Home Security Embedded System Test Plan
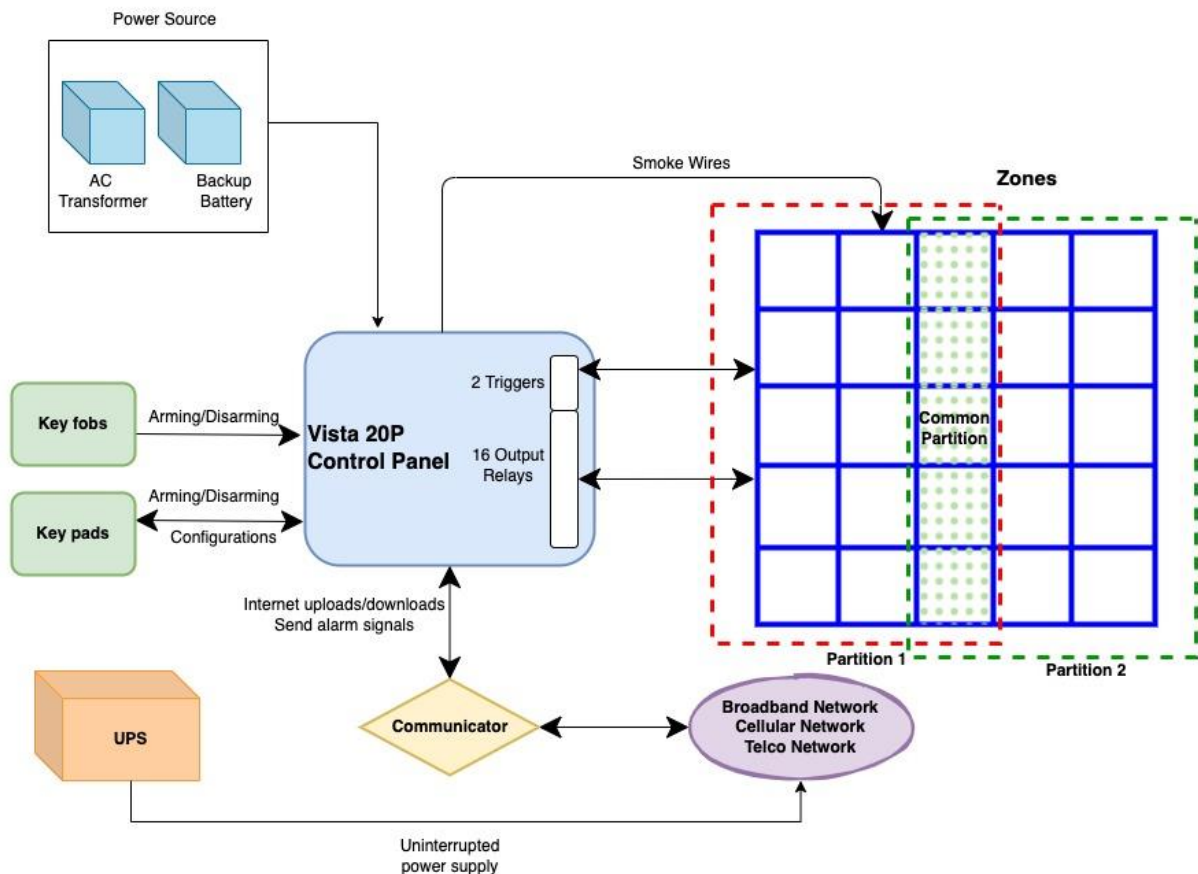
1 Introduction

1.1 Test Objectives

The objective of Vista-20P security system testing is to validate the system operation as a whole and with other components & systems. At the conclusion of the testing, the project team and the test team will have a high level of confidence that the system will work according to user requirements and will meet business needs.

1.2 System overview

Vista-20P is a feature rich, high-capacity security system, that eliminates most of the limitations of Vista-15P series. The system includes advanced graphic touchscreen keypads along with programmable key fobs that can perform multiple remote actions. It has a wider coverage of 48 zones with compared to the prior series. While providing the ability to effectively monitor alarm signals via multiple methods, the system also has increased the number of output relays making the system more beneficial and robust in terms of security and coverage.

