Software Requirements Specification

for

ADLynk Multi-Channel Advertising Management Platform

Version 1.0

Muhammad Hamza (NUM-BSCS-2024-48)
Bilal Ahmed Khan (NUM-BSCS-2024-21)

Department of Computer Science
Namal University, Mianwali

November 28, 2025

Contents

1 Introduction

Advertising is a crucial part of every business, but managing campaigns across multiple platforms can be complex and time-consuming. Our Multi-Channel Advertising Management Platform provides a digital solution that brings all advertising options together in one place — from online promotions and social media marketing to traditional methods like billboards and vehicle branding.

Business owners no longer need to contact multiple agencies or negotiate separate deals. Through our platform, they can easily find and book advertising services digitally, as well as reserve billboard spaces in different cities across Pakistan — all from a single, convenient dashboard.

This solution operates under ADLynk, which leverages digital innovation to make advertising easier and more effective. It makes professional advertising accessible to everyone — not just large corporations and retailers, but also small businesses, startups, and online store owners — enabling them to run complete marketing campaigns with transparent pricing, simplified booking, and clear performance tracking.

By centralizing the entire advertising process, our platform saves time, reduces costs, and improves coordination across all marketing channels, while also helping advertisers, billboard owners, and influencers connect with more clients efficiently.

1.1 Purpose

This Software Requirements Specification (SRS) document provides a complete description of the functional and non-functional requirements for the ADLynk Multi-Channel Advertising Management Platform. This document is intended for the development team, project stakeholders, requirement provider, and academic supervisors. It serves as the foundation for the design, implementation, testing, and validation phases of the project.

The primary purpose of this SRS is to:

- Define all functional requirements of the ADLynk platform

- Specify non-functional requirements including performance, security, and usability

- Establish a clear understanding between the development team and the requirement provider

- Provide a reference for testing and validation activities

- Serve as a contractual basis for the academic project deliverables

1.2 Scope

The ADLynk Multi-Channel Advertising Management Platform is a mobile application designed to centralize and streamline advertising services across multiple channels including billboards, vehicle branding, and social media marketing. The system will serve as a digital marketplace connecting business owners with professional advertisers, billboard owners, vehicle advertisers, and social media influencers.

1.2.1 Product Name

ADLynk - Multi-Channel Advertising Management Platform

1.2.2 Benefits and Goals

The system will provide the following benefits:

- Centralized platform for managing multiple advertising channels

- Simplified booking process for billboard spaces and advertising services

- Transparent pricing and performance tracking

- Increased accessibility for small businesses and startups

- Enhanced visibility for service providers and advertisers

- Reduced time and cost in managing advertising campaigns

- Digital transformation of traditional advertising methods

1.2.3 Product Objectives

- Provide a unified digital platform for all advertising services

- Enable business owners to discover, compare, and book advertising services

- Connect advertisers, billboard owners, and influencers with potential clients

- Facilitate campaign management and performance tracking

- Implement secure payment processing and booking systems

- Support scalability for nationwide expansion across Pakistan

1.3 Definitions, Acronyms, and Abbreviations

- **ADLynk:** The Multi-Channel Advertising Management Platform

- **API:** Application Programming Interface

- **SRS:** Software Requirements Specification

- **RP:** Requirement Provider

- **UI:** User Interface

- **UX:** User Experience

- **UAT:** User Acceptance Testing

- **MVP:** Minimum Viable Product

- **NFR:** Non-Functional Requirement

- **Business Owner:** Individual or organization seeking advertising services

- **Service Provider:** Advertisers, billboard owners, vehicle advertisers, or influencers offering services

- **Campaign:** A coordinated advertising effort across one or more channels

- **Billboard Space:** Physical advertising location available for booking

- **Vehicle Branding:** Advertisement on vehicles including cars, buses, and rickshaws

- **Influencer:** Social media content creator who promotes brands

- **Booking:** Reservation of advertising service or space

- **Administrator:** Platform manager with system-wide privileges

1.4   References

1. IEEE Std 830-1984, IEEE Guide to Software Requirements Specifications

2. Project Proposal: Multi-Channel Advertising Management Platform, November 2025

3. Requirement Provider Agreement between Saqlain Baig and Development Team

4. CSC-225 Software Engineering Course Materials, Namal University

5. Agile Software Development Principles and Scrum Framework

6. Flutter Documentation: `https://flutter.dev/docs`

7. Firebase Documentation: `https://firebase.google.com/docs`

1.5   Overview

The remainder of this document is organized as follows:

- **Section 2 - Overall Description:** Provides context for the system including product perspective, functions, user characteristics, constraints, assumptions, and dependencies.

