CHAPTER 5
QUALITY ASSURANCE

A. Purpose

The purpose of this Software Quality Assurance (SQA) Plan is to establish the goals, processes, and responsibilities required to implement effective quality assurance functions for the CLARITEAR Mobile Application project.

The CLARITEAR Mobile Application Software Quality Assurance Plan provides the framework necessary to ensure a consistent approach to software quality assurance throughout the project life cycle. It defines the approach that will be used by the SAM and Software Quality (SQ) personnel to monitor and assess software development processes and products to provide objective insight into the maturity and quality of the software.

B. Scope

This plan covers SQA activities throughout the phases of the CLARITEAR Mobile Application mission.

This project is to create an Android-based application called ClarietEar. ClaritEar (/ˈklær.ə.tɪər/) is an educational and entertainment applications based on Android that are useful to train your hearing sensitivity in knowing the kind of tone or chord that is being played. With this application we hope people will gain more knowledge about music chords. Also we hope our application will be helping a lot of people on becoming new musician.

C. Reference Documents

The following documents were used or referenced in the development of this plan:

- IEEE STD 730-2002, IEEE Standard for Software Quality Assurance Plans

- CLARITEAR Mobile Application Preliminary Project Plan

- CLARITEAR Mobile Application Software Management Plan (or Product Plan)

- CLARITEAR Mobile Application Software Test Document

D. Management

This section describes the management organizational structure, its roles and responsibilities, and the software quality tasks to be performed.

Management Organization

CLARITEAR Mobile Application efforts are supported by personnel Relevant entities/roles that are of interest and applicable to this SQA Plan and the software assurance effort are described at a high level below.

Product Assessments

The following are typical product assessments that may be conducted by SQ personnel. See the SQ Activity Schedule for the planned assessments:

- Peer Review packages

- Document Reviews

- Software Management Plan

- Software Test Document

- Test results

Process Assessments

The following are typical process assessments that may be conducted by SQ personnel. See the SQ Activity Schedule for the planned assessments:

- Project Planning

- Project Monitoring and Control

- Measurement and Analysis

- System/Subsystem Reviews

- Peer Reviews

- Requirements Management

- Software Configuration Management and Configuration Audits (FCA/PCA)

- Test Management (Verification & Validation)

- Software Problem Reporting and Corrective Action

- Risk Management

- Supplier Agreement Management

Roles and Responsibility

This section describes the roles and responsibilities for each assurance person assigned to the CLARITEAR Mobile Application Project.

SAM

Responsibilities include, but are not limited to:

- Secure and manage SQ personnel resource levels

- Ensure that SQ personnel have office space and the appropriate tools to conduct SQ activities

- Provide general guidance and direction to the SQ personnel responsible for conducting software quality activities and assessments

- Escalate any noncompliances to project management

Software Quality Personnel

Responsibilities include, but are not limited to:

- Develop and maintain the project software quality assurance plan

- Generate and maintain a schedule of software quality assurance activities

- Conduct process and product assessments, as described within this plan, using objective criteria

- Interface with Safety, Reliability, and IV&V personnel on software assurance activities

- Identify and document noncompliances, observations, and risks from all software assurance related activities to the SAM

- Communicate results from assessments with relevant stakeholders

- Ensure resolution of noncompliances and escalate any issues that cannot be resolved within the project

- Identify lessons learned that could improve processes for future products

- Develop and maintain metrics

Safety Personnel

Responsibilities include, but are not limited to:

- Provide system software safety expertise to the SQ personnel and/or project personnel, as required

- Assist in the assessment of the various software development efforts in terms of meeting applicable software safety standards and requirements

- Assist in the resolution of any software safety related issues, concerns, and/or risks identified throughout the project life cycle

- Assist in the review of various life cycle related artifacts as they pertain to system software safety

For additional support information, reference the project's System Safety Plan.

[Note: make sure this information is covered in the System Safety Plan.]

Reliability Personnel

Responsibilities include, but are not limited to:

- Provide software reliability expertise to the SQ personnel and/or project personnel, as required. Assist in the assessment of the various software development efforts in terms of meeting applicable software reliability standards and requirements

- Assist in the resolution of any software reliability related issues, concerns, and/or risks identified throughout the life cycle

- Assist in the review of various life cycle related artifacts as they pertain to software reliability

Software Assurance Estimated Resources

Staffing to support software assurance activities must be balanced against various project characteristics and constraints, including cost, schedule, maturity level of the providers, criticality of the software being developed, return on investment, perceived risk, etc.

Documentation

Purpose

This section identifies the minimum documentation governing the requirements, development, verification, validation, and maintenance of software that falls within the scope of this software quality plan. Each document below shall be assessed (reviewed) by SQ personnel.

Minimum Documentation Requirement

- Quality Manual

- Software Assurance Plan

- Software Management Plan

- Configuration Management Plan

- Software Requirements Specification

- Risk Management Plan

- Software Safety Plan

- Test Plans (Verification and Validation)

- Software User's Guide

- Software Maintenance Plan

- Interface Control Document(s)

- Test Reports and Artifacts

- Software Version Description Document (VDD)

- Software Requirements Traceability Matrix

- Software Development Records

- Peer Review data packages

Software Reviews

Purpose

This section identifies the number and type of system/subsystem reviews and engineering peer reviews that will be supported by the SQ Personnel. The Software Management Plan (SMP), the project milestone chart, the project's Engineering Peer Review Plan, and the SQ Personnel resource levels determine the reviews that are supported.