Component	Description
Key fobs	Vista wired alarm systems can be armed, disarmed, and interacted with via a key fob.
Keypads	Keypads can be used to arm, disarm a system, and most importantly to configure zones, partitions, key fobs, user codes, user schedules, output relays, triggers, etc.
Vista 20P Control Panel	Control panel is the hub which connects all the system components; hence it can be considered as the brain of the whole system. It will retrieve all the input/output signals from keypads, zones, and other components, then signal triggers and output relays to act accordingly.
Communicator	Communicator send alarm signals to the AlarmNet control center for monitoring purposes. This could be an internet communicator, LTE communicator, Dual Path communicator or the Telco line.
UPS	Uninterrupted Power supply is an optional component in this system that will provide power to the router/modem consistently during a power outage.
Zones	Zones are physical areas that the security system covers. (Ex: Lobby, Bedroom, Kitchen) Vista-20P can cater up to 48 zones with expansion modules. Zone doubling can be done for on-board hardwired zones (8 zones) except zone 1.
Partitions	Partition is a collection of zones, that enables user to control multiple zones at once. Vista-20P comes with dual partitions and a common partition.
Smoke Wires	There are 2 types of wired smoke detectors 2-wire or 4-wire. 2-wire smokes are only supported on zone 1 of the panel. 4-wire smokes can be used on any hardwired zone other than zone 1. Sends a CleanMe™ or maintenance alert signal to the control panel when the sensitivity is not within limits or if there is a hardware fault.
Power Source	Vista-20P is powered via an AC transformer. To make the system more reliable and convenient, user can keep a backup battery to use during power outages.

1.3 Scope of Testing

1.3.1 In Scope

The testing scope includes all the features and functionalities provided by the Vista-20P security system. Below is the diagram for the planned testing scope.
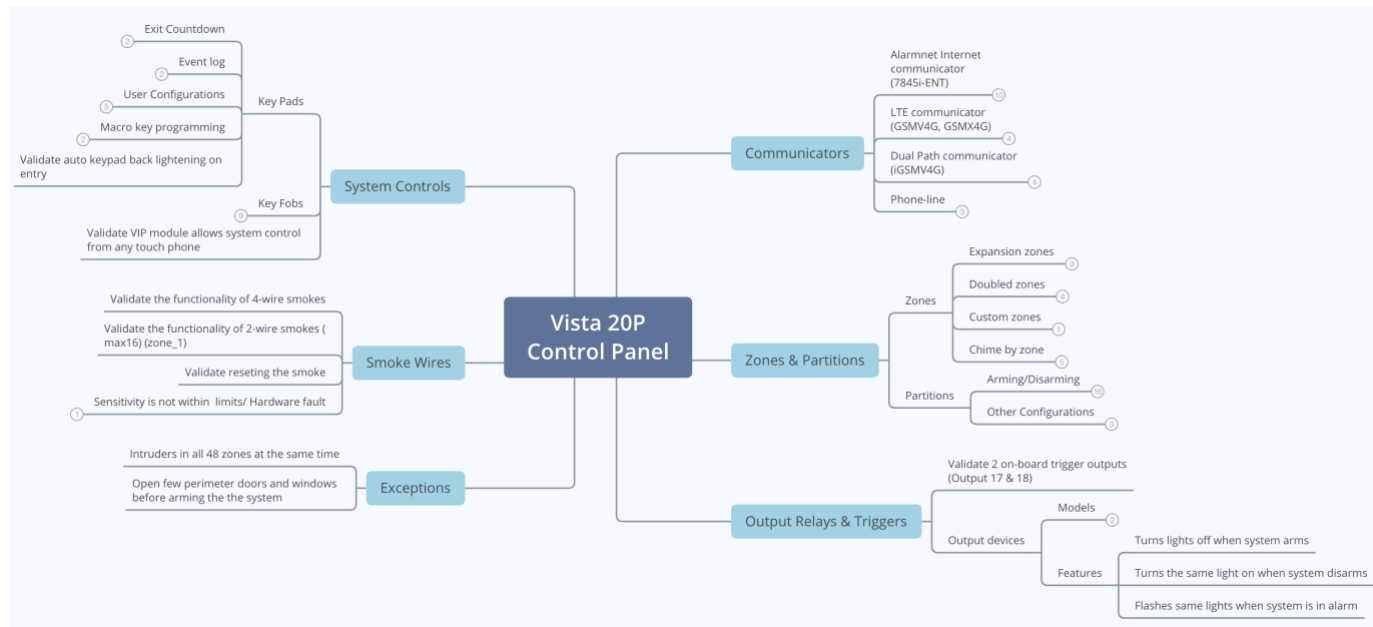
1.3.2 Out of Scope

All the functionalities of third parties (Ex: Alarm monitoring by AlarmNet Control Centre) and testing beyond the product's capabilities (Ex: Push the panel over the maximum current load) are not included in the testing scope.