- **Section 3 - Specific Requirements:** Details all functional requirements, external interface requirements, and non-functional requirements.

- **Appendices:** Include Context Diagram, Use Case Diagram, and additional reference materials.

2   Overall Description

2.1   Product Perspective

ADLynk is a new, self-contained mobile application that operates as an independent digital marketplace for advertising services in Pakistan. The system does not replace existing advertising methods but rather integrates them into a unified platform.

2.1.1 System Interfaces

The system will interface with:

- Mobile operating systems (Android and iOS)

- Backend server infrastructure

- Firebase Realtime Database/Firestore for data storage

- Payment gateway APIs for transaction processing

- Notification services for push notifications

- Map services for location-based features

2.1.2 User Interfaces

The mobile application will provide intuitive user interfaces for:

- Registration and authentication

- Service discovery and browsing

- Campaign creation and management

- Booking and reservation

- Payment processing

- Profile management

- Communication between users

- Performance analytics and reporting

2.1.3 Hardware Interfaces

- Smartphone devices (Android 8.0+ and iOS 12.0+)

- Camera for photo uploads

- GPS for location services

- Network connectivity (WiFi/Mobile Data)

2.1.4 Software Interfaces

- Operating Systems: Android and iOS

- Backend: Node.js or Python (Django/Flask)

- Database: Firebase Realtime Database/Firestore

- Development Framework: Flutter or React Native

- RESTful APIs for client-server communication

2.1.5 Communications Interfaces

- HTTPS protocol for secure data transmission

- RESTful API communication

- Real-time data synchronization

- Push notification protocols

- Email and SMS for notifications

2.1.6 Memory Constraints

- Mobile app size: Maximum 100 MB

- Local cache storage: Up to 200 MB

- Image uploads: Maximum 5 MB per image

- Database storage: Scalable cloud storage

2.1.7 Operations

The system will support the following operational modes:

- Online mode: Full functionality with internet connection

- Offline mode: Limited functionality for viewing cached data

- Background mode: Notifications and data synchronization

2.2 Product Functions

The major functions of ADLynk include:

2.2.1 User Management

- User registration and authentication

- Profile creation and management

- Role-based access control (Business Owners, Service Providers, Administrators)

- Account verification and security management

2.2.2 Service Discovery

- Browse available advertising services

- Search and filter by location, type, and price

- View detailed service provider profiles

- Compare service options

2.2.3 Billboard Management

- List available billboard spaces
- View billboard locations on map
- Check availability and pricing
- Book billboard spaces

2.2.4 Campaign Management

- Create multi-channel advertising campaigns
- Schedule campaign duration
- Manage campaign budgets
- Track campaign performance

2.2.5 Booking and Reservation

- Reserve advertising services
- Process booking requests
- Manage booking confirmations
- Handle cancellations and modifications

2.2.6 Payment Processing

- Secure payment transactions
- Multiple payment method support
- Transaction history
- Invoice generation

2.2.7 Communication

- In-app messaging between users
- Notifications for bookings and updates
- Support ticket system

2.2.8 Analytics and Reporting

- Campaign performance metrics
- Revenue tracking for service providers
- User engagement analytics
- Generate reports

2.3 User Characteristics

2.3.1 Business Owners

- **Technical Expertise:** Basic to intermediate smartphone usage skills

- **Education Level:** High school to university level

- **Experience:** May have limited experience with digital advertising platforms

- **Primary Goals:** Find affordable advertising services, manage campaigns efficiently, track ROI

- **User Base:** Small business owners, startups, e-commerce brands, large corporations

2.3.2 Service Providers (Advertisers, Billboard Owners, Influencers)

- **Technical Expertise:** Intermediate smartphone and business management skills

- **Education Level:** High school to university level

- **Experience:** Professional experience in advertising or marketing

- **Primary Goals:** Increase client base, manage bookings, maximize revenue

- **User Base:** Digital marketing agencies, billboard owners, vehicle advertisers, social media influencers

