

# AN

## NFC DTA APK Setup Guide

Rev 2.2 – 2017 June 27

Application Note

### Document information

Info	Content
<b>Keywords</b>	NFC, Android, DTA APK
<b>Abstract</b>	This document provides information on how to use NFC DTA APK on Android platform to validate NFC Forum compliance test cases.



Revision history		
Rev	Date	Description
1.0	2014-07-07	Initial version
1.1	2014-07-24	Update for Sec 4 (For apk installation) & 4.1 (removed port permissions)
1.2	2014-08-28	Update with DTA 5.2 version for all screen shots, added DTA supported features in selection 3 & 4.2.3 selection for Analog. Added screen timeout settings in section 4.0
1.3	2014-09-05	Updated 3.2 Wave-II testing. Added section 4.3.1 for LLCP testing. Added section 4.3.2 for SNEP testing. Limitation note on SNEP testing.
1.4	2014-09-12	Updated SNEP UI Changes and removed DEP(I) & DEP(T) radio buttons in Wave-II in DTA main screen.
1.5	2014-09-16	Updated SNEP testing scenario. Config file changes required for testing SNEP
1.6	2014-11-14	Updated background color in DTA main screen and Removed Initializing status screen.
1.7	2014-11-28	Updated with DTA UI with ESE in Card Emulation, UI version in Device Info and DTA Automation for Microgross Tool. SNEP UI for SNEP client message and server message.
1.8	2015-04-01	Updated GUI for selection of features for RF technologies for A, B, F in Poll & Listen mode. Added option to enable/disable parameters in Connect PDU in LLCP.
1.9	2015-11-10	Removed additional configurations to be done for SNEP as it is handled automatically.
2.0	2016-08-25	Updated DTA UI for selection of CR8/CR9. Certification Release (CR). Added UI toast messages for CR9 HCE NFC-F test case configuration.
2.1	2016-11-18	Updated DTA UI for CR9 with Time Slot Number (TSN-F) & Connection Device Limit.
2.2	2017-06-27	Updated DTA UI for CR10 to CR12 with Time Slot Number (TSN-F) & Connection Device Limit.

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## 1. Introduction

Device Test Application (DTA) that a vendor can integrate in an NFC Forum Device to ensure that the Implementation/Device Under Test (IUT/DUT) can be tested against the NFC Digital Protocol Technical Specification [DIGITAL], NFC Forum Type 1-4 Tag Operation Specifications [TnTOP], NFC Forum Analog RF, LLCP and SNEP.

DTA APK is designed to work with NCI based NFC chipsets. This setup guide provides the detailed directions about setting up NFC DTA apk for NFC Forum Compliance Testing of Implementation Under Testing (IUT) or Device Under Testing (DUT).

## 2. Scope

This document is written considering NFC DTA apk setup guidelines to perform the NFC Forum compliance validation of Implementation Under Testing (IUT) or Device Under Testing (DUT).

## 3. Architecture of NFC DTA APK

Figure 1 shows the architecture of NFC DTA APK.

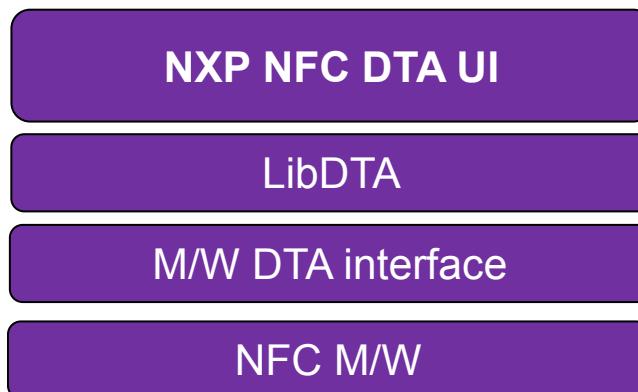


Figure 1: NFC DTA APK Architecture

### NFC DTA supported Features:

A NFC device may support one or more communication technologies: Type A, B and F, in both Poll & Listen modes.

### 3.1 Testing Scope

- NFC Forum Digital protocol test cases.
- NFC Forum T1T, T2T, T3T & T4T test cases
- NFC Forum Analog RF.
- NFC Forum LLCP.
- NFC Forum SNEP.

## 4. NFC DTA APK setup

Following commands need to be executed on the terminal to install the apk & supporting files.

- configuration file 32 bit:
- adb root
- adb remount
- adb shell mkdir /system/app/NxpDTA (Required for Android 5.0 or higher)
- adb push libdta\_jni.so /system/lib
- adb push libdta.so /system/lib
- adb push libmwif.so /system/lib
- adb push libosal.so /system/lib
- if Android version is Android 5.0 or higher
  - o adb push NxpDTA.apk /system/app/NxpDTA
- if Android version less than Android 5.0
  - o adb push NxpDTA.apk /system/app/
- adb reboot

Configuration file for 64 bit:

```
adb root  
adb remount  
adb shell mkdir /data/nfc  
adb shell mkdir /system/app/Nfc  
adb shell mkdir /system/app/NxpDta  
adb push libosal.so /system/lib64/  
adb push libmwif.so /system/lib64/  
adb push libdta.so /system/lib64/  
adb push libdta_jni.so /system/lib64/  
adb push NxpDTA.apk /system/app/NxpDta/  
adb reboot
```

After updating the required files the “NXP Device Test Application” appears in the main menu.

