile /etc/mosquitto/certs/ca.pem  
certfile /etc/mosquitto/certs/ca.pem  
keyfile /etc/mosquitto/certs/ca_key.pem  
  
require_certificate false  
use_identity_as_username false  
  
"default.conf" 16L, 289C 16,0-1 All
```

Copy server certificates to relevant folder (check `capath` in `default.conf`)

```
$ sudo c_rehash /etc/mosquitto/certs
```

Now restart Mosquitto server and test our changes.

```
sudo systemctl restart mosquitto
```

Restart subscribe client with following command.

```
mosquitto_sub -t "test" -h "localveggie.com" -p 1885 --cafile ./ca.pem
```

Restart publish client window, try to publish a message without a password.

```
mosquitto_pub -t "test" -m "message from mosquitto_pub client" -h  
"localveggie.com" -p 1885 --cafile ./ca.pem
```

To start the mosquitto server using the command below:

```
$ sudo systemctl start mosquitto
$ sudo tail -f /var/log/mosquitto/mosquitto.log
```

Here is an example of a successful start mosquitto server:

```
wdbsystems@localveggie-server:/$ sudo tail -f /var/log/mosquitto/mosquitto.log
1648039773: Config loaded from /etc/mosquitto/mosquitto.conf.
1648039773: Opening ipv4 listen socket on port 1883.
1648039773: Opening ipv6 listen socket on port 1883.
1648039773: Opening ipv4 listen socket on port 1885.
1648039773: Opening ipv6 listen socket on port 1885.
1648039774: New connection from 14.97.4.34 on port 1883.
1648039774: New client connected from 14.97.4.34 as 0a9e48f4-803c-4ed6-9be1-2571
6ce95f4a (c1, k60, u'pulsespectrum').
1648039780: New connection from 14.97.4.34 on port 1885.
1648039780: New client connected from 14.97.4.34 as 71ea64e5-0def-4fca-923c-162a
3c7d9295 (c1, k60).
1648039788: New connection from 14.97.4.34 on port 1885.
```

2) MQTT SSL with client certification check :

Create server (CA or chain of certificates) and client certificates using openssl command given below:

```
openssl req -x509 -nodes -days 365 -newkey rsa:1024 -keyout ca_key.pem
-out ca.pem
```

Add certificates (path) to default configuration file

```
cd /etc/mosquitto/conf.d~$ sudo vi default.conf
```

```
allow_anonymous true
password_file /etc/mosquitto/passwd

listener 1883
listener 1885

capath /etc/mosquitto/certs/
cafile /etc/mosquitto/certs/ca.pem
certfile /etc/mosquitto/certs/ca.pem
keyfile /etc/mosquitto/certs/ca_key.pem

require_certificate true
use_identity_as_username false
```

```
"default.conf" 16L, 288C
```

```
15,0-1
```

```
A11
```

Copy client certificates to relevant folder (check `capath` in `default.conf`)

```
$ sudo c_rehash /etc/mosquitto/certs
```

Now restart Mosquitto server and test our changes.

```
sudo systemctl restart mosquitto
```

Restart subscribe client with following command.

```
mosquitto_sub -t "test" -h "localveggy.com" -p 1885 --cafile ./ca.pem --cert generic_client_cert.pem --key generic_client_key.pem
```

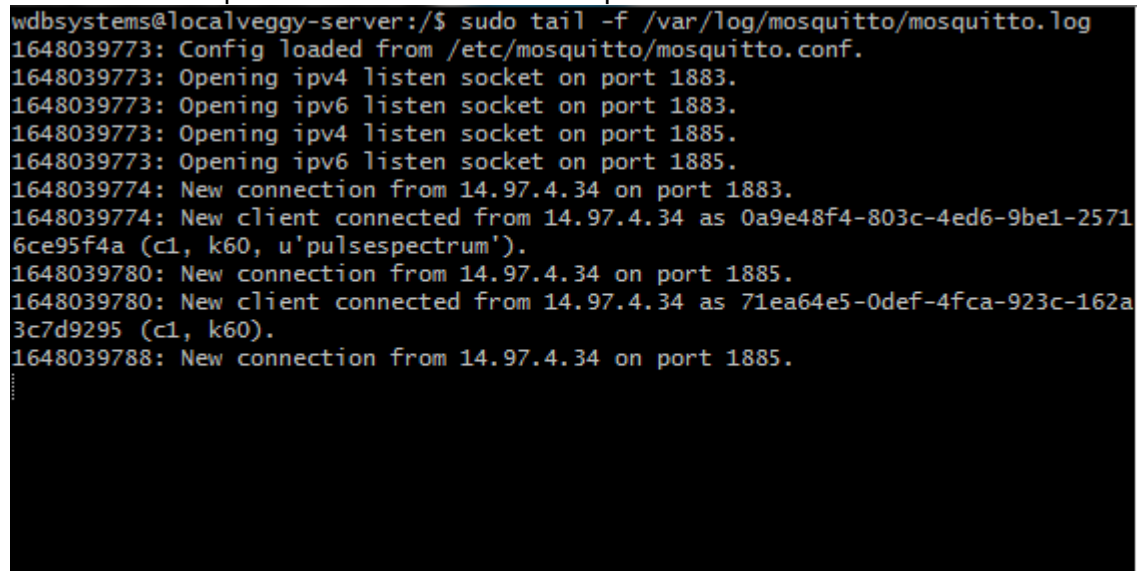
Restart publish client window, try to publish a message without a password.

```
mosquitto_pub -t "test" -m "message from client" -h "localveggy.com" -p 1885 --cafile ./ca.pem --cert generic_client_cert.pem --key generic_client_key.pem
```

To start the mosquitto server using the command below:

```
$ sudo systemctl start mosquitto  
$ sudo tail -f /var/log/mosquitto/mosquitto.log
```

Here is an example of a successful start mosquitto server:



```
wdbsystems@localveggy-server:/$ sudo tail -f /var/log/mosquitto/mosquitto.log  
1648039773: Config loaded from /etc/mosquitto/mosquitto.conf.  
1648039773: Opening ipv4 listen socket on port 1883.  
1648039773: Opening ipv6 listen socket on port 1883.  
1648039773: Opening ipv4 listen socket on port 1885.  
1648039773: Opening ipv6 listen socket on port 1885.  
1648039774: New connection from 14.97.4.34 on port 1883.  
1648039774: New client connected from 14.97.4.34 as 0a9e48f4-803c-4ed6-9be1-25716ce95f4a (c1, k60, u'pulsespectrum').  
1648039780: New connection from 14.97.4.34 on port 1885.  
1648039780: New client connected from 14.97.4.34 as 71ea64e5-0def-4fca-923c-162a3c7d9295 (c1, k60).  
1648039788: New connection from 14.97.4.34 on port 1885.
```

Pl refer the given below web link to know further:

<https://mosquitto.org/man/mosquitto-conf-5.html>

APPENDIX B

SI No	Test case Id	Parameters of variation	Remarks
1	TC_EC_FW_BUILD_1_1	<ul style="list-style-type: none"> Build test for EC firmware 	Refer 3.2.1
2	TC_MOBILE_APP_BUILD_1_1	<ul style="list-style-type: none"> Build for android 	Refer 3.2.2
3	TC_MOBILE_APP_BUILD_1_2	<ul style="list-style-type: none"> Build for IOS 	Refer 3.2.2
4	TC_PROVISION_SET_1_1	<ul style="list-style-type: none"> Set provision information 	Refer 3.3.1.1
5	TC_PROVISION_MODIFY_1_1	<ul style="list-style-type: none"> Modify provision information by changing Wifi credentials 	Refer 3.3.1.2
6	TC_PROVISION_MODIFY_1_2	<ul style="list-style-type: none"> Modify provision information by changing MQTT credentials 	Refer 3.3.1.2
7	TC_PROVISION_MODIFY_1_3	<ul style="list-style-type: none"> Modify provision information by changing device credentials 	Refer 3.3.1.2
8	TC_PROVISION_MODIFY_1_4	<ul style="list-style-type: none"> Modify provision information by changing Grow cycle credentials 	Refer 3.3.1.2
9	TC_PROVISION_MODIFY_1_5	<ul style="list-style-type: none"> Modify provision information by changing Sntp(email) credentials 	Refer 3.3.1.2
10	TC_PROVISION_GET_1_1	<ul style="list-style-type: none"> Get factory provision information 	Refer 3.3.1.3
11	TC_PROVISION_GET_1_2	<ul style="list-style-type: none"> Get user provision information 	Refer 3.3.1.3
12	TC_PROVISION_ERASE_1_1	<ul style="list-style-type: none"> User provision 	Refer 3.3.1.4
13	TC_PROFILE_SET_1_1	<ul style="list-style-type: none"> Set only one profile 	Refer 3.3.2.1
14	TC_PROFILE_SET_1_2	<ul style="list-style-type: none"> Set more than one profile 	Refer 3.3.2.1
15	TC_PROFILE_SET_1_3	<ul style="list-style-type: none"> Set all profiles 	Refer 3.3.2.1
16	TC_PROFILE_MODIFY_1_1	<ul style="list-style-type: none"> Modify the profile by changing one parameter of one device outlet 	Refer 3.3.2.2
17	TC_PROFILE_MODIFY_1_2	<ul style="list-style-type: none"> Modify the profile by changing all parameter of one device outlet 	Refer 3.3.2.2
18	TC_PROFILE_MODIFY_1_3	<ul style="list-style-type: none"> Modify the profile by changing one parameter of all device outlets 	Refer 3.3.2.2
19	TC_PROFILE_MODIFY_1_4	<ul style="list-style-type: none"> Modify the profile by changing multi parameters of all device outlets 	Refer 3.3.2.2
20	TC_PROFILE_MODIFY_1_5	<ul style="list-style-type: none"> Modify the profile by changing multi parameters of a few device outlets 	Refer 3.3.2.2
21	TC_PROFILE_MODIFY_2_1	<ul style="list-style-type: none"> Change only one parameter of one device outlet for 1st profile and change one parameter of all device outlets for 2nd profile 	Refer 3.3.2.3
22	TC_PROFILE_GET_1_1	<ul style="list-style-type: none"> Get Factory profile 	Refer 3.3.2.4
23	TC_PROFILE_GET_1_2	<ul style="list-style-type: none"> Get User Profile 	Refer 3.3.2.4

24	TC_PROFILE_GET_1_3	<ul style="list-style-type: none"> Get User profile (more than one) 	Refer 3.3.2.4
25	TC_PROFILE_ERASE_1_1	<ul style="list-style-type: none"> Erase one user profile 	Refer 3.3.2.5
26	TC_PROFILE_ERASE_1_2	<ul style="list-style-type: none"> Erase more than one user profile 	Refer 3.3.2.5
27	TC_GROW_CYCLE_START_1_1	<ul style="list-style-type: none"> Start with Factory profile 	Refer 3.3.3.1
28	TC_GROW_CYCLE_START_1_2	<ul style="list-style-type: none"> Start with User profile 	Refer 3.3.3.1
29	TC_GROW_CYCLE_START_2_1	<ul style="list-style-type: none"> Start with Factory profile past date as a day 	Refer 3.3.3.2
30	TC_GROW_CYCLE_START_2_2	<ul style="list-style-type: none"> Start with User profile past date as a day 	Refer 3.3.3.2
31	TC_GROW_CYCLE_START_2_3	<ul style="list-style-type: none"> Start with User profile past date as a week 	Refer 3.3.3.2
32	TC_GROW_CYCLE_START_2_4	<ul style="list-style-type: none"> Start with User profile past date as a month 	Refer 3.3.3.2
33	TC_GROW_CYCLE_START_2_5	<ul style="list-style-type: none"> Start with User profile past date as two months 	Refer 3.3.3.2
34	TC_GROW_CYCLE_START_2_6	<ul style="list-style-type: none"> Start with User profile current date and future time 	Refer 3.3.3.2
35	TC_GROW_CYCLE_START_2_7	<ul style="list-style-type: none"> Start with Factory profile current date, past time 	Refer 3.3.3.2
36	TC_GROW_CYCLE_START_2_8	<ul style="list-style-type: none"> Start with Factory profile current date without time 	Refer 3.3.3.2
37	TC_GROW_CYCLE_START_2_9	<ul style="list-style-type: none"> Start with User profile future date, future time 	Refer 3.3.3.2
38	TC_GROW_CYCLE_START_3_1	<ul style="list-style-type: none"> Start with Factory profile wait one hour and apply User profile 	Refer 3.3.3.3
39	TC_GROW_CYCLE_START_3_2	<ul style="list-style-type: none"> Start with User profile wait one hour and apply factory profile 	Refer 3.3.3.3
40	TC_GROW_CYCLE_START_3_2	<ul style="list-style-type: none"> Start with User profile1 wait one hour and apply user profile2 	Refer 3.3.3.3
41	TC_GROW_CYCLE_START_4_1	<ul style="list-style-type: none"> Start with Factory profile and apply User profile with current date, with current time 	Refer 3.3.3.4
42	TC_GROW_CYCLE_START_4_2	<ul style="list-style-type: none"> Start with Factory profile and apply User profile with current date, with current time 	Refer 3.3.3.4
43	TC_GROW_CYCLE_START_4_3	<ul style="list-style-type: none"> Start with User profile1 and apply User profile2 with future date and time 	Refer 3.3.3.4
44	TC_GROW_CYCLE_START_5_1	<ul style="list-style-type: none"> Start with Factory profile and get current working profile 	Refer 3.3.3.5
45	TC_GROW_CYCLE_START_5_2	<ul style="list-style-type: none"> Start with User profile and get current working profile 	Refer 3.3.3.5
46	TC_GROW_CYCLE_STOP_1_1	<ul style="list-style-type: none"> Start with Factory profile wait for an hour and then stop 	Refer 3.3.3.6
47	TC_GROW_CYCLE_STOP_1_2	<ul style="list-style-type: none"> Start with User profile wait for a day and then stop 	Refer 3.3.3.6
48	TC_GROW_CYCLE_STOP_2_1	<ul style="list-style-type: none"> Stop grow cycle after expiration of grow 	Refer 3.3.3.7

		days	
49	TC_GROW_CYCLE_STATUS_1_1	<ul style="list-style-type: none"> Start with Factory profile and check the status information as per given interval 	Refer 3.3.3.8
50	TC_GROW_CYCLE_STATUS_1_2	<ul style="list-style-type: none"> Start with User profile and check the status information as per given interval 	Refer 3.3.3.8
51	TC_GROW_CYCLE_STATUS_2_1	<ul style="list-style-type: none"> Start with Factory profile and check the status information stored on SD card 	Refer 3.3.3.9
52	TC_GROW_CYCLE_STATUS_2_2	<ul style="list-style-type: none"> Start with User profile and check the status information stored on SD card 	Refer 3.3.3.9
53	TC_DEVICE_LIGHT_1_1	<ul style="list-style-type: none"> Check light device outlet status for always On mode 	Refer 3.3.4.1
54	TC_DEVICE_LIGHT_1_2	<ul style="list-style-type: none"> Check light device outlet status for always Off mode 	Refer 3.3.4.1
55	TC_DEVICE_LIGHT_1_3	<ul style="list-style-type: none"> Check light device outlet status by normal Light on time/off time are evenly distributed (12hrs On, 12hrs Off) 	Refer 3.3.4.1
56	TC_DEVICE_LIGHT_1_4	<ul style="list-style-type: none"> Check light device outlet status by normal Light on time minimal (i.e., 1second) remaining light off time 	Refer 3.3.4.1
57	TC_DEVICE_LIGHT_1_5	<ul style="list-style-type: none"> Check light device outlet status by normal Light on time maximum (23:59:59), remaining light off time 	Refer 3.3.4.1
58	TC_DEVICE_HOOD_VENT_1_1	<ul style="list-style-type: none"> Check hood vent device outlet status for native mode with default delay value of 5 minutes 	Refer 3.3.4.3
59	TC_DEVICE_HOOD_VENT_1_2	<ul style="list-style-type: none"> Check hood vent device outlet status for native mode with maximum delay value of 1 hour 	Refer 3.3.4.3
60	TC_DEVICE_HOOD_VENT_1_3	<ul style="list-style-type: none"> Set device in follow mode 	Refer 3.3.4.3
61	TC_DEVICE_HOOD_VENT_1_4	<ul style="list-style-type: none"> Set device in flip mode 	Refer 3.3.4.3
62	TC_DEVICE_HOOD_VENT_1_5	<ul style="list-style-type: none"> Set device in RPT timer mode with <ul style="list-style-type: none"> LC parameter on (LC Default "Start Delay": 00:05:00, LC Default "Cycle Time" :00:05:00, LC Default "Repeat After ":03:00:00) DC parameter on (DC Default "Start Delay": 00:05:00, DC Default "Cycle Time" :00:05:00, Dc Default "Repeat After ":03:00:00) 	Refer 3.3.4.3
63	TC_DEVICE_HOOD_VENT_1_6	<ul style="list-style-type: none"> Set device in RPT timer mode with <ul style="list-style-type: none"> LC parameter on (LC Min "Start Delay": 00:00:00, LC "Cycle Time": Light Cycle Duration- Start Delay, LC "Repeat After ": 	Refer 3.3.4.3

		<p>Light Cycle Duration-(Cycle Time +Start Delay))</p> <ul style="list-style-type: none"> - DC parameter on (DC Min “Start Delay”: 00:00:00, DC “Cycle Time”: Dark Cycle Duration- Start Delay, DC “Repeat After “: Dark Cycle Duration- (Cycle Time +Start Delay)) 	
64	TC_DEVICE_HOOD_VENT_1_7	<ul style="list-style-type: none"> • Set device in RPT timer mode with - LC parameter on (LC Max “Start Delay”: Light Cycle Duration- 00:00:01, LC “Cycle Time”: Light Cycle Duration- Start Delay, LC “Repeat After “: Light Cycle Duration- (Cycle Time +Start Delay)) - DC parameter on (DC Max “Start Delay”: Dark Cycle Duration- 00:00:01, DC “Cycle Time”: Dark Cycle Duration- Start Delay, DC “Repeat After “: Dark Cycle Duration- (Cycle Time +Start Delay)) 	Refer 3.3.4.3
65	TC_DEVICE_HOOD_VENT_1_8	<ul style="list-style-type: none"> • Set device in RPT timer mode with - LC parameter on (LC Default “Start Delay”: 01:00:00, LC Default “Cycle Time” :02:00:00, Lc Default “Repeat After “:03:00:00) - DC parameter off 	Refer 3.3.4.3
66	TC_DEVICE_HOOD_VENT_1_9	<ul style="list-style-type: none"> • Set device in RPT timer mode with - LC parameter off - DC parameter on (DC Default “Start Delay”: 01:00:00, DC Default “Cycle Time” :02:00:00, Dc Default “Repeat After “:03:00:00) 	Refer 3.3.4.3