1.4 References & Supporting Documents

Document	URL Path
Requirement Document	assignment-01/Assignments_Nearfield_Instruments.docx
Product Specification	hybrid-systems/vista-20p-vistar-control-panel-vista-20p/
Test Design Document	assignment-01/Vista 20P Control Panel.xmind

2 Test Strategy

2.1 Test Types

The following type of testing will be performed during the system testing.

Test Type	Test Objective	Approach
Function Testing	Ensure system components function properly without any corruptions	Execute each derived test case, end-to-end test scenario along with the integrations to verify; - The configurations have applied correctly - Alarm signals are transmitted efficiently - Corresponding output relays/triggers are triggered accordingly - All components are integrated properly
UI Testing	Ensure the useability and accuracy of the screens of Keypads and configured touchscreens	Create tests to; - Verify proper navigation and states for each application window. - Verify the usability of the screens & application windows
Load Testing	Ensure the stability of the system when multiple events occur concurrently	Execute tests with multiple users, intruders performing multiple events at multiple zones at the same time; - Verify the system responds to all the events accordingly - Regardless of the load, verify the event log tracks all the events occurred up to 100 correctly
Performance Testing	Ensure the responsiveness of the system	Create tests to; - Verify the response time for both the zones when a zone is doubled - Verify the response time for both hardwired zones and wireless zones
Security & Access Control Testing	Ensure the user can access only the functions the user is permitted	Create tests for each user authority level and verify permission by trying unauthorized commands and configurations via keypads & key fobs
Failover Testing	Ensure the system is robust and respond to unexpected system failures without getting break	- Simulate power outage, internet outage and check the functionality and response of the system. - Simulate opened perimeter doors and windows before arming the system, then arm the system

Simulators can be used to generate signals when required.

2.2 Tools

Tool	Purpose
QMetry	Test Management
JIRA	Defect Management
(Optional) 1520 Precision Signal Simulator	To simulate the signals if needed

2.3 Environments

| Environment	Hardware	Network
Test	All the components - Vista-20P Control Panel - Key fob - Keypads - Communicator - Smoke wires (Both 2-wire & 4-wire) - 16 different output devices - Signal simulator	WAN Broad band LTE 4G Phone Line