Figure 2 shows the installed DTA apk in the main menu.

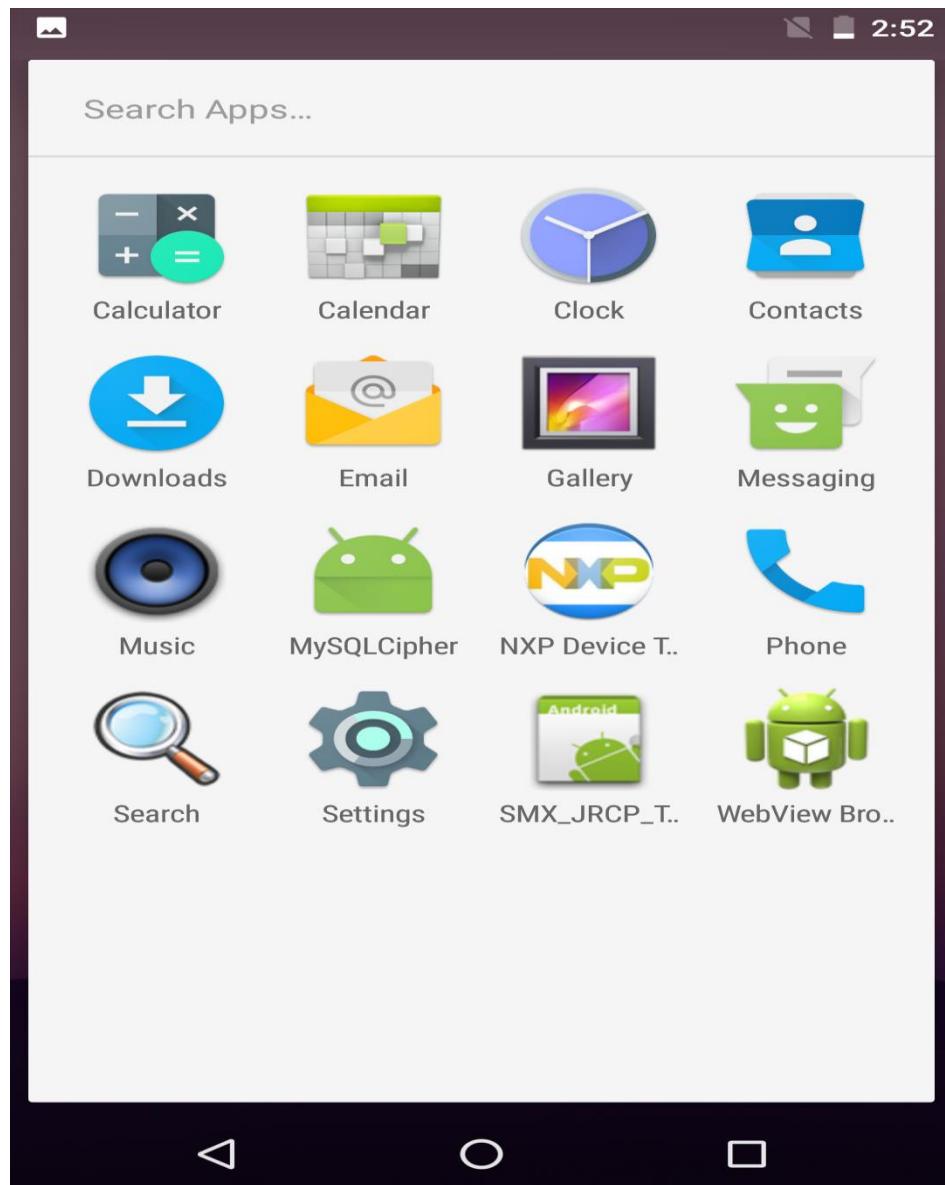


Figure 2: DTA APK installed in Android

#### Before running DTA APK

Switch off the NFC service option in Settings, Settings->More...->NFC as OFF (Un-ticked) and reboot the device (using 'adb reboot').