67	TC_DEVICE_HOOD_VENT_1_10	<ul style="list-style-type: none"> • Set device in RPT timer mode with - LC parameter on (LC Default “Start Delay”: 01:00:00, LC Default “Cycle Time” :02:00:00, Lc Default “Repeat After “:03:00:00) - DC parameter on (DC Default “Start Delay”: 01:00:00, DC Default “Cycle Time” :02:00:00, Dc Default “Repeat After “:03:00:00) 	Refer 3.3.4.3
68	TC_DEVICE_HOOD_VENT_1_11	<ul style="list-style-type: none"> • Set device in Heater Mode with - LC parameter on (LC Default “Temp On Val”: 65°F (18°C), LC Default “Temp Off Val”: 70°F (-21°C)) - DC parameter on (DC Default “Temp On Val”: 65°F (18°C), DC Default “Temp Off 	Refer 3.3.4.3

		Val": 70°F (-21°C))	
69	TC_DEVICE_HOOD_VENT_1_12	<ul style="list-style-type: none"> Set device in Heater Mode with LC parameter on (LC Min "Temp On Val": 0°F (-17.5°C), LC Min "Temp Off Val": 2°F (-16.6°C)) DC parameter on (DC Min "Temp On Val": 2°F (-17.5°C), DC Min "Temp Off Val": 2°F (-16.6°C)) 	Refer 3.3.4.3
70	TC_DEVICE_HOOD_VENT_1_13	<ul style="list-style-type: none"> Set device in Heater Mode with LC parameter on (LC Max "Temp On Val": 118°F (47.7°C), LC Max "Temp Off Val": 122°F (50°C)) DC parameter on (DC Min "Temp On Val": 118°F (47.7°C), DC Min "Temp Off Val": 122°F (-50°C)) 	Refer 3.3.4.3
71	TC_DEVICE_HOOD_VENT_1_14	<ul style="list-style-type: none"> Set device in Heater Mode with LC parameter on (LC Default "Temp On Val": 65°F (18°C), LC Default "Temp Off Val": 70°F (21°C)) DC parameter off 	Refer 3.3.4.3
72	TC_DEVICE_HOOD_VENT_1_15	<ul style="list-style-type: none"> Set device in Heater Mode with LC parameter off DC parameter on (DC Default "Temp On Val": 65°F (18°C), DC Default "Temp Off Val": 70°F (21°C)) 	Refer 3.3.4.3
73	TC_DEVICE_HOOD_VENT_1_16	<ul style="list-style-type: none"> Set device in Cooler Mode with LC parameter on (LC Default "Temp On Val": 70°F (21°C), LC Default "Temp Off Val": 65°F (-18°C)) DC parameter on (DC Default "Temp On Val": 70°F (21°C), DC Default "Temp Off Val": 65°F (18°C)) 	Refer 3.3.4.3
74	TC_DEVICE_HOOD_VENT_1_17	<ul style="list-style-type: none"> Set device in Cooler Mode with LC parameter on (LC Min "Temp On Val": 0°F (-17.7°C), LC Min "Temp Off Val": -2°F (-18.8°C)) DC parameter on (DC Min "Temp On Val": 0°F (-17.7°C), DC Min "Temp Off Val": -2°F (-18.8°C)) 	Refer 3.3.4.3
75	TC_DEVICE_HOOD_VENT_1_18	<ul style="list-style-type: none"> Set device in Cooler Mode with LC parameter on (LC Max "Temp On Val": 122°F (50°C), LC Max "Temp Off Val": 120°F (48.8°C)) DC parameter on (DC Max "Temp On 	Refer 3.3.4.3

		Val":122°F (50°C),DC Max "Temp Off Val": 120°F (48.8°C))	
76	TC_DEVICE_HOOD_VENT_1_19	<ul style="list-style-type: none"> • Set device in Cooler Mode with - LC parameter on (LC Default "Temp On Val": 70°F (21°C),LC Default "Temp Off Val": 65°F (18°C)) - DC parameter off 	Refer 3.3.4.3
77	TC_DEVICE_HOOD_VENT_1_20	<ul style="list-style-type: none"> • Set device in Cooler mode with - LC parameter off - DC parameter on (DC Default "Temp On Val": 70°F (21°C),DC Default "Temp Off Val": 65°F (18°C)) 	Refer 3.3.4.3
78	TC_DEVICE_HOOD_VENT_1_21	<ul style="list-style-type: none"> • Set device in Humidifier Mode with - LC parameter on (LC Default "Humidity On Val": 50%,LC Default "Humidity Off Val": 60%) - DC parameter on (DC Default "Humidity On Val": 50%,DC Default "Humidity Off Val": 60%) 	Refer 3.3.4.3
79	TC_DEVICE_HOOD_VENT_1_22	<ul style="list-style-type: none"> • Set device in Humidifier Mode with - LC parameter on (LC Min "Humidity On Val": 20%,LC Min "Humidity Off Val": 25%) - DC parameter on (DC Min "Humidity On Val": 20%,DC Min "Humidity Off Val": 25%) 	Refer 3.3.4.3
80	TC_DEVICE_HOOD_VENT_1_23	<ul style="list-style-type: none"> • Set device in Humidifier Mode with - LC parameter on (LC Max "Humidity On Val":90%,Lc Max "Humidity Off Val": 95%) - DC parameter on (DC Max "Humidity On Val": 90% ,DC Max "Humidity Off Val": 95%) 	Refer 3.3.4.3
81	TC_DEVICE_HOOD_VENT_1_24	<ul style="list-style-type: none"> • Set device in Humidifier Mode with - LC parameter on (LC Default "Humidity On Val": 50%,LC Default "Humidity Off Val": 60%) - DC parameter off 	Refer 3.3.4.3
82	TC_DEVICE_HOOD_VENT_1_25	<ul style="list-style-type: none"> • Set device in Humidifier Mode with - LC parameter off - DC parameter on (DC Default "Humidity On Val": 50%, DC Default "Humidity Off Val": 60%) 	Refer 3.3.4.3
83	TC_DEVICE_HOOD_VENT_1_26	<ul style="list-style-type: none"> • Set device in Dehumidifier Mode with - LC parameter on (LC Default "Humidity On Val": 60%, LC Default "Humidity Off Val": 	Refer 3.3.4.3

		50%) - DC parameter on (DC Default “Humidity On Val”: 60%,DC Default “Humidity Off Val”: 50%)	
84	TC_DEVICE_HOOD_VENT_1_27	<ul style="list-style-type: none"> Set device in Dehumidifier Mode with LC parameter on (LC Min “Humidity On Val”: 25%, LC Min “Humidity Off Val”: 20%) DC parameter on (DC Min “Humidity On Val”: 25%, DC Min “Humidity Off Val”: 20%) 	Refer 3.3.4.3
85	TC_DEVICE_HOOD_VENT_1_28	<ul style="list-style-type: none"> Set device in Dehumidifier Mode with LC parameter on (LC Max “Humidity On Val”:95%LC Max “Humidity Off Val”: 90%) DC parameter on (DC Max “Humidity On Val”: 95% DC Max “Humidity Off Val”: 90%) 	Refer 3.3.4.3
86	TC_DEVICE_HOOD_VENT_1_29	<ul style="list-style-type: none"> Set device in Dehumidifier Mode with LC parameter on (LC Default “Humidity On Val”: 60%,LC Default “Humidity Off Val”: 50%) DC parameter off 	Refer 3.3.4.3
87	TC_DEVICE_HOOD_VENT_1_30	<ul style="list-style-type: none"> Set device in Dehumidifier Mode with LC parameter off DC parameter on (DC Default “Humidity On Val”: 60%,DC Default “Humidity Off Val”: 50%) 	Refer 3.3.4.3
88	TC_DEVICE_HOOD_VENT_1_31	<ul style="list-style-type: none"> Set device in Leak Mode 	Refer 3.3.4.3
89	TC_DEVICE_HOOD_VENT_1_32	<ul style="list-style-type: none"> Set device in CO2 mode (Generator mode, Default On Threshold 1400 PPM, Default Off Threshold 1600 PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.3
90	TC_DEVICE_HOOD_VENT_1_33	<ul style="list-style-type: none"> Set device in CO2 mode (Generator mode, Min On Threshold 500 PPM, Min Off Threshold 700 PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.3
91	TC_DEVICE_HOOD_VENT_1_34	<ul style="list-style-type: none"> Set device in CO2 mode (Generator mode ,Max On Threshold 1800 PPM, Max Off Threshold 2000 PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.3
92	TC_DEVICE_HOOD_VENT_1_35	<ul style="list-style-type: none"> Set device in CO2 mode (Generator mode ,Default On Threshold 1400 PPM, Default Off Threshold 1600 PPM, Make sure Dark cycle running) 	Refer 3.3.4.3

93	TC_DEVICE_HOOD_VENT_1_36	<ul style="list-style-type: none"> Set device in CO2 mode (Generator mode, Default On Threshold 1400 PPM, Default Off Threshold 1600 PPM, Make sure Light cycle running & Vent Device on) 	Refer 3.3.4.3
94	TC_DEVICE_HOOD_VENT_1_37	<ul style="list-style-type: none"> Set device in CO2 mode (Generator mode, Default On Threshold 1400 PPM, Default Off Threshold 1600 PPM, Make sure Light cycle running & Vent Device in transition from On to Off) 	Refer 3.3.4.3
95	TC_DEVICE_HOOD_VENT_1_38	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode, Default On Threshold 1500 PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.3
96	TC_DEVICE_HOOD_VENT_1_39	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode, Set Threshold 500 PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.3
97	TC_DEVICE_HOOD_VENT_1_40	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode, Set Threshold 2000PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.3
98	TC_DEVICE_HOOD_VENT_1_41	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode, Set Threshold 1500 PPM, Make sure Dark cycle running) 	Refer 3.3.4.3
99	TC_DEVICE_HOOD_VENT_1_42	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode ,Set Threshold 1500 PPM, Make sure Light cycle running , Vent device ON) 	Refer 3.3.4.3
100	TC_DEVICE_HOOD_VENT_1_43	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode, Set Threshold 1500 PPM, Make sure Light cycle running & Vent Device in transition from On to Off) 	Refer 3.3.4.3
101	TC_DEVICE_HOOD_VENT_2_1	<ul style="list-style-type: none"> Check device hood vent outlet is on during hot re-strike fault mode 	Refer 3.3.4.4
102	TC_DEVICE_CIRC_1_1	<ul style="list-style-type: none"> Set device in native mode with <ul style="list-style-type: none"> LC parameter on (Default Start Delay) DC parameter on Default Start Delay) 	Refer 3.3.4.5
103	TC_DEVICE_CIRC_1_2	<ul style="list-style-type: none"> Set device in native mode with <ul style="list-style-type: none"> LC parameter on (Minimum Start Delay: 00:00:00) DC parameter on (Minimum Start Delay:00:00:00) 	Refer 3.3.4.5
104	TC_DEVICE_CIRC_1_3	<ul style="list-style-type: none"> Set device in native mode with <ul style="list-style-type: none"> LC parameter on (Maximum Start Delay: 	Refer 3.3.4.5

		LC duration – 00:00:01) - DC parameter on (Maximum Start Delay: DC duration – 00:00:01)	
105	TC_DEVICE_CIRC_1_4	<ul style="list-style-type: none"> • Set device in native mode with - LC parameter on (Default Start Delay) - DC parameter off 	Refer 3.3.4.5
106	TC_DEVICE_CIRC_1_5	<ul style="list-style-type: none"> • Set device in native mode with - LC parameter off - DC parameter on (Default Start Delay) 	Refer 3.3.4.5
107	TC_DEVICE_CIRC_1_6	<ul style="list-style-type: none"> • Set device in follow mode 	Refer 3.3.4.5
108	TC_DEVICE_CIRC_1_7	<ul style="list-style-type: none"> • Set device in Flip mode 	Refer 3.3.4.5
109	TC_DEVICE_CIRC_1_8	<ul style="list-style-type: none"> • Set device in RPT timer mode with - LC parameter on (LC Default “Start Delay” : 00:05:00,LC Default “Cycle Time” :00:05:00 ,LC Default “Repeat After “:03:00:00) - DC parameter on (DC Default “Start Delay” : 00:05:00,DC Default “Cycle Time” :00:05:00 ,DC Default “Repeat After “:03:00:00) 	Refer 3.3.4.5
110	TC_DEVICE_CIRC_1_9	<ul style="list-style-type: none"> • Set device in RPT timer mode with - LC parameter on (LC Min “Start Delay” : 00:00:00,LC “Cycle Time” : Light Cycle Duration- Start Delay, LC “Repeat After “:Light Cycle Duration-(Cycle Time +Start Delay)) - DC parameter on (DC Min “Start Delay” : 00:00:00,DC “Cycle Time” : Dark Cycle Duration- Start Delay, DC “Repeat After “:Dark Cycle Duration-(Cycle Time +Start Delay)) 	Refer 3.3.4.5
111	TC_DEVICE_CIRC_1_10	<ul style="list-style-type: none"> • Set device in RPT timer mode with - LC parameter on (LC Max “Start Delay” : Light Cycle Duration- 00:00:01,LC “Cycle Time” : Light Cycle Duration- Start Delay, LC “Repeat After “:Light Cycle Duration-(Cycle Time +Start Delay)) - DC parameter on (DC Max “Start Delay” : Dark Cycle Duration- 00:00:01,DC “Cycle Time” : Dark Cycle Duration- Start Delay, DC “Repeat After “:Dark Cycle Duration-(Cycle Time +Start Delay)) 	Refer 3.3.4.5