2.3.3 System Administrators

- **Technical Expertise:** Advanced technical and system management skills

- **Education Level:** University degree in Computer Science or related field

- **Experience:** System administration and platform management

- **Primary Goals:** Maintain platform stability, monitor activities, resolve disputes

2.4 Constraints

2.4.1 Regulatory Constraints

- Must comply with Pakistan's data protection and privacy laws

- Must adhere to advertising standards and regulations

- Must comply with mobile app store policies (Google Play, Apple App Store)

2.4.2 Hardware Limitations

- Must function on devices with limited storage and processing power

- Must support various screen sizes and resolutions

- Requires stable internet connection for full functionality

2.4.3 Interface Constraints

- Must maintain consistent UI/UX across Android and iOS platforms

- Must support Urdu and English languages

- Must be accessible to users with basic technical literacy

2.4.4 Development Constraints

- Academic project timeline (November 2025 - March 2026)

- Limited development team (2 developers)

- Academic resource constraints

- Must deliver MVP within semester timeframe

2.4.5 Technical Constraints

- Cross-platform compatibility requirement (Android and iOS)

- Must use approved technology stack (Flutter/React Native, Firebase)

- Limited third-party API integrations due to cost constraints

2.5 Assumptions and Dependencies

2.5.1 Assumptions

- Users have access to smartphones with Android 8.0+ or iOS 12.0+

- Users have basic smartphone operation skills

- Internet connectivity is available to users

- Service providers will maintain accurate and updated information

- Payment gateway services will remain operational

- Firebase services will continue to be available and affordable

- Billboard owners and advertisers are willing to adopt digital platform

- Business owners will trust online booking system

- The requirement provider will be available for regular feedback

2.5.2 Dependencies

- Availability of Firebase backend services

- Third-party payment gateway APIs

- Map service APIs for location features

- Notification service availability

- Mobile app store approval processes

- Internet service provider reliability

- Timely feedback from requirement provider (Saqlain Baig)

- Academic calendar and milestone deadlines

- Access to development tools and licenses

3 Specific Requirements

3.1 External Interface Requirements

3.1.1 User Interfaces

The mobile application shall provide intuitive user interfaces for:
UI-1: Registration and authentication screens with form validation
UI-2: Home dashboard showing:

- Quick access to main features

- Recent activity notifications

- Campaign status overview

UI-3: Service discovery interface with:

- Search bar with auto-complete

- Filter options (location, price, type, rating)

- Grid/list view of services

- Service detail pages

UI-4: Campaign management dashboard displaying:

- Active, upcoming, and completed campaigns

- Campaign performance metrics

- Budget tracking

UI-5: Booking interface with:

- Date/time selection

- Service customization options

- Pricing breakdown

- Confirmation screens

UI-6: Payment processing interface with:

- Payment method selection

- Secure payment forms

- Transaction receipts

UI-7: Profile management screens for updating user information
UI-8: Communication interface with:

- Chat message list

- Individual conversation threads

- Notification indicators

UI-9: Analytics and reporting interface with:

- Visual charts and graphs

- Performance metrics

- Export options

3.1.2 Hardware Interfaces

HW-1: The system shall interface with smartphone cameras to:

- Capture photos for service listings

- Upload campaign creative materials

- Take profile pictures

HW-2: The system shall interface with GPS hardware to:

- Determine user location

- Display nearby billboard locations

- Provide location-based service recommendations

HW-3: The system shall utilize device storage to:

- Cache frequently accessed data

- Store user session information

- Save downloaded reports and invoices

HW-4: The system shall require network connectivity (WiFi or mobile data) for:

- Real-time data synchronization

- API communication

- Push notification delivery

3.1.3   Software Interfaces

SW-1: Operating System Interfaces

- Android 8.0 (API Level 26) and above

- iOS 12.0 and above

SW-2: Backend Server Interface

- Technology: Node.js or Python (Django/Flask)