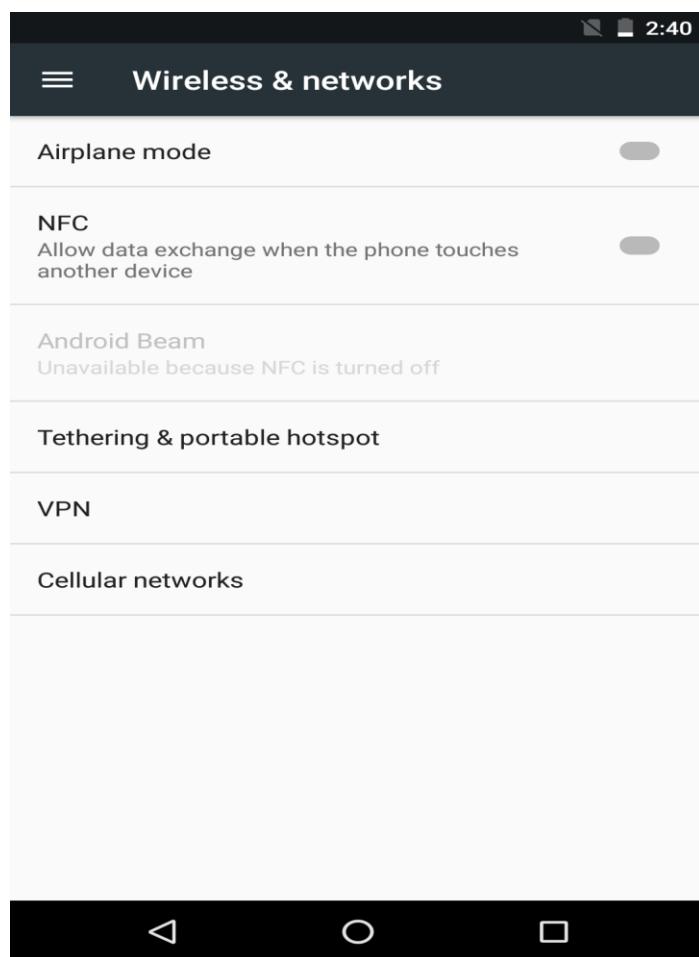


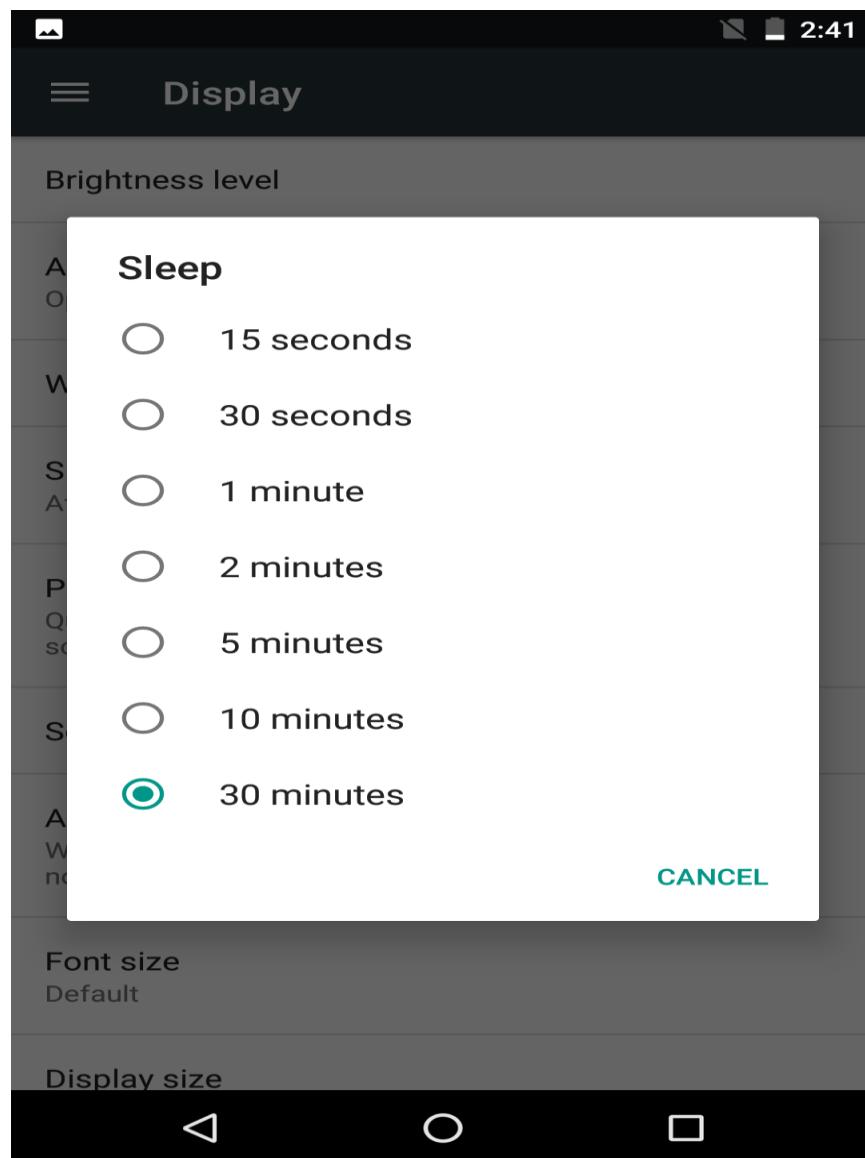
Figure 3: NFC service OFF in settings

### Screen time out settings

Screen time out should be updated in the IUT settings to avoid the DTA RF signal loss. Because once the device goes to sleep mode, immediately RF will be stopped from device, to avoid this device screen timeout should be increased to 30 minutes or device should powered.