112	TC_DEVICE_CIRC_1_11	<ul style="list-style-type: none"> • Set device in RPT timer mode with - LC parameter on (LC Default “Start Delay” : 01:00:00,LC Default “Cycle Time” :02:00:00 ,LC Default “Repeat After “:03:00:00) - DC parameter off 	Refer 3.3.4.5
113	TC_DEVICE_CIRC_1_12	<ul style="list-style-type: none"> • Set device in RPT timer mode with - LC parameter off - DC parameter on (DC Default “Start Delay” : 01:00:00,DC Default “Cycle Time” :02:00:00,DC Default “Repeat After “:03:00:00) 	Refer 3.3.4.5
114	TC_DEVICE_CIRC_1_13	<ul style="list-style-type: none"> • Set device in RPT timer mode with - LC parameter on (LC Default “Start Delay” : 01:00:00,LC Default “Cycle Time” :02:00:00 ,LC Default “Repeat After “:03:00:00) - DC parameter on (DC Default “Start Delay” : 01:00:00,DC Default “Cycle Time” :02:00:00 ,DC Default “Repeat After “:03:00:00) 	Refer 3.3.4.5
115	TC_DEVICE_CIRC_1_14	<ul style="list-style-type: none"> • Set device in Heater Mode with - LC parameter on (LC Default “Temp On Val”: 65°F (18°C),LC Default “Temp Off Val”: 70°F (-21°C)) - DC parameter on (DC Default “Temp On Val”: 65°F (18°C),DC Default “Temp Off Val”: 70°F (-21°C)) 	Refer 3.3.4.5
116	TC_DEVICE_CIRC_1_15	<ul style="list-style-type: none"> • Set device in Heater Mode with - LC parameter on (LC Min “Temp On Val”: 0°F (-17.5°C),LC Min “Temp Off Val”: 2°F (-16.6°C)) - DC parameter on (DC Min “Temp On Val”: 2°F (-17.5°C),DC Min “Temp Off Val”: 2°F (-16.6°C)) 	Refer 3.3.4.5
117	TC_DEVICE_CIRC_1_16	<ul style="list-style-type: none"> • Set device in Heater Mode with - LC parameter on (LC Max “Temp On Val”: 118°F (47.7°C),LC Max “Temp Off Val”: 122°F (50°C)) - DC parameter on (DC Min “Temp On Val”: 118°F (47.7°C),DC Min “Temp Off Val”: 122°F (-50°C)) 	Refer 3.3.4.5
118	TC_DEVICE_CIRC_1_17	<ul style="list-style-type: none"> • Set device in Heater Mode with - LC parameter on (LC Default “Temp On 	Refer 3.3.4.5

		Val": 65°F (18°C),LC Default "Temp Off Val": 70°F (21°C)) - DC parameter off	
119	TC_DEVICE_CIRC_1_18	<ul style="list-style-type: none"> Set device in Heater Mode with - LC parameter off - DC parameter on (DC Default "Temp On Val": 65°F (18°C),DC Default "Temp Off Val": 70°F (21°C))	Refer 3.3.4.5
120	TC_DEVICE_CIRC_1_19	<ul style="list-style-type: none"> Set device in Cooler Mode with - LC parameter on (LC Default "Temp On Val": 70°F (21°C),LC Default "Temp Off Val": 65°F (-18°C)) - DC parameter on (DC Default "Temp On Val": 70°F (21°C),DC Default "Temp Off Val": 65°F (18°C))	Refer 3.3.4.5
121	TC_DEVICE_CIRC_1_20	<ul style="list-style-type: none"> Set device in Cooler Mode with - LC parameter on (LC Min "Temp On Val": 0°F (-17.7°C),LC Min "Temp Off Val": - 2°F (-18.8°C)) - DC parameter on (DC Min "Temp On Val": 0°F (-17.7°C),DC Min "Temp Off Val": -2°F (-18.8°C))	Refer 3.3.4.5
122	TC_DEVICE_CIRC_1_21	<ul style="list-style-type: none"> Set device in Cooler Mode with - LC parameter on (LC Max "Temp On Val": 122°F (50°C),LC Max "Temp Off Val": 120°F (48.8°C)) - DC parameter on (DC Max "Temp On Val":122°F (50°C),DC Max "Temp Off Val": 120°F (48.8°C))	Refer 3.3.4.5
123	TC_DEVICE_CIRC_1_22	<ul style="list-style-type: none"> Set device in Cooler Mode with - LC parameter on (LC Default "Temp On Val": 70°F (21°C),LC Default "Temp Off Val": 65°F (18°C)) - DC parameter off	Refer 3.3.4.5
124	TC_DEVICE_CIRC_1_23	<ul style="list-style-type: none"> Set device in Cooler mode with - LC parameter off - DC parameter on (DC Default "Temp On Val": 70°F (21°C),DC Default "Temp Off Val": 65°F (18°C))	Refer 3.3.4.5
125	TC_DEVICE_CIRC_1_24	<ul style="list-style-type: none"> Set device in Humidifier Mode with - LC parameter on (LC Default "Humidity On Val": 50%,LC Default "Humidity Off Val": 60%) - DC parameter on (DC Default "Humidity	Refer 3.3.4.5

		On Val": 50%,DC Default "Humidity Off Val": 60%)	
126	TC_DEVICE_CIRC_1_25	<ul style="list-style-type: none"> • Set device in Humidifier Mode with - LC parameter on (LC Min "Humidity On Val": 20%,LC Min "Humidity Off Val": 25%) - DC parameter on (DC Min "Humidity On Val": 20%,DC Min "Humidity Off Val": 25%) 	Refer 3.3.4.5
127	TC_DEVICE_CIRC_1_26	<ul style="list-style-type: none"> • Set device in Humidifier Mode with - LC parameter on (LC Max "Humidity On Val":90%,LC Max "Humidity Off Val": 95%) - DC parameter on (DC Max "Humidity On Val": 90% ,DC Max "Humidity Off Val": 95%) 	Refer 3.3.4.5
128	TC_DEVICE_CIRC_1_27	<ul style="list-style-type: none"> • Set device in Humidifier Mode with - LC parameter on (LC Default "Humidity On Val": 50%,LC Default "Humidity Off Val": 60%) - DC parameter off 	Refer 3.3.4.5
129	TC_DEVICE_CIRC_1_28	<ul style="list-style-type: none"> • Set device in Humidifier Mode with - LC parameter off - DC parameter on (DC Default "Humidity On Val": 50%,DC Default "Humidity Off Val": 60%) 	Refer 3.3.4.5
130	TC_DEVICE_CIRC_1_29	<ul style="list-style-type: none"> • Set device in Dehumidifier Mode with - LC parameter on (LC Default "Humidity On Val": 60%,LC Default "Humidity Off Val": 50%) - DC parameter on (DC Default "Humidity On Val": 60%,DC Default "Humidity Off Val": 50%) 	Refer 3.3.4.5
131	TC_DEVICE_CIRC_1_30	<ul style="list-style-type: none"> • Set device in Dehumidifier Mode with - LC parameter on (LC Min "Humidity On Val": 25%,LC Min "Humidity Off Val": 20%) - DC parameter on (DC Min "Humidity On Val": 25%,DC Min "Humidity Off Val": 20%) 	Refer 3.3.4.5
132	TC_DEVICE_CIRC_1_31	<ul style="list-style-type: none"> • Set device in Dehumidifier Mode with - LC parameter on (LC Max "Humidity On Val":95%,LC Max "Humidity Off Val": 90%) - DC parameter on (DC Max "Humidity On Val": 95% ,DC Max "Humidity Off Val": 	Refer 3.3.4.5

		90%)	
133	TC_DEVICE_CIRC_1_32	<ul style="list-style-type: none"> Set device in Dehumidifier Mode with - LC parameter on (LC Default “Humidity On Val”: 60%,LC Default “Humidity Off Val”: 50%) - DC parameter off 	Refer 3.3.4.5
134	TC_DEVICE_CIRC_1_33	<ul style="list-style-type: none"> Set device in Dehumidifier Mode with - LC parameter off - DC parameter on (DC Default “Humidity On Val”: 60%,DC Default “Humidity Off Val”: 50%) 	Refer 3.3.4.5
135	TC_DEVICE_CIRC_1_34	<ul style="list-style-type: none"> Set device in Leak Mode 	Refer 3.3.4.5
136	TC_DEVICE_CIRC_1_35	<ul style="list-style-type: none"> Set device in CO2 mode (Generator mode ,Default On Threshold 1400 PPM, Default Off Threshold 1600 PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.5
137	TC_DEVICE_CIRC_1_36	<ul style="list-style-type: none"> Set device in CO2 mode (Generator mode ,Min On Threshold 500 PPM, Min Off Threshold 700 PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.5
138	TC_DEVICE_CIRC_1_37	<ul style="list-style-type: none"> Set device in CO2 mode (Generator mode ,Max On Threshold 1800 PPM, Max Off Threshold 2000 PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.5
139	TC_DEVICE_CIRC_1_38	<ul style="list-style-type: none"> Set device in CO2 mode (Generator mode ,Default On Threshold 1400 PPM ,Default Off Threshold 1600 PPM, Make sure Dark cycle running) 	Refer 3.3.4.5
140	TC_DEVICE_CIRC_1_39	<ul style="list-style-type: none"> Set device in CO2 mode (Generator mode, Default On Threshold 1400 PPM, Default Off Threshold 1600 PPM, Make sure Light cycle running & Vent Device on) 	Refer 3.3.4.5
141	TC_DEVICE_CIRC_1_40	<ul style="list-style-type: none"> Set device in CO2 mode (Generator mode, Default On Threshold 1400 PPM, Default Off Threshold 1600 PPM, Make sure Light cycle running & Vent Device in transition from On to Off) 	Refer 3.3.4.5
142	TC_DEVICE_CIRC_1_41	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode, Default On Threshold 1500 PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.5
143	TC_DEVICE_CIRC_1_42	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode, Set Threshold 500 PPM, Make sure Light 	Refer 3.3.4.5

		cycle running & Vent Device off)	
144	TC_DEVICE_CIRC_1_43	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode, Set Threshold 2000PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.5
145	TC_DEVICE_CIRC_1_44	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode, Set Threshold 1500 PPM, Make sure Dark cycle running) 	Refer 3.3.4.5
146	TC_DEVICE_CIRC_1_45	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode ,Set Threshold 1500 PPM, Make sure Light cycle running , Vent device ON) 	Refer 3.3.4.5
147	TC_DEVICE_CIRC_1_46	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode, Set Threshold 1500 PPM, Make sure Light cycle running & Vent Device in transition from On to Off) 	Refer 3.3.4.5
148	TC_FXP1_1_1	<ul style="list-style-type: none"> Set device in follow mode 	Refer 3.3.4.6
149	TC_FXP1_1_2	<ul style="list-style-type: none"> Set device in flip mode 	Refer 3.3.4.6
150	TC_FXP1_1_3	<ul style="list-style-type: none"> Set device in RPT timer mode with <ul style="list-style-type: none"> LC parameter on (LC Default “Start Delay” : 00:05:00, LC Default “Cycle Time” : 00:05:00 ,LC Default “Repeat After “:03:00:00) DC parameter on (DC Default “Start Delay” : 00:05:00, DC Default “Cycle Time” : 00:05:00 ,DC Default “Repeat After “:03:00:00) 	Refer 3.3.4.6
151	TC_FXP1_1_4	<ul style="list-style-type: none"> Set device in RPT timer mode with <ul style="list-style-type: none"> LC parameter on (LC Min “Start Delay” : 00:00:00, LC “Cycle Time” : Light Cycle Duration- Start Delay, LC “Repeat After “:Light Cycle Duration-(Cycle Time +Start Delay)) DC parameter on (DC Min “Start Delay” : 00:00:00, DC “Cycle Time” : Dark Cycle Duration- Start Delay, DC “Repeat After “:Dark Cycle Duration-(Cycle Time +Start Delay)) 	Refer 3.3.4.6
152	TC_FXP1_1_5	<ul style="list-style-type: none"> Set device in RPT timer mode with <ul style="list-style-type: none"> LC parameter on (LC Max “Start Delay” : Light Cycle Duration- 00:00:01, LC “Cycle Time” : Light Cycle Duration- Start Delay, LC “Repeat After “:Light Cycle Duration- 	Refer 3.3.4.6

		<p>(Cycle Time +Start Delay))</p> <ul style="list-style-type: none"> - DC parameter on (DC Max "Start Delay" : Dark Cycle Duration- 00:00:01,DC "Cycle Time" : Dark Cycle Duration- Start Delay, DC "Repeat After " :Dark Cycle Duration- (Cycle Time +Start Delay)) 	
153	TC_ FXP1_1_6	<ul style="list-style-type: none"> • Set device in RPT timer mode with - LC parameter on (LC Default "Start Delay" : 01:00:00,LC Default "Cycle Time" :02:00:00 ,LC Default "Repeat After " :03:00:00) - DC parameter off 	Refer 3.3.4.6
154	TC_ FXP1_1_7	<ul style="list-style-type: none"> • Set device in RPT timer mode with - LC parameter off - DC parameter on (DC Default "Start Delay" : 01:00:00,DC Default "Cycle Time" :02:00:00,DC Default "Repeat After " :03:00:00) 	Refer 3.3.4.6