3 Features to be tested

3.1 Output Relays & Triggers
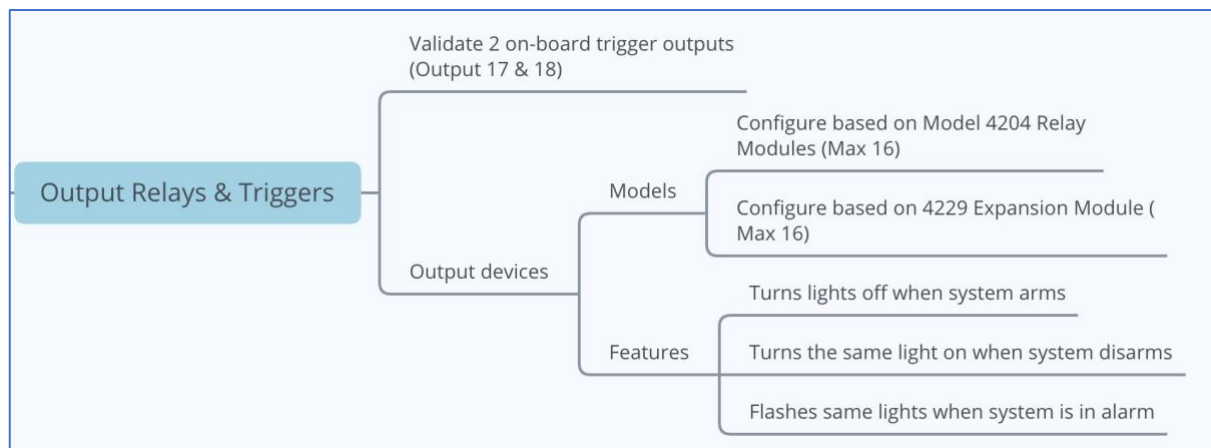
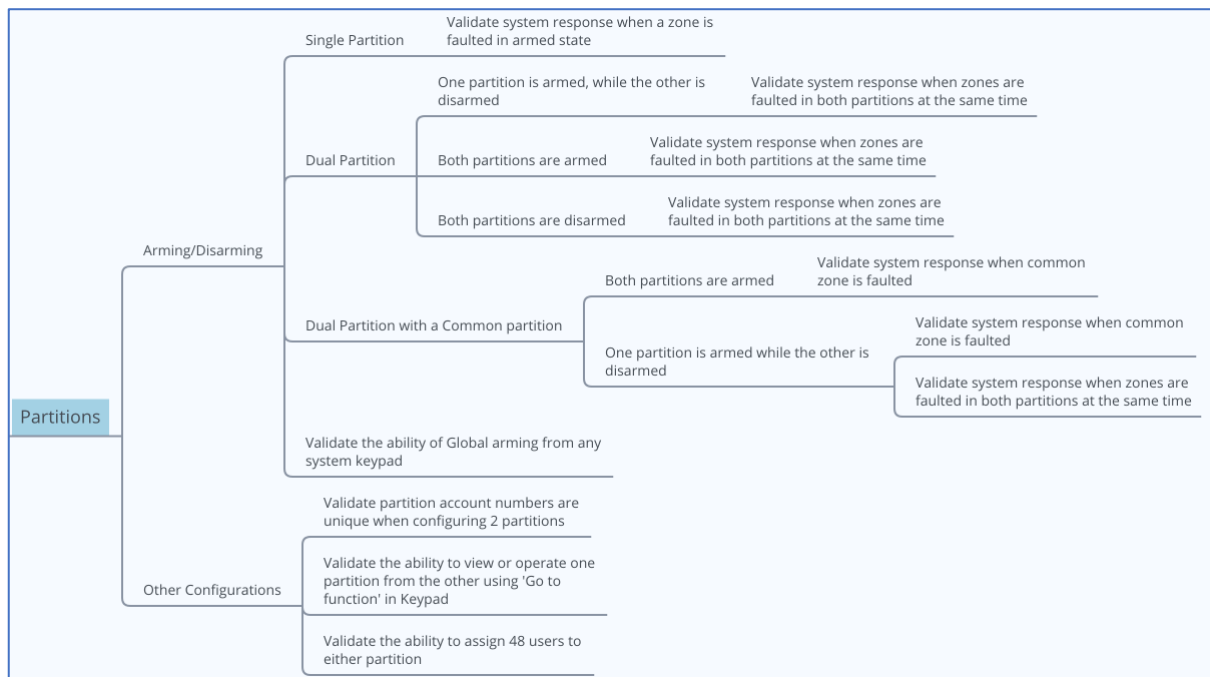| Component	Module	Features
Output Relays & Triggers	Triggers	2 low current onboard trigger outputs
	Output Devices	Compatibility with models (Expansion and Relay)
		Output functions based on the system state