Minimum Software Reviews

For each review, SQ will assess the review products to assure that review packages are being developed according to the specified criteria, the review content is complete, accurate, and of sufficient detail, and Requests for Action are captured, reviewed, and tracked to closure. In addition, SQ will assess the processes used to conduct the reviews to determine if appropriate personnel are in attendance, correct information is presented, entry and exit criteria are met, and appropriate documents are identified for update.

Test

SQ personnel will assure that the test management processes and products are being implemented per the Software Management Plan and /or Test Plan(s). This includes all types of testing of software system components as described in the test plan, specifically during integration testing (verification) and acceptance testing (validation).

SQ personnel will monitor testing efforts to assure that test schedules are adhered to and maintained to reflect an accurate progression of the testing activities. SQ will assure that tests are conducted using approved test procedures and appropriate test tools, and that test anomalies

are identified, documented, addressed, and tracked to closure. In addition, SQ will assure that assumptions, constraints, and test results are accurately recorded to substantiate the requirements verification/validation status.

SQ personnel will review post-test execution related artifacts including test reports, test results, problem reports, updated requirements verification matrices, etc.

Problem Reporting and Corrective Action

SQ personnel generate, track, and trend assessment findings/nonconformances and observations in the centralized Software Quality Engineering Repository Database (SQERD), available via claritear.contact.us@gmail.com. Reference the SQ Assessment Process WI for details on tracking and trending of assessment findings and observations and the reporting escalation process.

Tools, Techniques and Methodologies

SQ personnel will require access to the following:

Software Quality Tools

- Microsoft Office tools (i.e., Word, Excel, and PowerPoint)

- Android Studio IDE

- Access to idhostinger.com

- Access to the Soft CLARITEAR Mobile Application ware Quality Engineer Reporting Database

- Adobe Photoshop

Project Tools

- CLARITEAR Mobile Application Server

- CLARITEAR Mobile Application SPMP

- CLARITEAR Mobile Application Database

Media Control

SQ deliverables will be documented in one of the following Microsoft software applications: Word, Excel, or PowerPoint. Deliverables will be in soft copy, unless specified otherwise.

Software Quality deliverables, work products, and data items shall be maintained in accordance with the Software Quality Assurance Data Management Plan. This plan provides information on the data item, data category, owner, location, collection frequency, and data retention period.

Supplier Control

SQ personnel will conduct off-site surveillance activities at supplier sites on software development activities. SQ personnel will conduct a baseline assessment of the supplier(s) Quality Management Systems (QMS) to ensure that the supplier(s) have quality processes in place. This initial assessment will help to scope the level of effort and follow-on activities in the area of software quality assurance.

Process and product assessments will be conducted and any findings will be reported and tracked to resolution.

Insight: The application can generate the situation that the user need to fetch the sample question based on the situation from CLARITEAR Mobile Application Database.

Oversight: The ClaritEar Mobile Application Software Quality Assurance Plan provides the framework necessary to ensure a consistent approach to software quality assurance throughout the project life cycle. It defines the approach that will be used by the SAM and Software Quality (SQ) personnel to monitor and assess software development processes and products to provide objective insight into the maturity and quality of the software.

For software that is to be developed, the supplier shall be required to prepare and implement an SQAP in accordance with this standard. Discuss the receipt and review of that plan and how SQ will use the deliverable.

Also state the methods to be employed to assure that the suppliers comply with the requirements of this standard. If software is to be developed under contract, then the procedures for contract review and update shall be described.

Record Collection, Maintenance, and Retention

SQ personnel will maintain records that document assessments performed on the project. Maintaining these records will provide objective evidence and traceability of assessments performed throughout the project's life cycle. Example records include the process and product assessments reports, completed checklists, the SQ Activity Schedule, metrics, weekly status reports, etc.

Training

SQ personnel shall have fundamental knowledge in the following areas/disciplines through prior experience, training, or certification in methodologies, processes, and standards:

- Software Quality Assurance:

- Audits and Reviews

- Risk Management

- Configuration Management

- Software Safety

- Contracts/Contractor Surveillance

- Project-specific Training

- ISD Software Engineering Discussions

It is the responsibility of the SQ personnel to acquire the necessary skills or knowledge in each of the above disciplines. An SQ Training log has been prepared that specifies the type of training and/or on-the-job experience that has been completed, along with the source of the training, and the date of completion.

Risk Management

SQ personnel will assess the project's risk management process against the The CLARITEAR Mobile Application Risk Management Plan and GPG 7120.4. SQ participates in mothly risk management meetings and reports any software risks to the SAM and the project's Risk Manager.

SQA Plan Change Procedure and History

SQ personnel are responsible for the maintenance of this plan. It is expected that this plan will be updated throughout the life cycle to reflect any changes in support levels and SQ activities. Proposed changes shall be submitted to the CLARITEAR Mobile Application Systems Assurance Manager (SAM), along with supportive material justifying the proposed change. Changes to this document require prior approval of the ClaritEar Mobile Application Project CCB Chairperson.