155	TC_ FXP1_1_8	<ul style="list-style-type: none"> • Set device in RPT timer mode with - LC parameter on (LC Default "Start Delay" : 01:00:00,LC Default "Cycle Time" :02:00:00 ,LC Default "Repeat After " :03:00:00) - DC parameter on (DC Default "Start Delay" : 01:00:00,DC Default "Cycle Time" :02:00:00 ,DC Default "Repeat After " :03:00:00) 	Refer 3.3.4.6
156	TC_ FXP1_1_9	<ul style="list-style-type: none"> • Set device in Heater Mode with - LC parameter on (LC Default "Temp On Val": 65°F (18°C),LC Default "Temp Off Val": 70°F (-21°C)) - DC parameter on (DC Default "Temp On Val": 65°F (18°C),DC Default "Temp Off Val": 70°F (-21°C)) 	Refer 3.3.4.6
157	TC_ FXP1_1_10	<ul style="list-style-type: none"> • Set device in Heater Mode with - LC parameter on (LC Min "Temp On Val": 0°F (-17.5°C),LC Min "Temp Off Val": 2°F (-16.6°C)) - DC parameter on (DC Min "Temp On Val": 2°F (-17.5°C),DC Min "Temp Off Val": 2°F (-16.6°C)) 	Refer 3.3.4.6
158	TC_ FXP1_1_11	<ul style="list-style-type: none"> • Set device in Heater Mode with - LC parameter on (LC Max "Temp On Val": 118°F (47.7°C),LC Max "Temp Off 	Refer 3.3.4.6

		Val": 122°F (50°C)) - DC parameter on (DC Min "Temp On Val": 118°F (47.7°C),DC Min "Temp Off Val": 122°F (-50°C))	
159	TC_FXP1_1_12	<ul style="list-style-type: none"> Set device in Heater Mode with LC parameter on (LC Default "Temp On Val": 65°F (18°C),LC Default "Temp Off Val": 70°F (21°C)) DC parameter off 	Refer 3.3.4.6
160	TC_FXP1_1_13	<ul style="list-style-type: none"> Set device in Heater Mode with LC parameter off DC parameter on (DC Default "Temp On Val": 65°F (18°C),DC Default "Temp Off Val": 70°F (21°C)) 	Refer 3.3.4.6
161	TC_FXP1_1_14	<ul style="list-style-type: none"> Set device in Cooler mode with LC parameter on (LC Default "Temp On Val: 70°F (21°C), LC Default "Temp Off Val" : 65°F (-18°C)) DC parameter on (DC Default "Temp On Val: 70°F (21°C), DC Default "Temp Off Val" : 65°F (18°C)) 	Refer 3.3.4.6
162	TC_FXP1_1_15	<ul style="list-style-type: none"> Set device in Cooler mode with LC parameter on (LC Min "Temp On Val: 0°F (-17.7°C), LC Min "Temp Off Val" : -2°F (-18.8°C)) DC parameter on (DC Min "Temp On Val: 0°F (-17.7°C), DC Min "Temp Off Val" : -2°F (-18.8°C)) 	Refer 3.3.4.6
163	TC_FXP1_1_16	<ul style="list-style-type: none"> Set device in Cooler mode with LC parameter on (LC Max "Temp On Val: 122°F (50°C), LC Max "Temp Off Val" : 120°F (48.8°C)) DC parameter on (DC Max "Temp On Val: 122°F (50°C), DC Max "Temp Off Val" : 120°F (48.8°C)) 	Refer 3.3.4.6
164	TC_FXP1_1_17	<ul style="list-style-type: none"> Set device in Cooler mode with LC parameter on (LC Default "Temp On Val: 70°F (21°C), LC Default "Temp Off Val" : 65°F (18°C)) DC parameter off 	Refer 3.3.4.6
165	TC_FXP1_1_18	<ul style="list-style-type: none"> Set device in Cooler mode with LC parameter off DC parameter on (DC Default "Temp On Val: 70°F (21°C), DC Default "Temp Off 	Refer 3.3.4.6

		Val" : 65°F (18°C))	
166	TC_FXP1_1_19	<ul style="list-style-type: none"> • Set device in Humidifier mode with - LC parameter on (LC Default "Humidity on Val: 50%, LC Default "Humidity off Val" : 60%)) - DC parameter on ((DC Default "Humidity on Val: 50%, DC Default "Humidity off Val" : 60%)) 	Refer 3.3.4.6
167	TC_FXP1_1_20	<ul style="list-style-type: none"> • Set device in Humidifier mode with - LC parameter on (LC Min "Humidity on Val: 20%, LC Default "Min off Val" : 25%)) - DC parameter on ((DC Min "Humidity on Val: 20%, DC Default "Min off Val" : 25%)) 	Refer 3.3.4.6
168	TC_FXP1_1_21	<ul style="list-style-type: none"> • Set device in Humidifier mode with - LC parameter on (LC Max "Humidity on Val: 90%, LC Max "Humidity off Val" : 95%)) - DC parameter on (LC Max "Humidity on Val: 90%, LC Max "Humidity off Val" : 95%)) 	Refer 3.3.4.6
169	TC_FXP1_1_22	<ul style="list-style-type: none"> • Set device in Humidifier mode with - LC parameter on (LC Default "Humidity on Val: 50%, LC Default "Humidity off Val" : 60%)) - DC parameter off 	Refer 3.3.4.6
170	TC_FXP1_1_23	<ul style="list-style-type: none"> • Set device in Humidifier mode with - LC parameter off - DC parameter on (LC Default "Humidity on Val: 50%, LC Default "Humidity off Val" : 60%)) 	Refer 3.3.4.6
171	TC_FXP1_1_24	<ul style="list-style-type: none"> • Set device in Dehumidifier mode with - LC parameter on (LC Default "Humidity on Val: 60%, LC Default "Humidity off Val" : 50%)) - DC parameter on (LC Default "Humidity on Val: 60%, LC Default "Humidity off Val" : 50%)) 	Refer 3.3.4.6
172	TC_FXP1_1_25	<ul style="list-style-type: none"> • Set device in Dehumidifier mode with - LC parameter on (LC Min "Humidity on Val: 25%, LC Min "Humidity off Val" : 20%)) - DC parameter on (LC Min "Humidity on Val: 25%, LC Min "Humidity off Val" : 20%)) 	Refer 3.3.4.6

)	
173	TC_FXP1_1_26	<ul style="list-style-type: none"> Set device in Dehumidifier mode with - LC parameter on (LC Min "Humidity on Val: 25%, LC Min "Humidity off Val" : 20%)) - DC parameter on (LC Min "Humidity on Val: 25%, LC Min "Humidity off Val" : 20%)) 	Refer 3.3.4.6
174	TC_FXP1_1_27	<ul style="list-style-type: none"> Set device in Dehumidifier mode with - LC parameter on (LC Default "Humidity on Val: 60%, LC Default "Humidity off Val" : 50%)) - DC parameter off 	Refer 3.3.4.6
175	TC_FXP1_1_28	<ul style="list-style-type: none"> Set device in Dehumidifier mode with - LC parameter off - DC parameter on (LC Default "Humidity on Val: 60%, LC Default "Humidity off Val" : 50%)) 	Refer 3.3.4.6
176	TC_FXP1_1_29	<ul style="list-style-type: none"> Set device in Leak Mode 	Refer 3.3.4.6
177	TC_FXP1_1_30	<ul style="list-style-type: none"> Set device in CO2 mode (Generator mode, Default On Threshold 1400 PPM, Default Off Threshold 1600 PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.6
178	TC_FXP1_1_31	<ul style="list-style-type: none"> Set device in CO2 mode (Generator mode ,Min On Threshold 500 PPM, Min Off Threshold 700 PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.6
179	TC_FXP1_1_32	<ul style="list-style-type: none"> Set device in CO2 mode (Generator mode ,Max On Threshold 1800 PPM, Max Off Threshold 2000 PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.6
180	TC_FXP1_1_33	<ul style="list-style-type: none"> Set device in CO2 mode (Generator mode, Default On Threshold 1400 PPM, Default Off Threshold 1600 PPM, Make sure Dark cycle running) 	Refer 3.3.4.6
181	TC_FXP1_1_34	<ul style="list-style-type: none"> Set device in CO2 mode (Generator mode, Default On Threshold 1400 PPM, Default Off Threshold 1600 PPM, Make sure Light cycle running & Vent Device on) 	Refer 3.3.4.6
182	TC_FXP1_1_35	<ul style="list-style-type: none"> Set device in CO2 mode (Generator mode, Default On Threshold 1400 PPM, Default Off Threshold 1600 PPM, Make sure Light 	Refer 3.3.4.6

		cycle running & Vent Device in transition from On to Off)	
183	TC_FXP1_1_36	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode, Default On Threshold 1500 PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.6
184	TC_FXP1_1_37	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode, Set Threshold 500 PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.6
185	TC_FXP1_1_38	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode, Set Threshold 2000PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.6
186	TC_FXP1_1_39	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode, Set Threshold 1500 PPM, Make sure Dark cycle running) 	Refer 3.3.4.6
187	TC_FXP1_1_40	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode ,Set Threshold 1500 PPM, Make sure Light cycle running , Vent device ON) 	Refer 3.3.4.6
188	TC_FXP1_1_41	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode, Set Threshold 1500 PPM, Make sure Light cycle running & Vent Device in transition from On to Off) 	Refer 3.3.4.6
189	TC_FXP2_1_1	<ul style="list-style-type: none"> Set device in follow mode 	Refer 3.3.4.7
190	TC_FXP2_1_2	<ul style="list-style-type: none"> Set device in flip mode 	Refer 3.3.4.7
191	TC_FXP2_1_3	<ul style="list-style-type: none"> Set device in RPT timer mode with <ul style="list-style-type: none"> LC parameter on (LC Default “Start Delay” : 00:05:00,LC Default “Cycle Time” :00:05:00 ,LC Default “Repeat After “:03:00:00) DC parameter on (DC Default “Start Delay” : 00:05:00,DC Default “Cycle Time” :00:05:00 ,DC Default “Repeat After “:03:00:00) 	Refer 3.3.4.7
192	TC_FXP2_1_4	<ul style="list-style-type: none"> Set device in RPT timer mode with <ul style="list-style-type: none"> LC parameter on (LC Min “Start Delay” : 00:00:00,LC “Cycle Time” : Light Cycle Duration- Start Delay, LC “Repeat After “:Light Cycle Duration-(Cycle Time +Start Delay)) DC parameter on (DC Min “Start Delay” : 00:00:00,DC “Cycle Time” : Dark Cycle Duration- Start Delay, DC “Repeat After “:Dark Cycle Duration-(Cycle Time +Start Delay)) 	Refer 3.3.4.7

193	TC_FXP2_1_5	<ul style="list-style-type: none"> • Set device in RPT timer mode with - LC parameter on (LC Max “Start Delay” : Light Cycle Duration- 00:00:01,LC “Cycle Time” : Light Cycle Duration- Start Delay, LC “Repeat After “:Light Cycle Duration- (Cycle Time +Start Delay)) - DC parameter on (DC Max “Start Delay” : Dark Cycle Duration- 00:00:01,DC “Cycle Time” : Dark Cycle Duration- Start Delay, DC “Repeat After “:Dark Cycle Duration- (Cycle Time +Start Delay)) 	Refer 3.3.4.7
194	TC_FXP2_1_6	<ul style="list-style-type: none"> • Set device in RPT timer mode with - LC parameter on (LC Default “Start Delay” : 01:00:00,LC Default “Cycle Time” :02:00:00 ,LC Default “Repeat After “:03:00:00) - DC parameter off 	Refer 3.3.4.7
195	TC_FXP2_1_7	<ul style="list-style-type: none"> • Set device in RPT timer mode with - LC parameter off - DC parameter on (DC Default “Start Delay” : 01:00:00,DC Default “Cycle Time” :02:00:00,DC Default “Repeat After “:03:00:00) 	Refer 3.3.4.7
196	TC_FXP2_1_8	<ul style="list-style-type: none"> • Set device in RPT timer mode with - LC parameter on (LC Default “Start Delay” : 01:00:00,LC Default “Cycle Time” :02:00:00 ,LC Default “Repeat After “:03:00:00) - DC parameter on (DC Default “Start Delay” : 01:00:00,DC Default “Cycle Time” :02:00:00 ,DC Default “Repeat After “:03:00:00) 	Refer 3.3.4.7
197	TC_FXP2_1_9	<ul style="list-style-type: none"> • Set device in Heater Mode with - LC parameter on (LC Default “Temp On Val”: 65°F (18°C),LC Default “Temp Off Val”: 70°F (-21°C)) - DC parameter on (DC Default “Temp On Val”: 65°F (18°C),DC Default “Temp Off Val”: 70°F (-21°C)) 	Refer 3.3.4.7
198	TC_FXP2_1_10	<ul style="list-style-type: none"> • Set device in Heater Mode with - LC parameter on (LC Min “Temp On Val”: 0°F (-17.5°C),LC Min “Temp Off Val”: 2°F (-16.6°C)) - DC parameter on (DC Min “Temp On 	Refer 3.3.4.7

		Val": 2°F (-17.5°C),DC Min "Temp Off Val": 2°F (-16.6°C))	
199	TC_FXP2_1_11	<ul style="list-style-type: none"> • Set device in Heater Mode with - LC parameter on (LC Max "Temp On Val": 118°F (47.7°C),LC Max "Temp Off Val": 122°F (50°C)) - DC parameter on (DC Min "Temp On Val": 118°F (47.7°C),DC Min "Temp Off Val": 122°F (-50°C)) 	Refer 3.3.4.7
