**Contact Shield Demo App Deployment Document**

The purpose of the deployment of this application is to demonstrate the capabilities of the Contact Shield API developed by Huawei. This application is only deployed to a small number of users due to restrictions of the Contact Shield API. We will collect the statistics and display the results on our dashboard created from our Google Cloud database. Realistically, there are no real Covid-19 patients that are going to participate in the deployment, we will need to designate some devices as the patient device, and others non-patient to help us complete the interactions. We will have a website that functions as the testing center, which provides information needed to complete the deployment. The portal address is <http://34.69.249.103:5000/portal>. Please follow the guide for using the application and completing the testing scenarios detailed in this document.

Device Suggestion:

* Android 10
* EMUI 10
* HMS Core 5.0.1.307

Qualifications for testers and environment:

* Working environment
* Testers should be working closely (on the same floor) and encounter each other in a day

Download and Install:

Step 1. Download our APK, install it onto your device

Step 2. Accept any permissions for the application. Make sure Bluetooth is turned on and internet is connected. Here is an example of all the permissions allowed for the application. Note that location permission is required, however, we only use it for Bluetooth not GPS.

A screenshot of a cell phone

Description automatically generated

Step 3. Allow permissions in HMS Core. To run our app, you will only need to accept the storage and location permission, as highlighted in the screenshot below.A screenshot of a cell phone

Description automatically generated

Step 4. Allow App to run in background, which is adjusted in “Power Usage Details” in settings. Directions shown in the screenshot below:

A screenshot of a cell phone

Description automatically generated A screenshot of a cell phone

Description automatically generated A screenshot of a cell phone

Description automatically generated

Using the Application:

Non-Patient:

For users that are non-patients, here are the functions of the app.

\*\* Note: Contacts will be automatically recorded by the app when it is running in the background

|  |  |  |
| --- | --- | --- |
| **#** | **Title** | **Description** |
| 1 | Viewing the statistics and user control | The user will see a display of number of hits and risk level when entering the application. These numbers can be refreshed when new contacts are found. There is also controls over the application in the settings page. |
| 2 | Notifications and Alerts | The device will be receiving push notifications and alerts from the app if notification is not disabled.  Push Notification:   1. These notifications mostly are used for announcements for all users. 2. The user can see the notification in the notification center, and he/she can click the notification. 3. The user will be taken to a page where the specific details are displayed.   Alerts:   1. The device will generate an alert if when the risk level of a user is greater than or equal to medium high 2. The user will again see this alert in the notification center. 3. When clicking the alert, he/she will be taken to a page where the specific details are displayed. |

Patient:

If a user has been tested for COVID-19, there are some extra scenarios.

|  |  |  |
| --- | --- | --- |
| **#** | **Title** | **Description** |
| 1 | Report Positive Procedure (voluntary) | If a user has been tested positive for COVID-19, the user can self-report a positive test.   1. Click on the “report your results” button in the home page. This button will appear after you select positive in “My Status” panel. 2. After clicking on the button, the user will see a consent of sharing your result and notifying others. If the user agrees to share this information, click on the “share my test result” button. Otherwise, click “cancel”. 3. If the agreed to continue, the user will see the page for choosing a verification method. For security measures, the user needs to verify that he/she has received a positive test report by verifying with our server. This process is detailed in #2. 4. If the verification succeeds, the test has been successfully reported. |
| A screenshot of a cell phone  Description automatically generated A screenshot of a cell phone  Description automatically generated A screenshot of a cell phone  Description automatically generated | | |
| 2 | Verification Methods | When reporting a positive COVID-19 test, the user will need to verify their test results with two verification methods:  QR Code:   1. In this scenario, the user will receive a QR code along with their test report 2. The user selects the “Scan QR code” method on the verification method page 3. The user will then see a loading screen as the system processes 4. If scanned successfully, the user will then see the success screen   TELETAN:   1. In this scenario, the user will receive a verification teleTAN by calling a hotline 2. The user selects the “request TAN code” method on the verification method page 3. The user will be taken to a screen where he can call a hotline number directly by pressing the “call” button 4. After getting the 6-digit teleTAN number, the user presses the “enter tan” button, where the user will be taken to a page where he can enter this code 5. By pressing the “submit result” button, the user will successfully report a positive test   \*\*Note: a QR code does not have a limit on its lifetime, whereas a teleTAN has the lifetime of 30 mintues |
| Verification through QR code  A screenshot of a cell phone  Description automatically generatedA screenshot of a cell phone  Description automatically generatedA close up of a logo  Description automatically generatedA screenshot of a cell phone  Description automatically generated | | |
| Verification through TeleTAN  A screenshot of a cell phone  Description automatically generatedA screenshot of a cell phone  Description automatically generatedA screenshot of a cell phone  Description automatically generatedA screenshot of a cell phone  Description automatically generated | | |

Testing Scenarios

Actors involved: Patient, Non-Patient and testing center

**Before you begin:**

**Number of hits:** Patients will upload their anonymous periodic keys to the server daily. Once you refresh, the app downloads the newly added periodic keys, and then go check with the Bluetooth signals it has collected. Once the app finds a match, the number of hits will increase by one. The displayed number is the total number of hits since installation or latest clear data.

