iPad Hearing Test Application — Requirements Document

1. Overview

This iPad application enables certified hearing test administrators to efficiently conduct and record employee hearing assessments while maintaining HIPAA compliance. Testers authenticate via secure JWT-based login and can select from tenants, groups, and individual employee profiles provided by backend APIs. Employee selection can be done manually or via driver's license scanning. Once a profile is selected, the application retrieves a detailed testing path—including frequencies, decibels, and ear targets—and guides the tester through each step of the hearing test. Results are securely transmitted to the backend API for storage, enabling streamlined, accurate, and compliant occupational hearing testing.

In addition to the testing, another important requirement is to be able to calibrate the application and headphones to ensure the audio being outputted is in fact the audio desired, both the frequency and the decibel level.

---

2. Goals

- Provide an intuitive iPad-based workflow for certified testers.
- Ensure HIPAA-compliant data handling and transmission.
- Support multiple tenants per tester account.

---

3. Functional Requirements

3.1 User Authentication

- **Login**: Certified testers log in with username and password.
- **Authentication Method**: REST API call to backend returning a JWT token.

- **Security**: All communication via HTTPS (TLS 1.2+).
- **HIPAA**: Token storage must be secure (Keychain) and expire after inactivity.

3.2 Tenant Selection

1. **Fetch Tenants**: After authentication, the application performs a `GET /tenants` call to retrieve a list of tenants the user has access to.
2. **Tenant Selection**: The tester selects the tenant they are currently working with.

Tenant Context: The selected `tenant_id` is used in all subsequent API calls in the **URL path** format:

```
/api/{tenant_id}/...
```

3.3 Group Selection

- **Fetch Groups**: API call `GET /api/{tenant_id}/groups` retrieves available groups for the selected tenant.
- **Group Selection**: Tester selects the target group to administer tests.

3.4 Profile Selection

- **Fetch Profiles**: API call `GET /api/{tenant_id}/groups/{group_id}/profiles` retrieves a list of employee profiles.
- **Profile Search Options**:
    - Scan driver's license (camera-based PDF417 - parser)
    - Manual search in the profile list.
    - Add new user profile (form entry).

3.5 Profile Data Retrieval (Pre-Test)

- **Fetch Profile Information**: API call `GET /api/{tenant_id}/profiles/{profile_id}` returns:
    - Profile demographics.
    - Assigned testing path:
        - **Frequency** (Hz).
        - **Decibel** (dB).
        - **Ear**: Left, Right, Both.
    - Test path is an **array** of datasets defining each step in the hearing test.

3.6 Hearing Test Execution

- **UI Display**:
    - Current frequency (Hz) and decibel (dB).
    - Ear being tested (Left/Right/Both).
    - “Heard” / “Not Heard” button for tester input.
- **Progress Tracking**:
    - Iterate through test path array until complete.
- **Test Rules**:
    - All results stored temporarily on device until submission.
    - HIPAA-compliant in-memory storage (no writing to disk unless encrypted).

3.7 Results Submission

- **Submit Test**: `POST /api/{tenant_id}/profiles/{profile_id}/tests`
- **Payload**:
    - Test metadata (date/time, tester ID, device ID).
    - Individual test step results (frequency, dB, ear, heard/not heard).
- **On Success**: Return to profile list for the group.

---

4. Non-Functional Requirements

- **HIPAA Compliance**:
    - Data encryption in transit (TLS 1.2+).
    - Data encryption at rest (AES-256 if stored).
    - Secure authentication (JWT with refresh tokens).
    - Automatic logout after configurable inactivity period.
- **Performance**:
    - All API calls < 1s response time in typical network conditions.
- **Reliability**:
    - Offline test caching with later sync if connectivity is lost.
- **Usability**:
    - Touch-friendly interface optimized for iPad.
    - Large, clear buttons for hearing test responses.

---

5. API Endpoints (Illustrative)

```
POST /login
GET  /tenants
GET  /api/{tenant_id}/groups
GET  /api/{tenant_id}/groups/{group_id}/profiles
GET  /api/{tenant_id}/profiles/{profile_id}
POST /api/{tenant_id}/profiles/{profile_id}/tests
```

---

6. Flow Diagram

```
flowchart TD
    A[Login Screen] -->|POST /login| B[JWT Returned]
    B --> C[Fetch Tenants]
    C -->|GET /tenants| D[Select Tenant]
    D --> E[Fetch Groups]
    E -->|GET /api/{tenant_id}/groups| F[Select Group]
    F --> G[Fetch Profiles]
    G -->|GET /api/{tenant_id}/groups/{group_id}/profiles| H[Select or
Add Profile]
    H --> I[Fetch Profile Info & Test Path]
    I -->|GET /api/{tenant_id}/profiles/{profile_id}| J[Run Hearing
Test]
    J --> K[Submit Results]
    K -->|POST /api/{tenant_id}/profiles/{profile_id}/tests| F
```

---

7. UI Screens

1. **Login Screen**
    - Username/password fields.
    - Secure login button.
2. **Tenant Selection Screen**

- List of tenants user can access.
- Large, tappable list items.

3. **Group Selection Screen**
    - Scrollable list of groups.
    - Search/filter option.
4. **Profile Selection Screen**
    - Search bar.
    - Driver’s license scan button.
    - Add profile button.
    - Scrollable profile list.
5. **Profile Detail & Test Path Screen**
    - Profile photo/name/details.
    - List of upcoming test steps (Hz/dB/Ear).
6. **Hearing Test Screen**
    - Large display of frequency/dB.
    - Ear indicator.
    - "Heard" / "Not Heard" buttons.
7. **Results Submission Screen**
    - Summary of test results.
    - Confirm & submit button.