3.2   Communicators
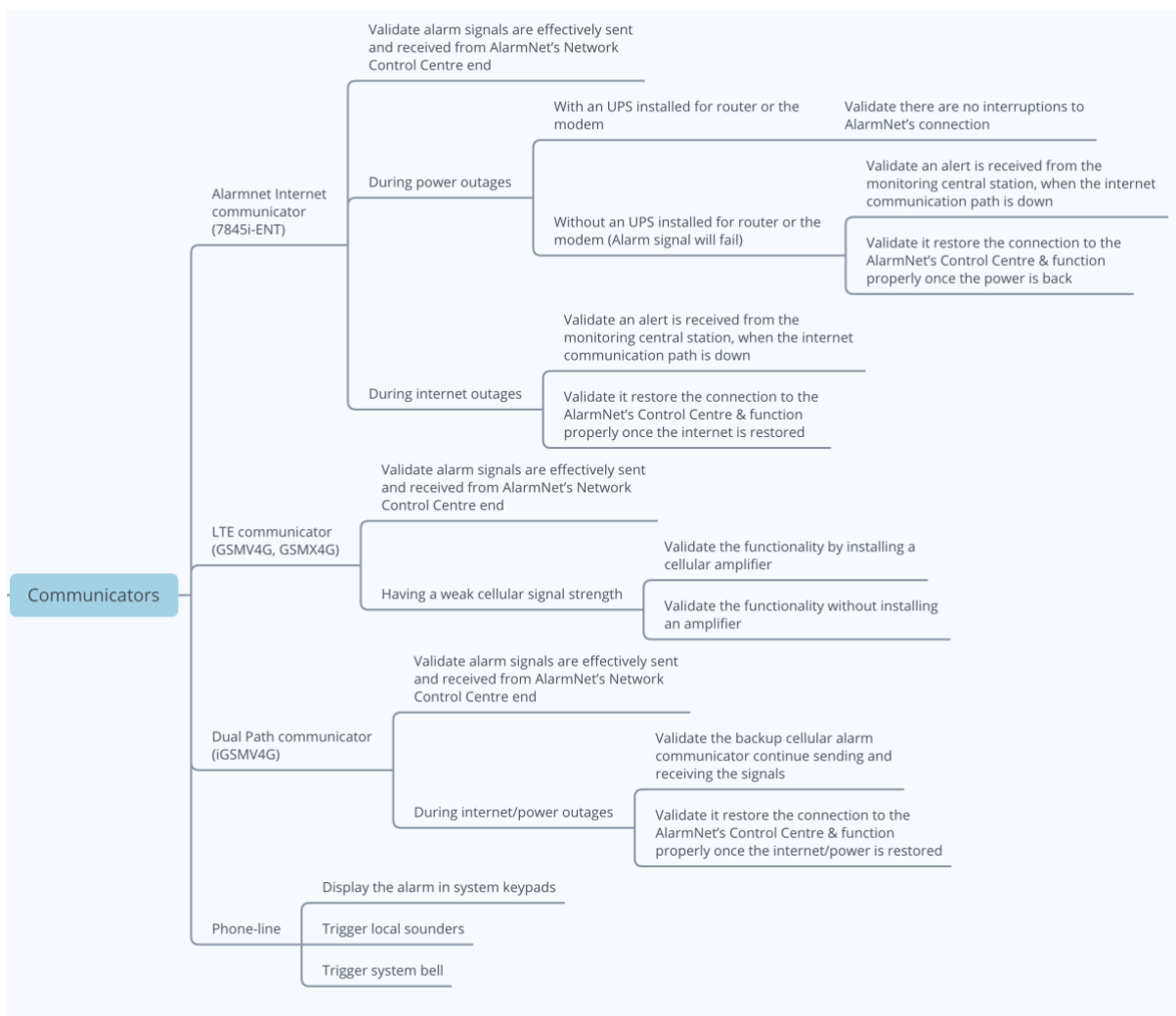
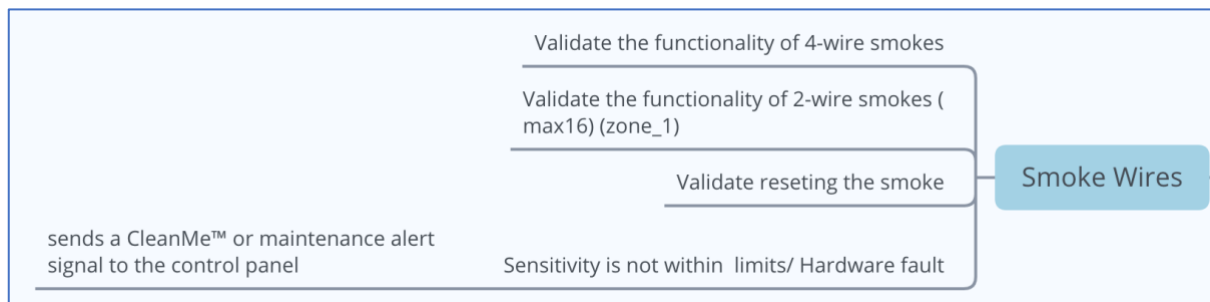| Component	Module	Features
Communicators	Internet Communicator	Alarm signal transmission with AlarmNet's Control Centre
		Alarm signal transmission during internet/power outages
	LTE Communicator	Alarm signal transmission with AlarmNet's Control Centre
		Alarm signal transmission with having a weak cellular signal strength
	Dual Path Communicator	Alarm signal transmission with AlarmNet's Control Centre
		Alarm signal transmission during power/internet outages
	Phone Line	Trigger local sounders/system bell
		Display the alarm in system keypads