The following path can be used for updating the screen timeout setting.

Main menu-> Settings -> Display -> Sleep -> select 30 minutes.



## 4.1. Running DTA APK with options

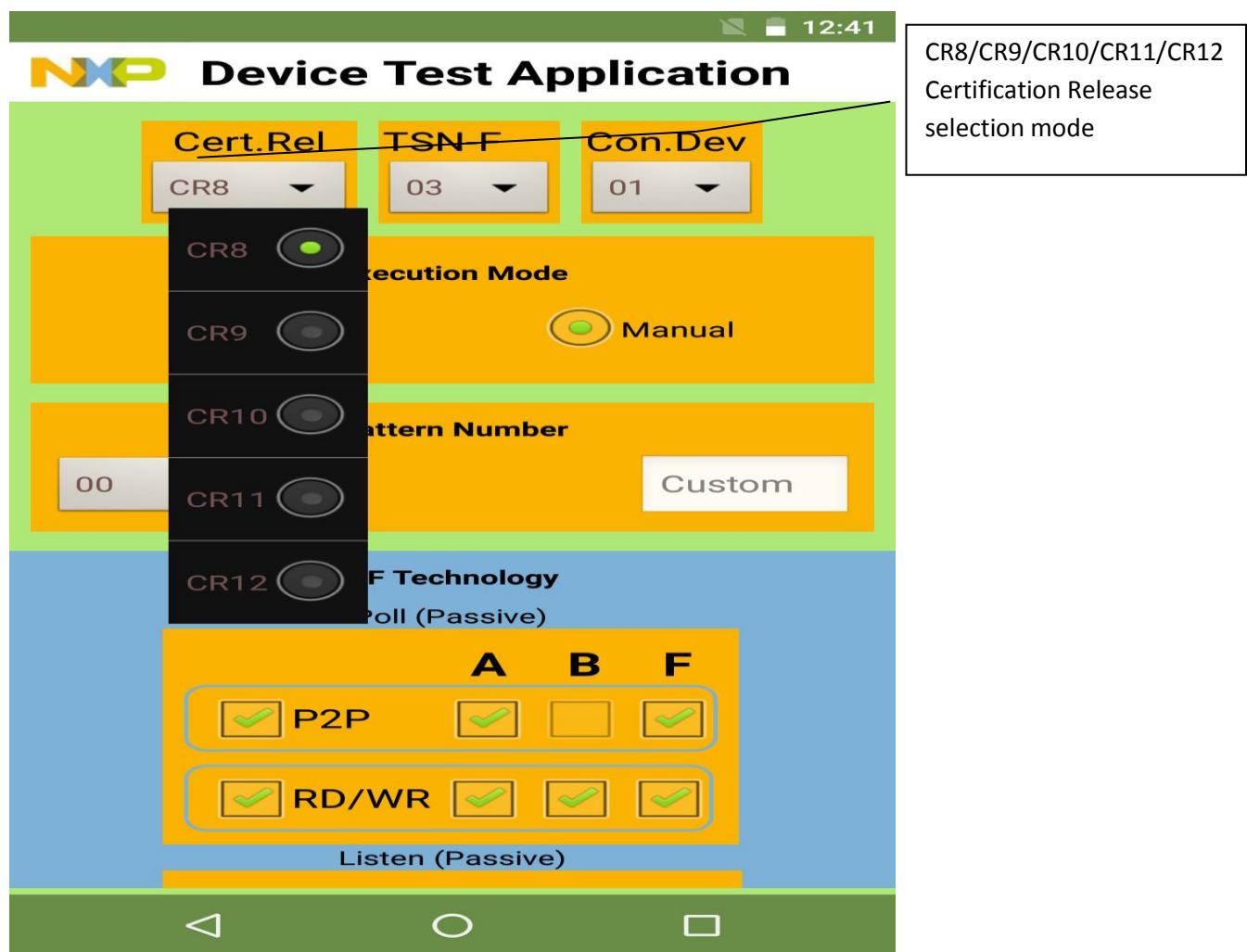
### 4.2.1 NXP\_DTA\_UI\_SCR\_SCENERIO\_01: Default screen