200	TC_FXP2_1_12	<ul style="list-style-type: none"> • Set device in Heater Mode with - LC parameter on (LC Default "Temp On Val": 65°F (18°C),LC Default "Temp Off Val": 70°F (21°C)) - DC parameter off 	Refer 3.3.4.7
201	TC_FXP2_1_13	<ul style="list-style-type: none"> • Set device in Heater Mode with - LC parameter off - DC parameter on (DC Default "Temp On Val": 65°F (18°C),DC Default "Temp Off Val": 70°F (21°C)) 	Refer 3.3.4.7
202	TC_FXP2_1_14	<ul style="list-style-type: none"> • Set device in Cooler mode with - LC parameter on (LC Default "Temp On Val: 70°F (21°C), LC Default "Temp Off Val" : 65°F (-18°C)) - DC parameter on (DC Default "Temp On Val: 70°F (21°C), DC Default "Temp Off Val" : 65°F (18°C)) 	Refer 3.3.4.7
203	TC_FXP2_1_15	<ul style="list-style-type: none"> • Set device in Cooler mode with - LC parameter on (LC Min "Temp On Val: 0°F (-17.7°C), LC Min "Temp Off Val" : -2°F (-18.8°C)) - DC parameter on (DC Min "Temp On Val: 0°F (-17.7°C), DC Min "Temp Off Val" : -2°F (-18.8°C)) 	Refer 3.3.4.7
204	TC_FXP2_1_16	<ul style="list-style-type: none"> • Set device in Cooler mode with - LC parameter on (LC Max "Temp On Val: 122°F (50°C), LC Max "Temp Off Val" : 120°F (48.8°C)) - DC parameter on (DC Max "Temp On Val: 122°F (50°C), DC Max "Temp Off Val" : 120°F (48.8°C)) 	Refer 3.3.4.7
205	TC_FXP2_1_17	<ul style="list-style-type: none"> • Set device in Cooler mode with - LC parameter on (LC Default "Temp On Val: 70°F (21°C), LC Default "Temp Off Val" : 65°F (18°C)) 	Refer 3.3.4.7

		<ul style="list-style-type: none"> - DC parameter off 	
206	TC_FXP2_1_18	<ul style="list-style-type: none"> • Set device in Cooler mode with - LC parameter off - DC parameter on (DC Default "Temp On Val: 70°F (21°C), DC Default "Temp Off Val" : 65°F (18°C)) 	Refer 3.3.4.7
207	TC_FXP2_1_19	<ul style="list-style-type: none"> • Set device in Humidifier mode with - LC parameter on (LC Default "Humidity on Val: 50%, LC Default "Humidity off Val" : 60%)) - DC parameter on ((DC Default "Humidity on Val: 50%, DC Default "Humidity off Val" : 60%)) 	Refer 3.3.4.7
208	TC_FXP2_1_20	<ul style="list-style-type: none"> • Set device in Humidifier mode with - LC parameter on (LC Min "Humidity on Val: 20%, LC Default "Min off Val" : 25%)) - DC parameter on ((DC Min "Humidity on Val: 20%, DC Default "Min off Val" : 25%)) 	Refer 3.3.4.7
209	TC_FXP2_1_21	<ul style="list-style-type: none"> • Set device in Humidifier mode with - LC parameter on (LC Max "Humidity on Val: 90%, LC Max "Humidity off Val" : 95%)) - DC parameter on (LC Max "Humidity on Val: 90%, LC Max "Humidity off Val" : 95%)) 	Refer 3.3.4.7
210	TC_FXP2_1_22	<ul style="list-style-type: none"> • Set device in Humidifier mode with - LC parameter on (LC Default "Humidity on Val: 50%, LC Default "Humidity off Val" : 60%)) - DC parameter off 	Refer 3.3.4.7
211	TC_FXP2_1_23	<ul style="list-style-type: none"> • Set device in Humidifier mode with - LC parameter off - DC parameter on (LC Default "Humidity on Val: 50%, LC Default "Humidity off Val" : 60%)) 	Refer 3.3.4.7
212	TC_FXP2_1_24	<ul style="list-style-type: none"> • Set device in Dehumidifier mode with - LC parameter on (LC Default "Humidity on Val: 60%, LC Default "Humidity off Val" : 50%)) - DC parameter on (LC Default "Humidity on Val: 60%, LC Default "Humidity off Val" : 50%)) 	Refer 3.3.4.7

213	TC_FXP2_1_25	<ul style="list-style-type: none"> • Set device in Dehumidifier mode with - LC parameter on (LC Min "Humidity on Val: 25%, LC Min "Humidity off Val" : 20%)) - DC parameter on (LC Min "Humidity on Val: 25%, LC Min "Humidity off Val" : 20%)) 	Refer 3.3.4.7
214	TC_FXP2_1_26	<ul style="list-style-type: none"> • Set device in Dehumidifier mode with - LC parameter on (LC Min "Humidity on Val: 25%, LC Min "Humidity off Val" : 20%)) - DC parameter on (LC Min "Humidity on Val: 25%, LC Min "Humidity off Val" : 20%)) 	Refer 3.3.4.7
215	TC_FXP2_1_27	<ul style="list-style-type: none"> • Set device in Dehumidifier mode with - LC parameter on (LC Default "Humidity on Val: 60%, LC Default "Humidity off Val" : 50%)) - DC parameter off 	Refer 3.3.4.7
216	TC_FXP2_1_28	<ul style="list-style-type: none"> • Set device in Dehumidifier mode with - LC parameter off - DC parameter on (LC Default "Humidity on Val: 60%, LC Default "Humidity off Val" : 50%)) 	Refer 3.3.4.7
217	TC_FXP2_1_29	<ul style="list-style-type: none"> • Set device in Leak Mode 	Refer 3.3.4.7
218	TC_FXP2_1_30	<ul style="list-style-type: none"> • Set device in CO2 mode (Generator mode, Default On Threshold 1400 PPM, Default Off Threshold 1600 PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.7
219	TC_FXP2_1_31	<ul style="list-style-type: none"> • Set device in CO2 mode (Generator mode ,Min On Threshold 500 PPM, Min Off Threshold 700 PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.7
220	TC_FXP2_1_32	<ul style="list-style-type: none"> • Set device in CO2 mode (Generator mode ,Max On Threshold 1800 PPM, Max Off Threshold 2000 PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.7
221	TC_FXP2_1_33	<ul style="list-style-type: none"> • Set device in CO2 mode (Generator mode, Default On Threshold 1400 PPM, Default Off Threshold 1600 PPM, Make sure Dark cycle running) 	Refer 3.3.4.7
222	TC_FXP2_1_34	<ul style="list-style-type: none"> • Set device in CO2 mode (Generator mode, Default On Threshold 1400 PPM, Default 	Refer 3.3.4.7

		Off Threshold 1600 PPM, Make sure Light cycle running & Vent Device on)	
223	TC_FXP2_1_35	<ul style="list-style-type: none"> Set device in CO2 mode (Generator mode, Default On Threshold 1400 PPM, Default Off Threshold 1600 PPM, Make sure Light cycle running & Vent Device in transition from On to Off) 	Refer 3.3.4.7
224	TC_FXP2_1_36	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode, Default On Threshold 1500 PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.7
225	TC_FXP2_1_37	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode, Set Threshold 500 PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.7
226	TC_FXP2_1_38	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode, Set Threshold 2000PPM, Make sure Light cycle running & Vent Device off) 	Refer 3.3.4.7
227	TC_FXP2_1_39	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode, Set Threshold 1500 PPM, Make sure Dark cycle running) 	Refer 3.3.4.7
228	TC_FXP2_1_40	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode ,Set Threshold 1500 PPM, Make sure Light cycle running , Vent device ON) 	Refer 3.3.4.7
229	TC_FXP2_1_41	<ul style="list-style-type: none"> Set device in CO2 mode (Cylinder mode, Set Threshold 1500 PPM, Make sure Light cycle running & Vent Device in transition from On to Off) 	Refer 3.3.4.7
230	TC_DEVICE_VENT_1_1	<ul style="list-style-type: none"> Set device in RPT timer mode with <ul style="list-style-type: none"> LC parameter on (LC Default Start Delay - 00:00:00, Cycle Time - 00:05:00, Repeat After - 01:30:00) DC parameter on (DC Default Start Delay - 00:00:00, Cycle Time - 00:05:00, Repeat After - 01:30:00) 	Refer 3.3.4.8
231	TC_DEVICE_VENT_1_2	<ul style="list-style-type: none"> Set device in RPT timer mode with <ul style="list-style-type: none"> LC parameter on (LC Min Start Delay - 00:00:01, Cycle Time (+ LC Delay), Repeat After (+ Cycle Time + LC Start delay)) DC parameter on (DC Min Start Delay - 00:00:01, Cycle Time (+ LC Delay), Repeat After (+Cycle Time + LC Start delay)) 	Refer 3.3.4.8
232	TC_DEVICE_VENT_1_3	<ul style="list-style-type: none"> Set device in RPT timer mode with <ul style="list-style-type: none"> LC parameter on (LC Max Start Delay - 	Refer 3.3.4.8

		00:00:01, Cycle Time (+ LC Delay), Repeat After (+ Cycle Time + LC Start delay)) <ul style="list-style-type: none"> - DC parameter on (DC Max Start Delay - 00:00:01, Cycle Time (+ LC Delay), Repeat After (+Cycle Time + LC Start delay)) 	
233	TC_DEVICE_VENT_1_4	<ul style="list-style-type: none"> • Set device in RPT timer mode with - LC parameter on (LC Default Start Delay - 01:00:00, Cycle Time - 02:00:00, Repeat After - 03:00:00) - DC parameter off 	Refer 3.3.4.8
234	TC_DEVICE_VENT_1_5	<ul style="list-style-type: none"> • Set device in RPT timer mode with - LC parameter off - DC parameter on (DC Default Start Delay - 01:00:00, Cycle Time - 02:00:00, Repeat After - 03:00:00) 	Refer 3.3.4.8
235	TC_DEVICE_VENT_1_6	<ul style="list-style-type: none"> • Set device in RPT timer mode with - LC parameter on (LC Default Start Delay - 01:00:00, Cycle Time - 02:00:00, Repeat After - 03:00:00) - DC parameter on (DC Default Start Delay - 01:00:00, Cycle Time - 02:00:00, Repeat After - 03:00:00) 	Refer 3.3.4.8
236	TC_DEVICE_VENT_1_7	<ul style="list-style-type: none"> • Set device in Temp Check with - LC parameter on (Lc Default "Temp On Val": 70°F (21°C),Lc Default "Temp Off Val": 65°F (18°C)) - -DC parameter on (Dc Default "Temp On Val": 70°F (21°C),Dc Default "Temp Off Val": 65°F (18°C)) 	Refer 3.3.4.8
237	TC_DEVICE_VENT_1_8	<ul style="list-style-type: none"> • Set device in Temp Check with - LC parameter on (LC Min Temp on Val : 2°F(0°C), LC Min Temp off Val : 0°F(-1°C)) - DC parameter on (DC Min Temp on Val : 2°F(0°C), LC Min Temp off Val : 0°F(-1°C)) 	Refer 3.3.4.8
238	TC_DEVICE_VENT_1_9	<ul style="list-style-type: none"> • Set device in Temp Check with - LC parameter on (LC Max Temp on Val : 122°F(50°C), LC Max Temp off Val : 120°F(49°C)) - DC parameter on (DC Max Temp on Val : 122°F(50°C), LC Max Temp off Val : 	Refer 3.3.4.8

		120°F(49°C))	
239	TC_DEVICE_VENT_1_10	<ul style="list-style-type: none"> Set device in Temp Check with - LC parameter on (LC Default Temp on Val : 70°F(21°C), LC Max Temp off Val : 65°F(18°C)) - DC parameter off 	Refer 3.3.4.8
240	TC_DEVICE_VENT_1_11	<ul style="list-style-type: none"> Set device in Temp Check with - LC parameter off - DC parameter on (DC Default Temp on Val : 70°F(21°C), LC Max Temp off Val : 65°F(18°C)) 	Refer 3.3.4.8
241	TC_DEVICE_VENT_1_12	<ul style="list-style-type: none"> Set device in humidity check with - LC parameter on (LC Default Humidity On Val: 60%, Humidity Off Val: 50%) - DC parameter on (DC Default Humidity On Val: 60%, Humidity Off Val: 50%) 	Refer 3.3.4.8
242	TC_DEVICE_VENT_1_13	<ul style="list-style-type: none"> Set device in humidity check with - LC parameter on (LC Min Humidity On Val: 5%, Humidity Off Val: 0%) - DC parameter on (DC Min Humidity On Val: 5%, Humidity Off Val: 0%) 	Refer 3.3.4.8
243	TC_DEVICE_VENT_1_14	<ul style="list-style-type: none"> Set device in humidity check with - LC parameter on (LC Max Humidity On Val: 95%, Humidity Off Val: 90%) - DC parameter on (DC Max Humidity On Val: 95%, Humidity Off Val: 90%) 	Refer 3.3.4.8
244	TC_DEVICE_VENT_1_15	<ul style="list-style-type: none"> Set device in humidity check with - LC parameter on (LC Default Humidity On Val: 60%, Humidity Off Val: 50%) - DC parameter off 	Refer 3.3.4.8