3.3 Zones
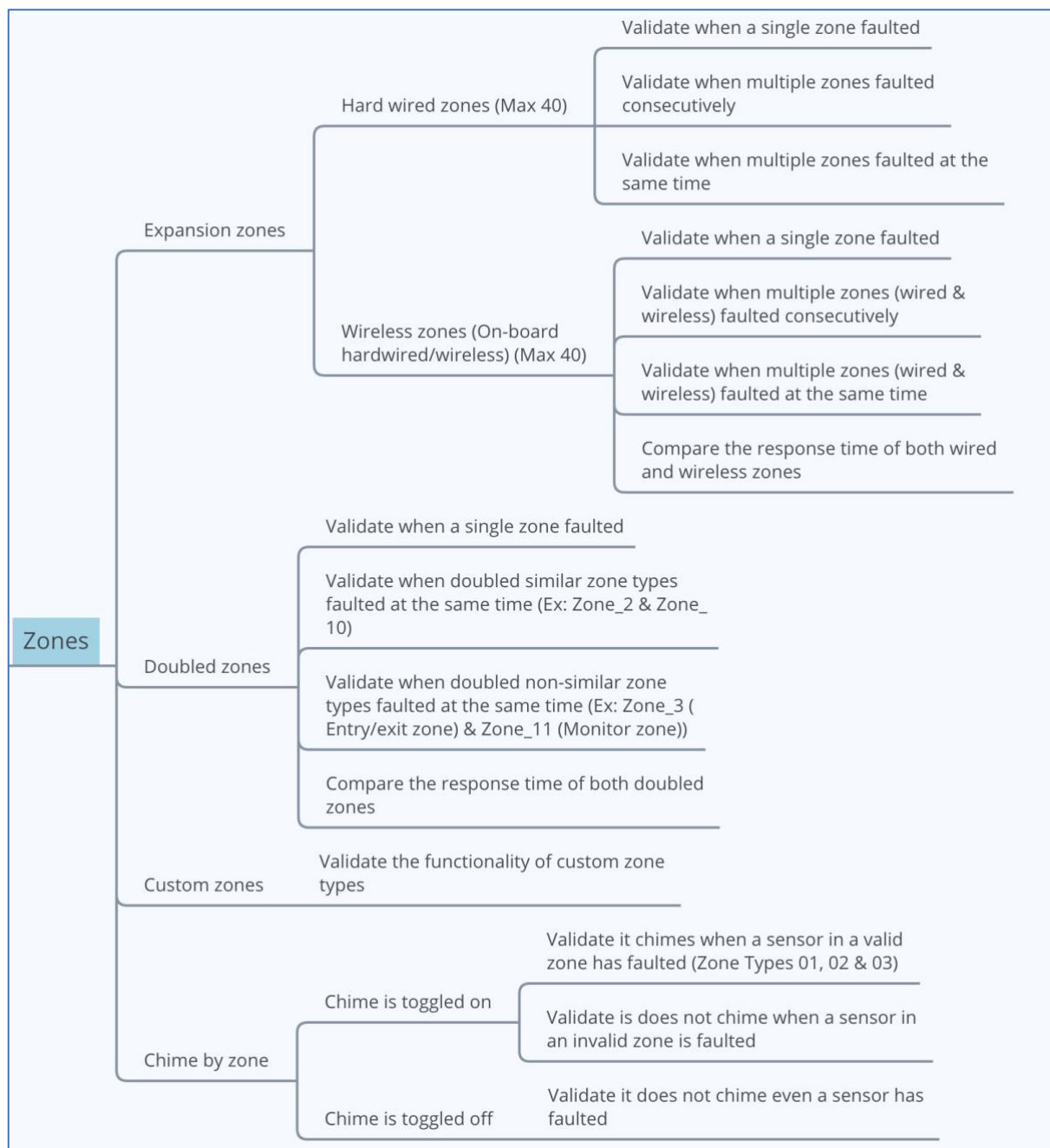
Component	Module	Features
Zones	Expansion Zones	Hardwired zones when faulted
		Wireless zones when faulted
	Doubled Zones	Doubled zones when faulted
	Custom Zones	Custom zone types
	Chime by Zone	Chime toggled on
		Chime toggled off

3.4 Partitions

Component	Module	Features
Partitions	Arming/Disarming	Single Partition
		Dual Partition
		Dual Partition with a common partition
		Global Arming
	Configurations	Unique partition account numbers
		'Go to' function in Keypad
		User assigning to partitions

