

## Engineering Requirements

1. The system shall be able to unlock up to 24 hours after being previously unlocked with current draw under 100mA during the period of inactivity.
  - a. Verifiable: Direct measurement of the battery capacity can show depletion. (Design for Test)
  - b. Abstract: No specific type of power supply has to be used.
  - c. Traceable: The client said that they would like any battery operated portion of the device to work up to 1 year after being on minimal power.
  - d. Unambiguous: Unlocking the system is an example of it's main use, and recording the current draw for the testing period has a benchmark to meet.
  
2. The system shall fit within an 8" x 8" area. (alt: the system must be no larger than 8" x 8")
  - a. Verifiable: The requirement will be verified by an inspection of the dimensions. (Design for Verification, White Box)
  - b. Abstract: The system can be smaller than 8"<sup>2</sup>.
  - c. Traceable: We were told by the client that the system would need to fit into an 8" x 8" area.
  - d. Unambiguous: Specific dimensions, 8" x 8".
  
3. The system shall unlock within 10 seconds of the user's activation action for 9/10 users.
  - a. Verifiable: This can be directly tested by users. (Design for Test)
  - b. Abstract: No limitations on what locking method is used.
  - c. Traceable: An analysis of vulnerabilities is required by the client.
  - d. Unambiguous: A specific time for a measurable number of users.
  
4. The system shall be able to report the battery's charge level with up to 5% accuracy.
  - a. Verifiable: The battery's actual charge level can be determined and compared with the reading. (Design for Analysis)
  - b. Abstract: No limitation on how or when the charge level is reported to the user.
  - c. Traceable: The client requires that the system can be used by multiple users and would like it to function up to 1 year after it is initially used without use in between. This is a method of allowing any user to check its status to.
  - d. Unambiguous: The accuracy rating of within 5% is verifiable and specific.
  
5. The system shall be rechargeable via an external source and will be able to be used while charging.
  - a. Verifiable: The system can be tested by users to see if it is operable while charging. (Design for Test)
  - b. Abstract: No specific charging method is mentioned.
  - c. Traceable: The client requested the possibility of external power to the system.
  - d. Unambiguous: All of the system's uses can be done while the system is charging.

6. The system shall have a quick connection option for end-users that allows them to quickly connect to the device with a wireless device within 30 seconds.
  - a. Verifiable: The system can be tested with a wireless device like a cell phone that can connect wirelessly to the system. (Design for Test)
  - b. Abstract: The connection method isn't specific other than needing to be wireless.
  - c. Traceable: The client asked for a plug-and-play system like "Chromecast or WPS".
  - d. Unambiguous: The system must connect in 30 seconds or less.
  
7. The system shall be able to be unlocked by a user with the correct credentials in a location where the system is not connected to the server.
  - a. Verifiable: The system can be moved out of range of the server and tested. (Design for Test)
  - b. Abstract: There isn't a specific location mentioned, and no explicit parameters for the condition of the location.
  - c. Traceable: The client asked the team to think about having the system work in semi-remote locations.
  - d. Unambiguous: The user needs the correct credentials to activate the device.
  
8. After initial configuration, the system shall not need to be reconnected to a server to receive updates, unlock, be reset, or otherwise operate normally.
  - a. Verifiable: The system can be disconnected from the server and ran through a list of tests (to be determined) that can verify this requirement.
  - b. Abstract: No mention of how the system will need to operate in each scenario.
  - c. Traceable: The client suggested that the system could work for long-term storage even if the "manufacturer" no longer existed.
  - d. Unambiguous: The system can be tested specifically to work in an area with no server connection.
  
9. The system shall provide an authenticated method for granting temporary access (which automatically expires) to selected non-administrative users.
  - a. Verifiable: Expiration of access and access restrictions can be demonstrated.
  - b. Abstract: The period of access method of authentication may vary.
  - c. Traceable: The client requires a secure method for users to pick up a package from the system.
  - d. Unambiguous: User privileging scope and automatic expiration are specified.
  
10. The system shall display status information (including locked/unlocked) to administrators via an internet connection.
  - a. Verifiable: Administrator accounts can view system status information from an independent local area network.
  - b. Abstract: Status information and viewing methods may vary.
  - c. Traceable: The client requires that the system status can be viewed remotely.

- d. Unambiguous: A minimum level of status information, and a method of communication are defined.
11. The system shall have the ability to be administered by multiple authenticated users.
- a. Verifiable: Multiple individuals may sign into their own accounts, and control the same system.
  - b. Abstract: The exact number of users and methods of authentication may vary.
  - c. Traceable: The client requires that the system is secure, and able to be controlled by multiple people (for use by a store).
  - d. Unambiguous: The number of authenticated administrators must be able to be greater than one.
12. The system shall accept and store conventional Wi-Fi credentials (including SSID, and password) during the setup process.
- a. Verifiable: The system will be able to reconnect to the configured Wi-Fi network after power cycling, demonstrating that the credentials have been stored.
  - b. Abstract: The credentials may be accepted using various methods and technologies.
  - c. Traceable: The client requires a user-friendly setup process, specifically including the ability to configure Wi-Fi settings.
  - d. Unambiguous: The specific credentials are listed in the requirement.