245	TC_DEVICE_VENT_1_16	<ul style="list-style-type: none"> Set device in humidity check with - LC parameter off - DC parameter on (LC Default Humidity On Val: 60%, Humidity Off Val: 50%) 	Refer 3.3.4.8
246	TC_DEVICE_VENT_1_17	<ul style="list-style-type: none"> Set device in RPT timer + Temp check with - Set device in RPT timer mode with - LC parameter on (LC Default Start Delay - 01:00:00, Cycle Time - 02:00:00, Repeat After - 03:00:00) - DC parameter on (DC Default Start Delay - 01:00:00, Cycle Time - 02:00:00, Repeat After - 03:00:00) - Set device in Temp Check with 	Refer 3.3.4.8

		<ul style="list-style-type: none"> - LC parameter on (Lc Default “Temp On Val”: 70°F (21°C),Lc Default “Temp Off Val”: 65°F (18°C)) - DC parameter on (Dc Default “Temp On Val”: 70°F (21°C),Dc Default “Temp Off Val”: 65°F (18°C)) 	
247	TC_DEVICE_VENT_1_18	<ul style="list-style-type: none"> • Set device in RPT timer + humidity check with <ul style="list-style-type: none"> - Set device in RPT timer mode with - LC parameter on (LC Default Start Delay - 01:00:00, Cycle Time - 02:00:00, Repeat After - 03:00:00) - DC parameter on (DC Default Start Delay - 01:00:00, Cycle Time - 02:00:00, Repeat After - 03:00:00) - Set device in humidity check with - LC parameter on (LC Default Humidity On Val: 60%, Humidity Off Val: 50%) - DC parameter on (DC Default Humidity On Val: 60%, Humidity Off Val: 50%) 	Refer 3.3.4.8
248	TC_DEVICE_VENT_1_19	<ul style="list-style-type: none"> • Set device in Humidity Check + Temp Check with <ul style="list-style-type: none"> - Set device in Temp Check with - LC parameter on (Lc Default “Temp On Val”: 70°F (21°C),Lc Default “Temp Off Val”: 65°F (18°C)) - DC parameter on (Dc Default “Temp On Val”: 70°F (21°C),Dc Default “Temp Off Val”: 65°F (18°C)) - Set device in humidity check with - LC parameter on (LC Default Humidity On Val: 60%, Humidity Off Val: 50%) - DC parameter on (DC Default Humidity On Val: 60%, Humidity Off Val: 50%) 	Refer 3.3.4.8
249	TC_DEVICE_VENT_1_20	<ul style="list-style-type: none"> • Set device in RPT Timer + Humidity Check + Temp Check with <ul style="list-style-type: none"> - Set device in RPT timer mode with - LC parameter on (LC Default Start Delay - 01:00:00, Cycle Time - 02:00:00, Repeat After - 03:00:00) - DC parameter on (DC Default Start Delay - 01:00:00, Cycle Time - 02:00:00, Repeat After - 03:00:00) - Set device in Temp Check with - LC parameter on (Lc Default “Temp On 	Refer 3.3.4.8

		Val": 70°F (21°C),Lc Default "Temp Off Val": 65°F (18°C)) - DC parameter on (Dc Default "Temp On Val": 70°F (21°C),Dc Default "Temp Off Val": 65°F (18°C)) - Set device in humidity check with - LC parameter on (LC Default Humidity On Val: 60%, Humidity Off Val: 50%) - DC parameter on (DC Default Humidity On Val: 60%, Humidity Off Val: 50%)	
250	TC_WIFI_WPA2_1_1	<ul style="list-style-type: none"> Wifi security as PEAP(use web page) 	Refer 3.3.5.1
251	TC_WIFI_WPA2_1_2	<ul style="list-style-type: none"> Wifi security as TLS(use web page) 	Refer 3.3.5.1
252	TC_WIFI_WPA2_1_3	<ul style="list-style-type: none"> Wifi security as TTLS(use web page) 	Refer 3.3.5.1
253	TC_WIFI_WPA2_1_4	<ul style="list-style-type: none"> Wifi security as PEAP(use MQTT script) 	Refer 3.3.5.1
254	TC_WIFI_WPA2_1_5	<ul style="list-style-type: none"> Wifi security as TLS(use MQTT script) 	Refer 3.3.5.1
255	TC_WIFI_WPA2_1_6	<ul style="list-style-type: none"> Wifi security as TTLS(use MQTT script) 	Refer 3.3.5.1
256	TC_WIFI_MIXED_SECURITY_1_1	<ul style="list-style-type: none"> Wifi security as TLS (use web page) and security as PEAP and PSK (use MQTT scripts) 	Refer 3.3.5.2
257	TC_EMAIL_1_1	<ul style="list-style-type: none"> Use Gmail account 	Refer 3.3.5.3
258	TC_EMAIL_1_2	<ul style="list-style-type: none"> Use Hot mail account 	Refer 3.3.5.3
259	TC_EMAIL_1_3	<ul style="list-style-type: none"> Use any other email account 	Refer 3.3.5.3
260	TC_SD_CARD_1_1	<ul style="list-style-type: none"> SD card formatted cluster size 512 bytes 	Refer 3.3.5.4
261	TC_SD_CARD_1_2	<ul style="list-style-type: none"> SD card formatted cluster size 4K bytes 	Refer 3.3.5.4
262	TC_SD_CARD_1_3	<ul style="list-style-type: none"> SD card formatted cluster size 16K bytes 	Refer 3.3.5.4
263	TC_ BACKUP_BATTERY_VOLTAGE_1 _1	<ul style="list-style-type: none"> Power up EC using fresh batteries 	Refer 3.3.5.5
264	TC_ BACKUP_BATTERY_VOLTAGE_1 _2	<ul style="list-style-type: none"> Power up EC using used batteries 	Refer 3.3.5.5

265	TC_ BACKUP_BATTERY_VOLTAGE_2_1	<ul style="list-style-type: none"> Low threshold voltage 2.7V 	Refer 3.3.5.6
266	TC_ BACKUP_BATTERY_VOLTAGE_3_1	<ul style="list-style-type: none"> Low threshold voltage 2.7V High Threshold voltage 3.8V 	Refer 3.3.5.7
267	TC_AC_POWER_FAULT_1_1	<ul style="list-style-type: none"> 	Refer 3.3.5.8
268	TC_AC_POWER_FAULT_2_1	<ul style="list-style-type: none"> 	Refer 3.3.5.9
269	TC_ HOT_RE_STRIKE_FAULT_1_1	<ul style="list-style-type: none"> Default delay value 	Refer 3.3.5.10
270	TC_ HOT_RE_STRIKE_FAULT_1_2	<ul style="list-style-type: none"> Min delay value 	Refer 3.3.5.10
271	TC_ HOT_RE_STRIKE_FAULT_1_3	<ul style="list-style-type: none"> Max delay value 	Refer 3.3.5.10
272	TC_ HOT_RE_STRIKE_FAULT_2_1	<ul style="list-style-type: none"> EC in Dark Cycle 	Refer 3.3.5.11
273	TC_ HOT_RE_STRIKE_FAULT_2_2	<ul style="list-style-type: none"> EC in transition from dark cycle to Light cycle 	Refer 3.3.5.11
274	TC_ HOT_RE_STRIKE_FAULT_2_3	<ul style="list-style-type: none"> EC in transition from light cycle to dark cycle 	Refer 3.3.5.11
275	TC_FAULTS_1_1	<ul style="list-style-type: none"> Emr fuse fault 	Refer 3.3.5.12
276	TC_FAULTS_1_2	<ul style="list-style-type: none"> RS485 fuse fault 	Refer 3.3.5.12
277	TC_FAULTS_1_3	<ul style="list-style-type: none"> Sensor fault 	Refer 3.3.5.12
278	TC_FAULTS_2_1	<ul style="list-style-type: none"> Emr fuse fault 	Refer 3.3.5.13
279	TC_FAULTS_2_2	<ul style="list-style-type: none"> RS485 fuse fault 	Refer 3.3.5.13
280	TC_FAULTS_2_3	<ul style="list-style-type: none"> Sensor fault 	Refer 3.3.5.13
281	TC_ GROW_CYCLE_SUSPEND_1_1	<ul style="list-style-type: none"> Start with user profile Suspend one device outlet 	Refer 3.3.5.14

282	TC_ GROW_CYCLE_SUSPEND_1_2	<ul style="list-style-type: none"> Start with user profile Suspend all device outlet 	Refer 3.3.5.14
283	TC_ GROW_CYCLE_SUSPEND_2_1	<ul style="list-style-type: none"> Start with user profile one device outlet 	Refer 3.3.5.15
284	TC_ GROW_CYCLE_SUSPEND_2_2	<ul style="list-style-type: none"> Start with user profile all device outlet 	Refer 3.3.5.15
285	TC_IDLE_SUSPEND_1_1	<ul style="list-style-type: none"> 	Refer 3.3.5.16
286	TC_ GROW_CYCLE_FORCED_1_1	<ul style="list-style-type: none"> Start with user profile One device outlet 	Refer 3.3.5.17
287	TC_ GROW_CYCLE_FORCED_1_2	<ul style="list-style-type: none"> Start with user profile All device outlets 	Refer 3.3.5.17
288	TC_ GROW_CYCLE_FORCED_2_1	<ul style="list-style-type: none"> Start with user profile one device outlet 	Refer 3.3.5.18
289	TC_ GROW_CYCLE_FORCED_2_2	<ul style="list-style-type: none"> Start with user profile all device outlet 	Refer 3.3.5.18
290	TC_IDLE_FORCED_1_1	<ul style="list-style-type: none"> 	Refer 3.3.5.19
291	TC_IDLE_FORCED_2_1	<ul style="list-style-type: none"> 	Refer 3.3.5.20
292	TC_GROW_CYCLE_PANIC_1_1	<ul style="list-style-type: none"> Start with user profile 	Refer 3.3.5.21
293	TC_GROW_CYCLE_PANIC_2_1	<ul style="list-style-type: none"> Start with user profile one device outlet 	Refer 3.3.5.22
294	TC_IDLE_PANIC_1_1	<ul style="list-style-type: none"> 	Refer 3.3.5.23
295	TC_FW_UG_1_1	<ul style="list-style-type: none"> 	Refer 3.3.6.1
296	TC_FW_UG_2_1	<ul style="list-style-type: none"> 	Refer 3.3.6.2
297	TC_EC_WEB_PROVISIONING_1_1	<ul style="list-style-type: none"> Use mobile phone as android 	Refer 3.3.7.1
298	TC_EC_WEB_PROVISIONING_1_2	<ul style="list-style-type: none"> Use mobile phone as IOS 	Refer 3.3.7.1
299	TC_EC_WEB_PROVISIONING_1_3	<ul style="list-style-type: none"> Use mobile APP on Android phone 	Refer 3.3.7.1
300	TC_EC_WEB_PROVISIONING_1_4	<ul style="list-style-type: none"> Use mobile APP on IOS phone 	Refer 3.3.7.1
301	TC_EC_WEB_PROVISIONING_1_5	<ul style="list-style-type: none"> Use windows PC 	Refer 3.3.7.1
302	TC_EC_WEB_PROVISIONING_1_6	<ul style="list-style-type: none"> Use Linux PC 	Refer 3.3.7.1
303	TC_EC_WEB_PROVISIONING_2_1	<ul style="list-style-type: none"> 	Refer 3.3.7.2

304	TC_LONGEVITY_1_1	<ul style="list-style-type: none"> EC in Idle mode 	Refer 3.4.1
305	TC_LONGEVITY_2_1	<ul style="list-style-type: none"> 	Refer 3.4.2
306	TC_LONGEVITY_3_1	<ul style="list-style-type: none"> 	Refer 3.4.3
307	TC_LONGEVITY_4_1	<ul style="list-style-type: none"> 	Refer 3.4.4
308	TC_NO_NETWORK_1_1	<ul style="list-style-type: none"> EC in Idle mode 	Refer 3.5.1.1
309	TC_NO_NETWORK_1_2	<ul style="list-style-type: none"> EC in active grow mode 	Refer 3.5.1.1
310	TC_NO_NETWORK_2_1	<ul style="list-style-type: none"> EC in Idle mode 	Refer 3.5.1.2
311	TC_NO_NETWORK_2_2	<ul style="list-style-type: none"> EC in active grow mode 	Refer 3.5.1.2
312	TC_NO_MQTT_1_1	<ul style="list-style-type: none"> EC in Idle mode 	Refer 3.5.2.1
313	TC_NO_MQTT_1_2	<ul style="list-style-type: none"> EC in active grow mode 	Refer 3.5.2.1
314	TC_NO_MQTT_2_1	<ul style="list-style-type: none"> EC in Idle mode 	Refer 3.5.2.2
315	TC_NO_MQTT_2_2	<ul style="list-style-type: none"> EC in active grow mode 	Refer 3.5.2.2
316	TC_UNFORMAT_SD_CARD_1_1	<ul style="list-style-type: none"> EC in Idle mode 	Refer 3.5.3
317	TC_UNFORMAT_SD_CARD_1_2	<ul style="list-style-type: none"> EC in active grow mode 	Refer 3.5.3
318	TC_FW_UG_INTERRUPT_1_1	<ul style="list-style-type: none"> Wifi network off during firmware upgrade 	Refer 3.5.4.1
319	TC_FW_UG_INTERRUPT_1_2	<ul style="list-style-type: none"> MQTT server off while sending packets 	Refer 3.5.4.1
320	TC_FW_UG_INTERRUPT_1_3	<ul style="list-style-type: none"> Mobile app is off (MQTT script, make sure to terminates the packets sending) 	Refer 3.5.4.1
321	TC_FW_UG_INTERRUPT_2_1	<ul style="list-style-type: none"> Wifi network off during firmware upgrade 	Refer 3.5.4.2
322	TC_FW_UG_INTERRUPT_2_2	<ul style="list-style-type: none"> MQTT server off while sending packets 	Refer 3.5.4.2
323	TC_FW_UG_INTERRUPT_2_3	<ul style="list-style-type: none"> Mobile app is off (MQTT script, make sure to terminates the packets sending) 	Refer 3.5.4.2
324	TC_EC_WEB_PROVISION_EMPTY_FIELD_1_1	<ul style="list-style-type: none"> 	Refer 3.5.5

APPENDIX C

This section describes the details about “**FreeRadius server**” used to configure Wireless WPA2 enterprise networks.

Install FreeRADIUS Server

Following command to install the FreeRadius service in linux pc/laptop