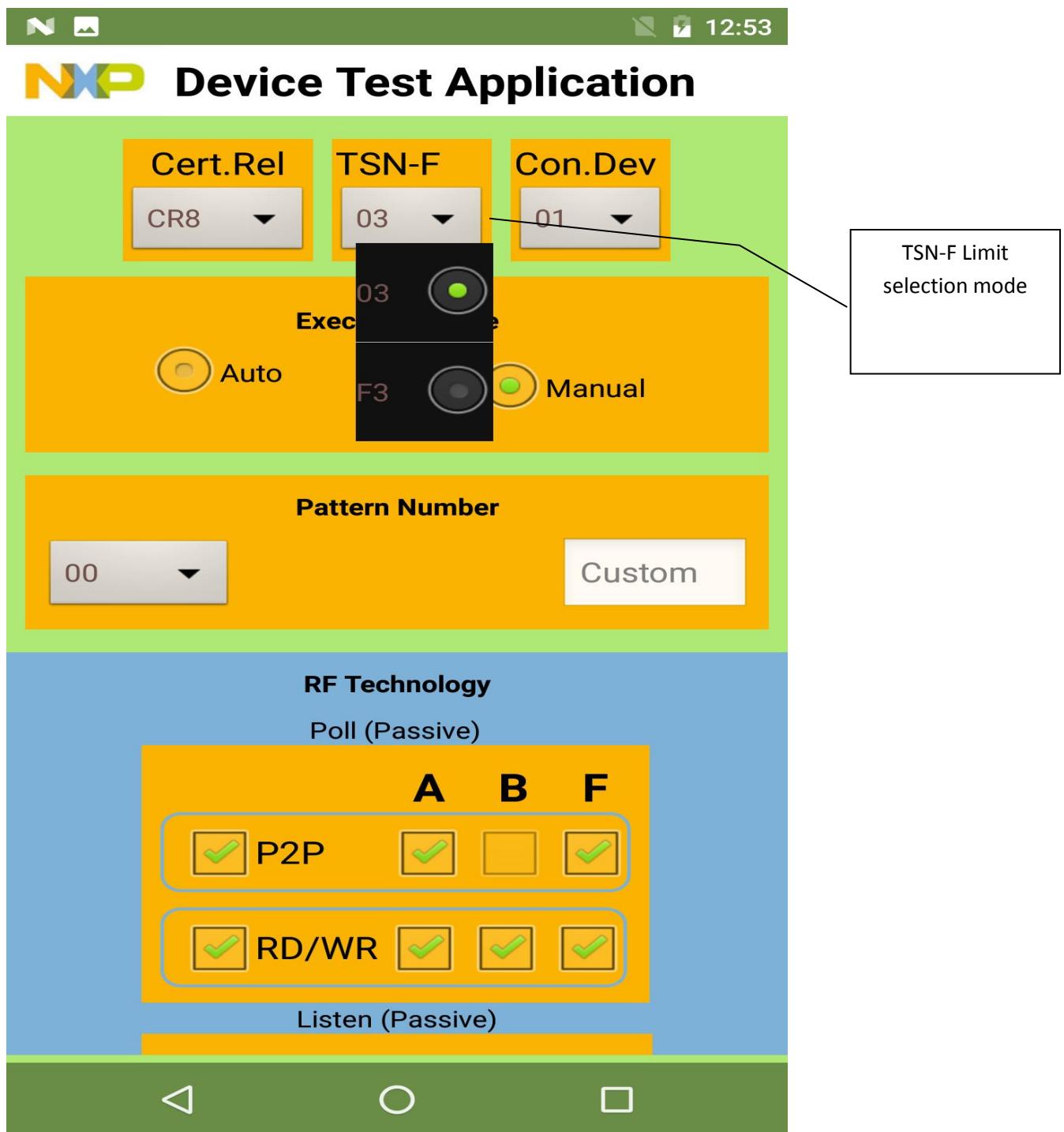
The default screen is loaded as soon as the application is launched. By default Certification Release CR8 with Time Slot Number for NFC-F Technology (TSN-F) with value 03, Connection Device Limit with 01 & Manual mode is selected and the pattern number will be set to "00" in multi option. The user has the option to enter custom pattern number. By default A & F RF Technologies for P2P & A,B,F RF Technologies for RD/WR will be enabled for Poll. By default A & F RF Technologies for P2P will be enabled in Listen mode. Device information will not be displayed in the default screen.