3.5 Smoke Wires

Component	Module	Features
Smoke Wires	Smoke Wires	4-wire smoke
		2-wire smoke
		Reset the smoke
		Maintenance alert

3.6 Keypads
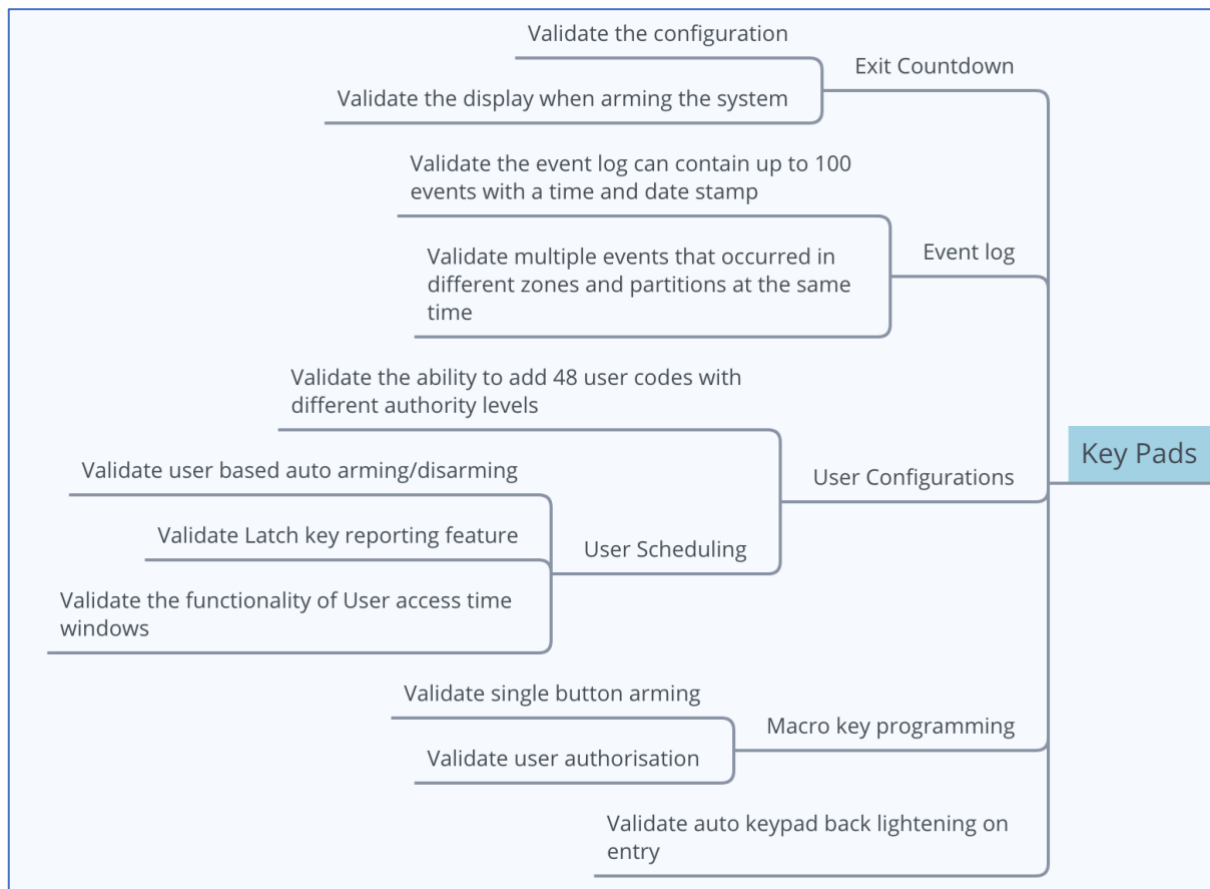
Component	Module	Features
Keypads	Exit Countdown	Configurations
		Functionality when arming/disarming
	Event Log	Log Display
		Multiple event tracking
	User Configurations	Add Users
		User authorization
		User scheduling
	Macro Key	Macro Key Programming
		Single-button arming