- Communication: RESTful API over HTTPS

- Data Format: JSON

SW-3: Database Interface

- System: Firebase Realtime Database or Firestore

- Purpose: Store user data, bookings, campaigns, and transactions

- Access: Through Firebase SDK

SW-4: Payment Gateway Interface

- Integration with third-party payment processors

- Support for credit/debit cards and mobile wallets

- Secure transaction processing

- API-based communication

SW-5: Map Service Interface

- Integration with Google Maps API or equivalent

- Display billboard locations

- Provide directions and navigation

SW-6: Notification Service Interface

- Firebase Cloud Messaging (FCM) for push notifications

- Email service API for email notifications

- SMS gateway API for text notifications

SW-7: Authentication Service Interface

- Firebase Authentication

- Support for email/password and social login

3.1.4 Communications Interfaces

COM-1: Network Protocol

- HTTPS protocol for all client-server communication

- TLS 1.2 or higher for encryption

COM-2: API Communication

- RESTful API architecture

- JSON data format

- Standard HTTP methods (GET, POST, PUT, DELETE)

COM-3: Real-time Data Synchronization

- WebSocket connections for real-time updates

- Firebase Realtime Database listeners

COM-4: Push Notifications

- Firebase Cloud Messaging (FCM) protocol

- Platform-specific notification delivery (APNs for iOS)

COM-5: Email Communication

- SMTP protocol for sending emails

- Support for HTML formatted emails

COM-6: SMS Communication

- SMS gateway API for text message delivery

- Two-factor authentication support

3.2 Functional Requirements

3.2.1 User Registration

REQ-F-1.1: The system shall allow users to register and log in as:

- Business Owners
- Advertisers / Marketing Agencies
- Billboard Owners
- Vehicle Advertising Providers
- Social Media Influencers
- Platform Administrator

3.2.2   User Profile Management

REQ-F-2.1: The system shall allow all users to:

- Create and update their profile information
- Manage contact details and service information

REQ-F-2.2: Service providers shall be able to list:

- Advertising services
- Pricing details
- Availability

3.2.3   Service Discovery and Search

REQ-F-3.1: The system shall allow business owners to:

- Browse available advertising services
- Search services based on category, location, and price
- View service provider details

3.2.4   Booking and Reservation

REQ-F-4.1: The system shall allow business owners to:

- Book advertising services digitally
- Reserve billboard spaces in different cities
- Schedule campaign duration

REQ-F-4.2: The system shall record booking details for future reference.

3.2.5   Campaign Management

REQ-F-5.1: The system shall provide business owners with a dashboard to:

- View active, upcoming, and completed campaigns
- Manage multiple advertising channels from one place

3.2.6   Payment Processing

REQ-F-6.1: The system shall provide a secure payment processing feature that allows business owners to:

- Make payments for booked advertising services through the platform
- View payment details and transaction summaries
- Receive confirmation after successful payment

REQ-F-6.2: The system shall record payment information related to campaigns for reference and management purposes.

3.2.7 Administrator Management

REQ-F-7.1: The system shall allow the administrator to:

- Manage user accounts
- Monitor platform activity
- Ensure proper system functioning

3.2.8 Ratings and Reviews

REQ-F-8.1: The system shall allow business owners to:

- Rate advertising service providers after campaign completion
- Submit reviews based on their experience

REQ-F-8.2: The system shall:

- Display ratings and reviews on service provider profiles
- Help other users make informed decisions when selecting advertising services

3.2.9 Requirement Change Support

REQ-F-9.1: The system shall support updates and modifications to services and campaigns based on mutually agreed requirement changes, as defined in the agreement.

3.3 Non-Functional Requirements

3.3.1 Performance

REQ-NF-1.1: The system shall respond to user 95percent actions within one second.
   REQ-NF-1.2: The system shall handle minimum 1000 concurrent users without performance degradation. **REQ-NF-1.3:** The system shall load the home screen within 3 seconds of application launch..
   REQ-NF-2.1: The system shall secure user authentication and data storage.
   REQ-NF-2.2: The system shall enforce password complexity requirements: minimum 8 characters including at least one uppercase letter, one lowercase letter, one number, and one special character **REQ-NF-2.4:** The system shall implement role-based access control to restrict features based on user roles.

3.3.2 Reliability

REQ-NF-3.1: The system shall perform consistently under normal operating conditions.
   REQ-NF-3.2: The system shall minimize system failures during campaign booking and management. **REQ-NF-3.3:** The system shall have a Mean Time To Recovery (MTTR) of less than 2 hours for critical failures.
   REQ-NF-3.4: Critical operations (payment processing, booking confirmation) shall have a success rate of at least 99.9

3.3.3 Usability

REQ-NF-4.1: The system shall be operable after 30 minutes of training, achieve SUS Score ¿=70.