**Risk Level**: Each hit comes with a risk level, here we display the maximum risk level. The displayed risk level is the maximum risk level since installation or latest clear data.

**Clear data:** Once you click clear data, you removed all the data related to contact shield before and restart the contact shield engine.

If you focus on testing risk level, you may need to clear data often, because the displayed risk level will only change when the new risk new periodic keys bring is at record high. If you focus more on testing number of hits, be carefully to use clear data because it will wipe history.

**SCENARIO 1: Patients and non-patient interaction (exposed):**

**This test focus more on the accuracy of risk level returned by Contact Shield, so we would like to record the findings in the table below.**

1. The patient device A and a non-patient device B comes in close contact for some time at various distance (recommended testing at distance 1m, 2m, and 3m for 10min, 20 min and 30 min)
2. Afterwards, device A reports a positive test and then device B should receive a notification for a possible exposure and recommendation to get tested
   1. In the home page, Device B should see the number of hits with COVID-19 patients increase by 1 and a possible risk level
3. The device B gets tested positive and generate a QR Code through the testing center website
4. Device B should go through the self-reporting and verification process

**SCENARIO 2: Patients and non-patient interaction (not exposed):**

1. The patient device A and a non-patient device B comes in close contact for more than 15 minutes
2. Afterwards, the device B should receive a notification for a possible exposure and recommendation to get tested
   1. In the home page, Device B should see the number of hits with COVID-19 patients increase by 1 and the risk level should increase
3. The device B gets tested negative and he does not need to go through the reporting and verifying process

**SCENARIO 3: Non-patient and non-patient interaction (not exposed):**

1. The non-patient device A and a non-patient device B comes in close contact for more than 15 minutes
2. Nothing will change since none of the devices are patients

**SCENARIO 4: Multiple non-patients and multiple patients interaction (5 days):**

1. 10 testers will participate in this experiment and 3 of them will choose to be patients
   1. Testers are preferably working in the same department and on the same floor, where they will encounter each other occasionally each day
2. Patients will submit a positive test result through either teleTAN or QR code at the start of each day
3. All testers can refresh and clear data whenever they want during the day
4. Repeat this test for 5 days.

**Testing Center:**

The portal (<http://34.69.249.103:5000/portal>) we created will act as the testing center. When a user becomes a patient of Covid-19, the patients can retrieve the QR code and teleTAN from the site in order to verify a positive test. We will only want patients to use the site in order to submit a test report.

An example of what the portal will look like is shown in this screenshot below:

A close up of a flower

Description automatically generated

**Push Notification:**

1. Generate a new notification through AGC
2. All users should receive this notification

Warning and Error display

|  |  |  |
| --- | --- | --- |
| **#** | **Title** | **Scenario Solution** |
| 1 | App disabled when the user is trying to report a positive test | 1. The user is trying to report a positive test by changing his/her status in the home page while he/she disabled the app 2. Error message appears asking the user to enable the app in order to use this function |
| 2 | QR code invalid during the scanning process | 1. The user is going through the verification process with an invalid QR code 2. The user will be taken to a report unsuccessful page upon submission, asking them to recheck their QR code |
| 3 | App cannot access camera when trying to scan QR code | 1. The user is going through the verification process with the “scan QR code” method 2. The user did not enable the access for camera on the device 3. Error message appears asking the user to provide access to the camera |
| 4 | No internet connection while reporting a positive test | 1. The user does not have internet connection while reporting a positive test 2. The user will be taken to a page where it asks the user to turn on internet to proceed |
| 5 | User does not have a positive test but tries to report positive | 1. The user reports positive and goes through the verification process 2. The user will not be able to successfully obtain a valid QR code or teleTAN |
| 6 | The user enters an invalid teleTAN | 1. The user entered the wrong 6 digit or an expired teleTAN verification code 2. The user will be taken to a report unsuccessful page upon submission, asking them to recheck their teleTAN code |
| 7 | teleTAN is not the correct format | 1. The user enters a teleTAN that is an incorrect format (not 6 digits or not numbers) 2. When the user tries to submit, an error message will appear on the screen |