3.7   Key Fobs
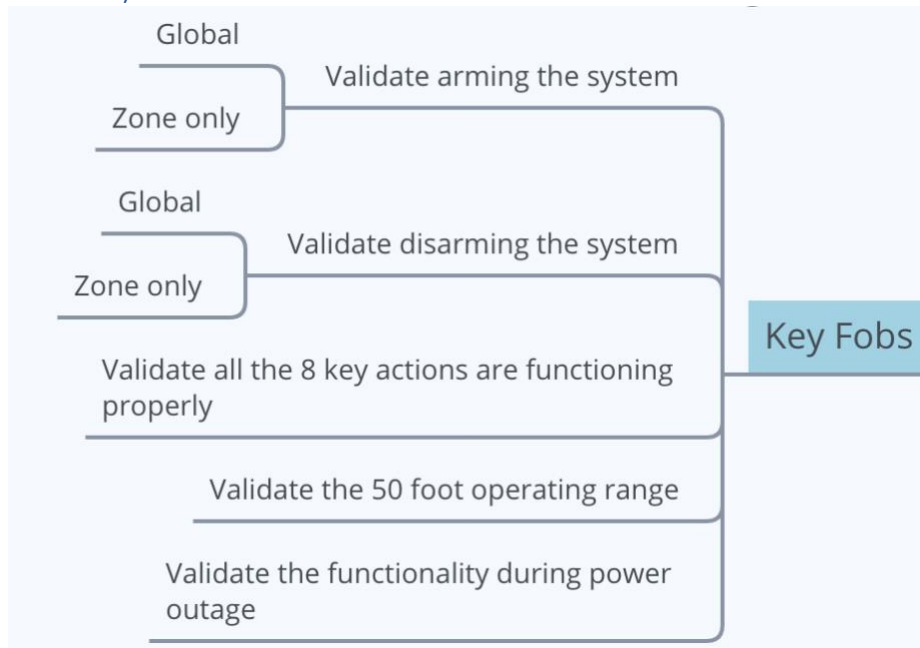
Component	Module	Features
Key Fobs	Key Fobs	Arming/Disarming
		8 Key actions
		50 ft. Operating coverage

3.8   VIP Module

Component	Module	Features
VIP	VIP	System control via touch phones

4   Testing Procedures

4.1   Setting up the environment

To proceed with the testing, QA team needs a separate isolate area to set up the test environment. The control panel along with other devices (keypads, communicators, smoke wires, input sensors, and other output devices) must be installed in the said testing area. A simulator must be available to generate signals when required.

4.2   Test Execution

For each system feature to be tested, team will execute the pre-defined test cases. Each test case will have a series of actions and expected results. As each action is performed, the results are evaluated. If all the results are equal to the expected results, the test will be marked as passed, or failed otherwise. Defects will be reported for the failures of the tests.
At the end of the test execution team needs to make sure all the configurations on the system are reset.

4.3 Entry/Exit Criteria

4.3.1 Entry Criteria

- Test environment is completely set up
- 0 Major failures at any component
- 0 Blockers and dependencies that are not resolved
- Smoke test suite is passed

4.3.2 Exit Criteria

- All defects tagged to the release are in "Closed" state
- 0 Blockers
- 100% test execution coverage
- Above 95% Pass rate

4.4 Defect Management

The testing team will be using JIRA tool to log and track defects. The assignment and description of defect severity levels will be as follows:

Severity	Description
Critical	Defects that block the feature objective or the completion of test case
High	Defects that can cause erroneous results and cause harm to the system
Medium	Defects which provide invalid information, but does not cause major issues to the system
Low	Defects that do not impact on the functionality

5 Assumptions

- Key Fobs are performing global arming when they are configured without zones
- The end user is well explained and informed about
  - The system installation
  - The recommended/accurate positions for components/devices to get installed (Ex: smoke wires are not recommended to install in Bathrooms or the Kitchen)
  - The supported voltage and amperes by the control panel

6   Risks & Contingencies

Risk/Contingency	Mitigation	Level of Impact	Likelihood	Risk Exposure
The test environment is not a replicate of the actual environment. The actual environment can be vary based on the building structure, weather conditions, etc.	Even though the team is not able to mitigate this risk completely, it is possible to level down the risk by keeping a separate isolate area for testing purposes, so that the team would be able to control the temperature and change the object positions within the testing area to make the environment more diverse.	High	High	**High**
Using simulators to generate signals does not replicate the real environment	Team can reduce the usage of signal simulators by using the actual devices integrated to the system.	High	Low	**Medium**