```
$ sudo apt-get install freeradius
```

Check installation is proper or not using the below command . It displays working version.

```
$ freeradius -v
```

To start/stop FreeRADIUS server using below commands

```
$ sudo service freeradius stop
```

```
$ sudo freeradius -X ( debug mode start )
```

Or

```
$ sudo service freeradius start
```

```
$ sudo tail -f /var/log/freeradius/radius.log ( to get the logging information )
```

Configuration

```
$ cd /etc/freeradius
```

```
$ sudo vi /etc/freeradius/radiusd.conf
```

To add users to the USERS configuration file:

```
$ sudo vi /etc/freeradius/users
```

Add the following lines at the end of the users file:

```
test Cleartext-Password := "welcome" (here "test" is username "welcome" is password)
```

To add the clients (wifi access points):

PI see the given below screen to edit `/etc/freeradius/clients.conf` file to add respective APs . Make sure that IP addresses are valid.

```
wdb@wdb-Systems: /etc/freeradius
# Each client has a "short name" that is used to distinguish it from
# other clients.
#
# In version 1.x, the string after the word "client" was the IP
# address of the client. In 2.0, the IP address is configured via
# the "ipaddr" or "ipv6addr" fields. For compatibility, the 1.x
# format is still accepted.
#
client linksyse1200{
    ipaddr = 192.168.4.1
    secret = testing123
    nastype = other      # localhost isn't usually a NAS...
}
client linksyscisco2{
    ipaddr = 192.168.5.1
    secret = testing123
    nastype = other      # localhost isn't usually a NAS...
}
client klatucisco{
    ipaddr = 192.168.1.195
    secret = testing123
    nastype = other      # localhost isn't usually a NAS...
}
22,1 9%
```

Restart the FreeRADIUS server using the command below:

```
$ service freeradius restart
```

Pl refer the given below web link to know further

<https://thebackroomtech.com/2018/08/16/how-to-install-freeradius-on-ubuntu/>

Test the radius authentication locally on the Radius server using the following commands:

```
$ radtest test welcome localhost 0 testing123
```

```
wdb@wdb-Systems:~$ radtest test welcome localhost 0 testing123
Sending Access-Request of id 239 to 127.0.0.1 port 1812
  User-Name = "test"
  User-Password = "welcome"
  NAS-IP-Address = 127.0.1.1
  NAS-Port = 0
  Message-Authenticator = 0x00000000000000000000000000000000
rad_recv: Access-Accept packet from host 127.0.0.1 port 1812, id=239, length=20
```

Configure WiFi Access point

- Open the access point's web page & enter Radius server details

Configuration of FreeRadius with different wifi securities :

Free radius server comes by default with PEAP enabled. To change wifi security edit
`/etc/freeradius/eap.conf`

PEAP (it is by default security)

```
default_eap_type = md5
```

TLS:

```
eap {  
    default_eap_type = tls  
    tls {  
        certdir = ${confdir}/certs  
        cadir = ${confdir}/certs  
        private_key_password = welcome  
        private_key_file = ${certdir}/ca_key.pem  
        certificate_file = ${certdir}/ca.pem  
        CA_file = ${cadir}/ca.pem  
        check_crl = no  
        CA_path = ${cadir}  
    }  
    #  
    # If check_cert_issuer is set, the value will  
    # be checked against the DN of the issuer in  
    # the client certificate. If the values do not  
    # match, the certificate verification will fail,  
    # rejecting the user.  
    #
```

Copy client certificates (if required) to relevant folder (check `capath` in `eap.conf`) & redo indexing by running the given below commands

```
$ sudo c_rehash /etc/freeradius/certs/
```

TTLS:

```
default_eap_type = ttls
```

To check wifi securities using eapol-test

Install wpa_supplicant

```
$ wget wl.fi/release/wpa_supplicant-2.6.tar.gz  
$ tar -xvf wpa_supplicant-2.6.tar.gz  
$ cd wpa_supplicant-2.6/wpa_supplicant
```

Create new .config file using default config file

```
$ cp defconfig .config
```

Open config file and change the below settings (cd wpa_supplicant-2.6/.config)

```
CONFIG_EAPOL_TEST=y,  
#CONFIG_DRIVER_NL80211=y
```

To compile eapol_test

```
$ sudo make eapol_test
```

Create "test.conf" file with following options

For PEAP Testing :

```
ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev  
update_config=1  
country=IN
```

```
network={  
    scan_ssid=1  
    ssid="test"
```

```

key_mgmt=WPA-EAP
eap=PEAP
phase2="auth=MSCHAPV2"
identity="test"
password="welcome"
}

```

For TLS testing :

```

ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
update_config=1
country=IN

```

```

network={
    scan_ssid=1
    ssid="test"
    key_mgmt=WPA-EAP
    eap=TLS
    identity="test"
    ca_cert="/etc/freeradius/certs/ca.pem "
    client_cert="/etc/freeradius/certs/ca.pem "
    private_key="/etc/freeradius/certs/ca_key.pem "
    private_key_passwd="welcome"
}

```

Copy client certificates (if required) to relevant folder here the folder chosen as same as that of free radius server i.e “/etc/freeradius/certs” & redo indexing by running the given below commands

```
$ sudo c_rehash /etc/freeradius/certs/
```

TTLS:

```

ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
update_config=1
country=IN

```

```

network={
    scan_ssid=1
    ssid="test"
    key_mgmt=WPA-EAP
    eap=TTLS
    phase2="auth=MSCHAPV2"
    identity="test"
    password="welcome"
}

```

Run the `eapol_test` program from the command-line, with configuration files.

```
$ eapol_test -c test.conf -s testing123 -p 1812
```

Pl refer the given below web link to know about wpa_supplicant configuration:

<https://netbeez.net/blog/connect-your-raspberry-pi-to-wireless-enterprise-environments-with-wpa-supPLICANT/>

https://linux.die.net/man/5/wpa_supplicant.conf

APPENDIX D

This section describes the details about “**ESP-IDF**” installation and execution.

- Install ESP_IDF using git

```
$ git clone -b v4.3 --recursive https://github.com/espressif/esp-idf.git esp-idf-v4.3 . define  
environ variable IDF_TOOL_PATH pointing to esp-idf directory
```

- Install Python (preferred version 3.8.1 python3.8.1-amd64 <https://www.python.org>) & set python path

- Building & Flashing

Go to esp-idf directory

```
$ cd \ESP\esp\esp-idf
```

```
$ install.bat
```

```
$ export.bat
```

Get EC repository checked out , assume that EC checked out to drive C:

Navigate to EC project directory C:\environ-controller\system\sw\code\cntrl-app\ESP32-S2-MIN/

Let the build directory as C:\temp-build

To Build complete firmware

```
$ idf.py -B C:\temp-build build
```

To flash complete firmware :

```
$ idf.py -B C:\temp-build -p COMx flash
```

To flash only the application firmware

```
$ idf.py -B C:\temp-build -p COMx app-flash
```

To erase complete flash:

```
$ idf.py -B C:\temp-build -p COMx erase_flash
```

The following commands are only required when to change SDK configurations & target hardware.

To change the target board

```
$ idf.py -B C:\temp-build set-target esp32s2
```

To select/modify idf libraries & SDK components

```
$ idf.py -B C:\temp-build menuconfig
```