REQ-NF-4.2: The system shall be accessible to non-technical users such as small business owners.

REQ-NF-4.3: The system shall be designed with a clean and intuitive interface.

3.3.4 Availability

REQ-NF-5.1: The system should provide 99.5percent uptime, max 4 hours maintenance per month

REQ-NF-5.2: The system shall be reliable for campaign booking and management activities.

3.3.5 Scalability

REQ-NF-6.1: The system shall be scalable to:

- Support increasing numbers of users
- Add more advertising services and locations across Pakistan **REQ-NF-6.2:** The system shall support geographic expansion to all major cities in Pakistan without requiring significant architectural changes.

3.3.6 Compatibility

REQ-NF-7.1: The system shall support Android and iOS platforms.

REQ-NF-7.2: The system shall work consistently across different mobile devices.
REQ-NF-7.3: The system shall support screen resolutions from 720x1280 pixels to 1440x3040 pixels.

A Context Diagram

The Context Diagram (Figure 1) illustrates the ADLynk system boundary and its interactions with external entities. The diagram shows the system at the center with the following external entities:

- **Business Owners:** Small businesses, startups, e-commerce companies seeking advertising services. They submit service requests, make bookings, process payments, and receive campaign reports.

- **Service Providers:** Advertisers, billboard owners, vehicle advertisers, and social media influencers who list services, manage availability, receive bookings, and track revenue.

- **System Administrators:** Platform managers and system supervisors who monitor system activity, manage users, resolve disputes, and generate system reports.

- **Payment Gateway:** External payment processing services (JazzCash, EasyPaisa, Stripe) that process transactions and return payment confirmations.

Data Flows:
From Business Owners to System:

- Search queries and service requests

- Booking requests and campaign data

- Payment information

- Confirmations and acknowledgments

From System to Business Owners:

- Service listings and available options

- Booking confirmations

- Campaign analytics and reports

- Payment information and receipts

From Service Providers to System:

- Service registration and portfolio data

- Availability updates and pricing information

- Payment notifications

From System to Service Providers:

- Booking details and client information

- Campaign reports and performance metrics

- Availability updates

From Administrators to System:

- User management and system configuration

- System reports requests

From System to Administrators:

- System reports and activity logs

System and Payment Gateway:

- Payment requests and transaction data (System to Gateway)

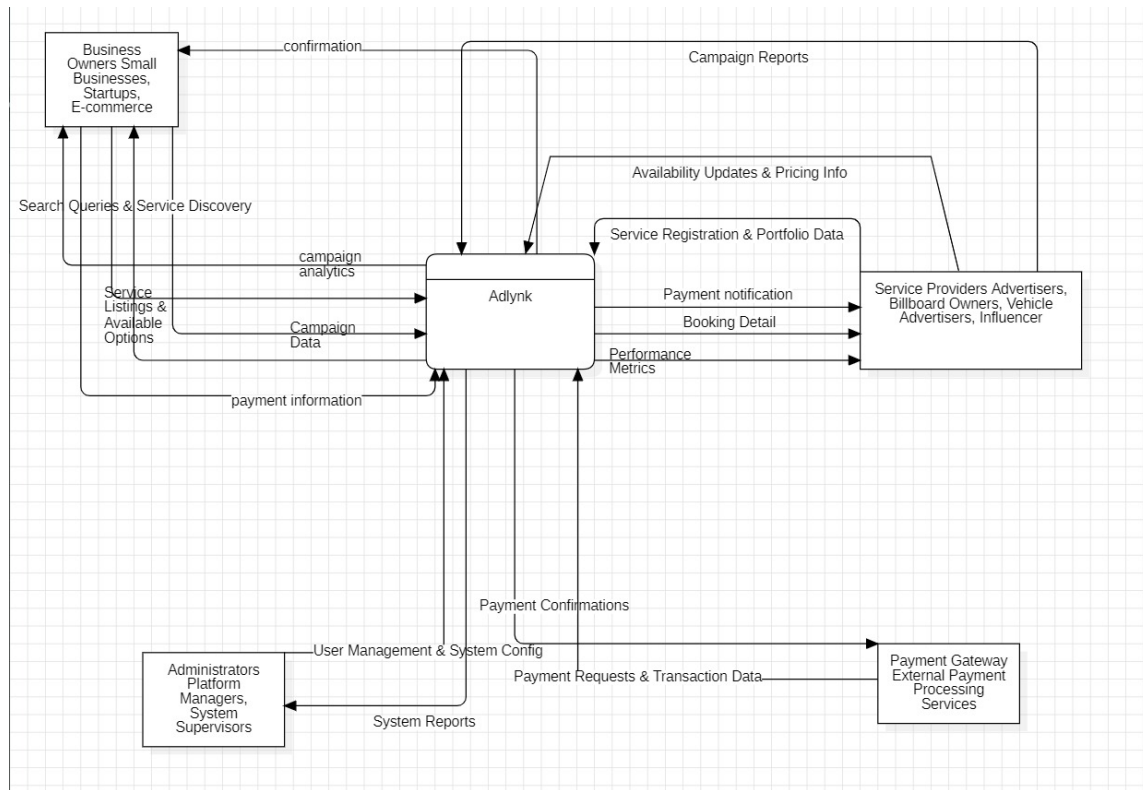- Payment confirmations and receipts (Gateway to System)