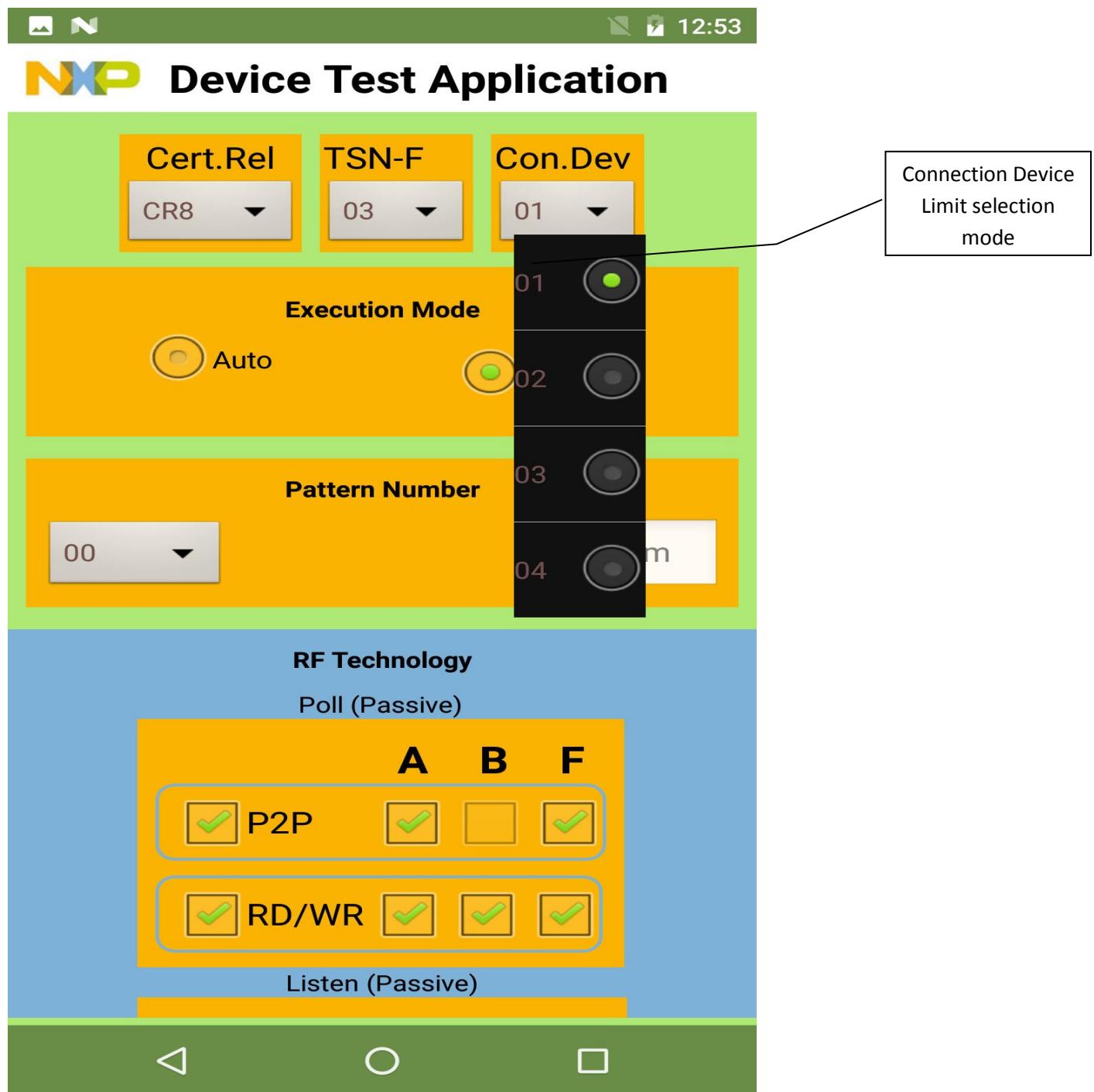
The **current status** of the application is **stopped** and the text color is in red.

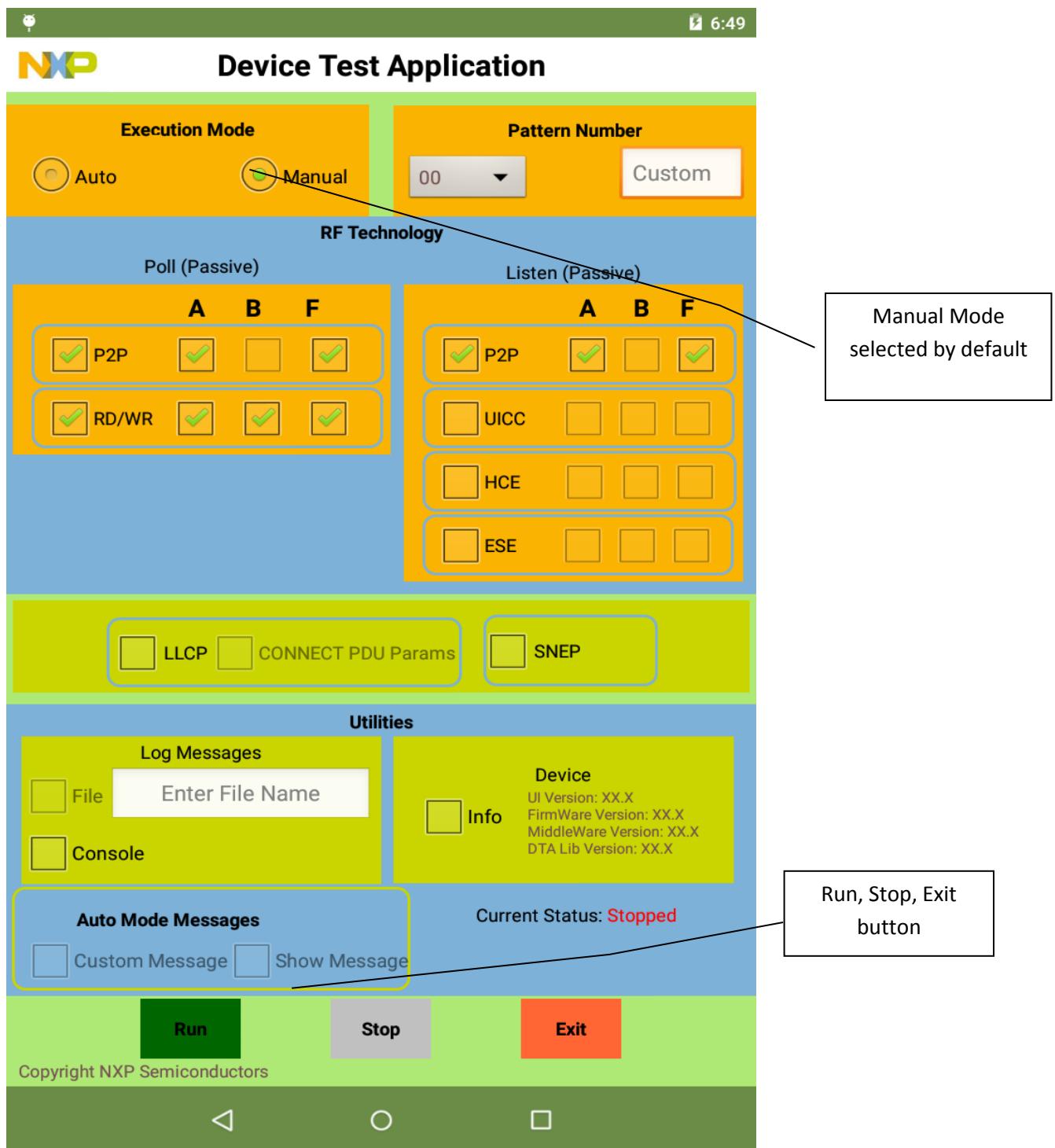
The **RUN** button in **GREEN** color, **STOP** button in **GRAY** color and **EXIT** button in **orange** color.