Figure 1: ADLynk System Context Diagram

B Use Case Diagram

The Use Case Diagram (Figure 2) depicts the main functional interactions between actors and the ADLynk system.
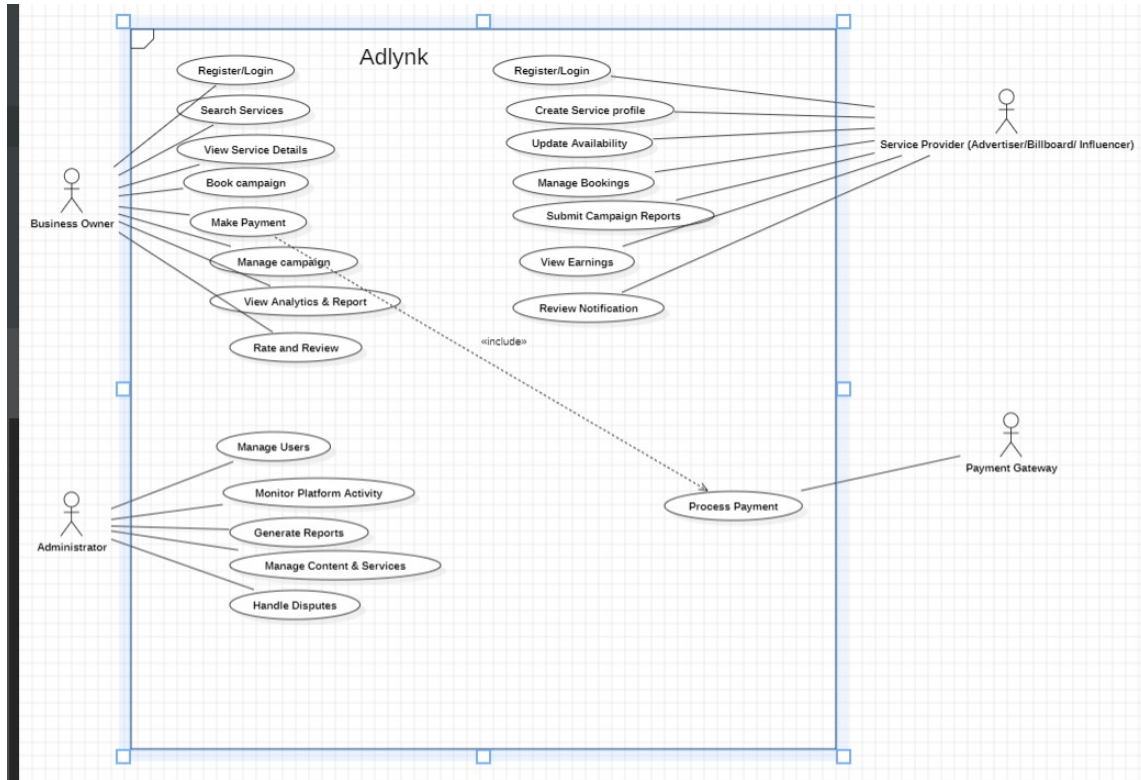
Figure 2: ADLynk System Use Case Diagram

C   Glossary

Additional terms and definitions relevant to the ADLynk platform are provided in Section 1.3 of this document.

D   Change Log

- Version 1.0 (November 28, 2025): Initial SRS document created