In manual mode check boxes Custom Message and Show Message are disabled. Copyright and UI Version are showed in the bottom.







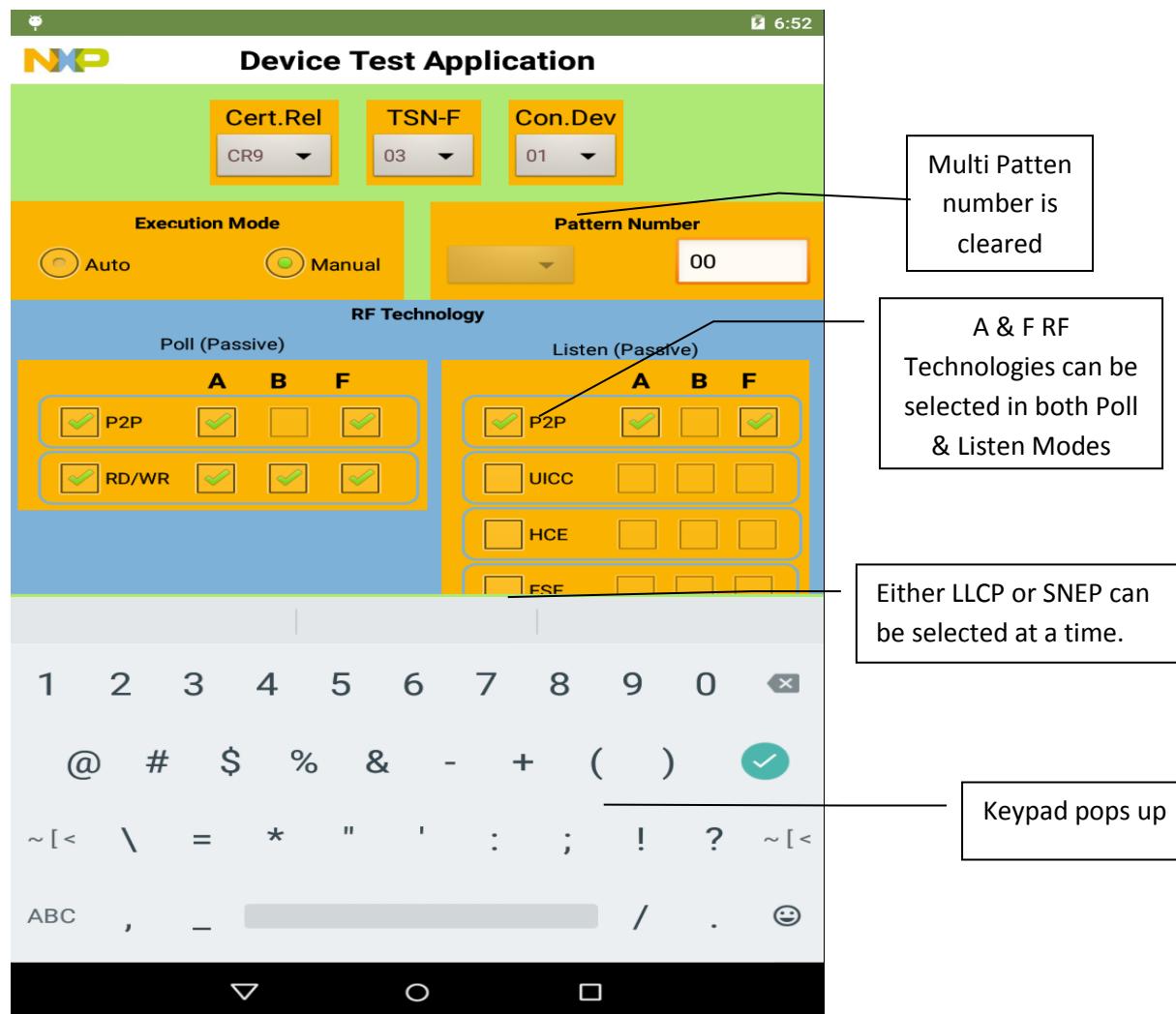


#### 4.2.2 NXP\_DTA\_UI\_SCR\_SCENERIO\_02: Selections in Manual Mode

This screen is similar to “NXP\_DTA\_UI\_SCR\_SCENERIO\_01” screen with the changes shown based on the user selection.

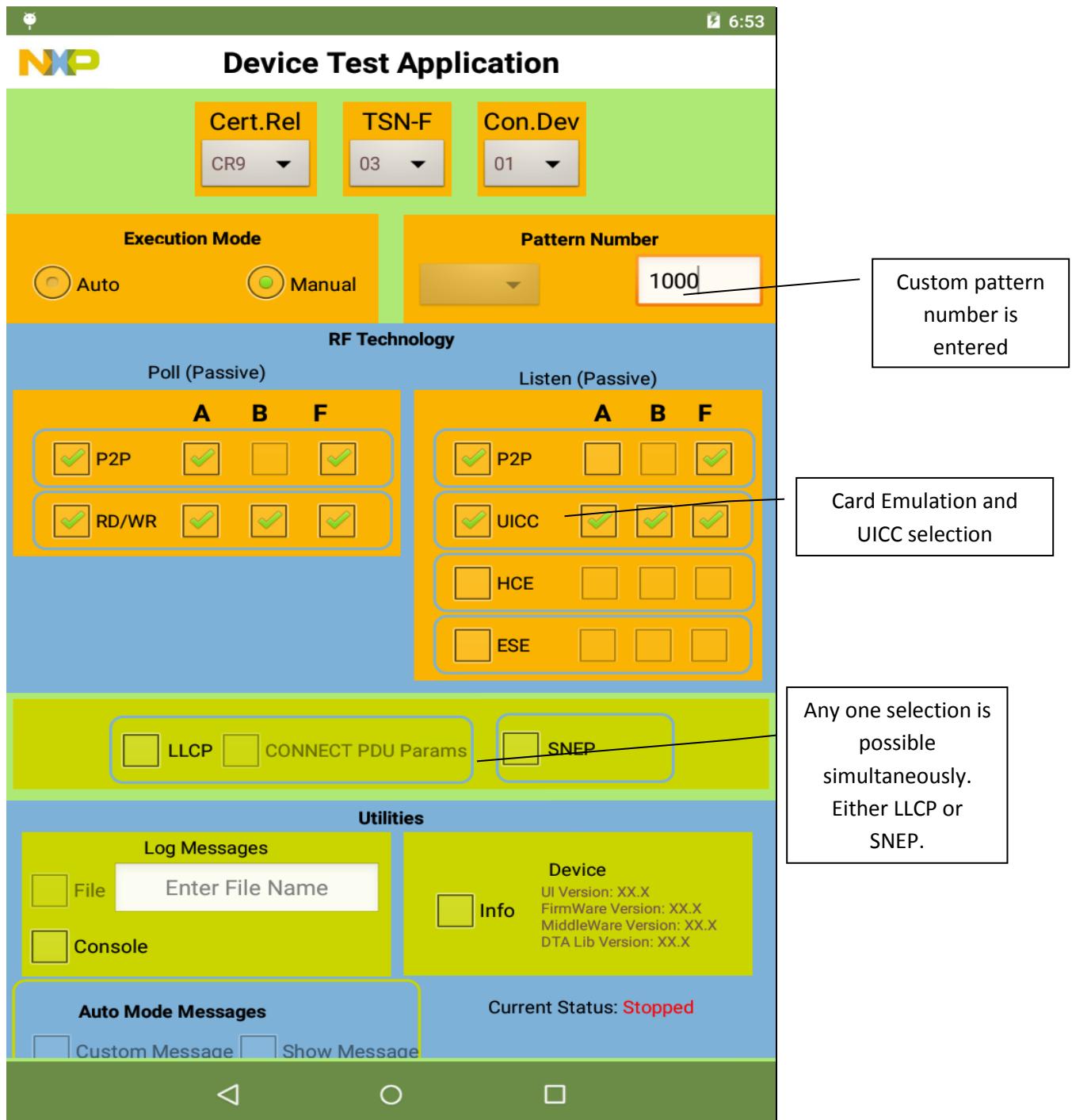
The custom pattern number is entered as 0000. Multi pattern number if selected will get cleared. Need to enter hexadecimal pattern number without the prefix 0x. Only 0000 to ffff is allowed to enter. Other entry will show pop-up message as shown in the. Maximum number of bytes allowed is only 4. As soon as the user touches in the custom pattern number box, the keypad pops up as shown in the screen.

Below are RF Technology options available for selection in Poll & Listen mode. In Poll Mode P2P and RD/WR modes are allowed to select. However enabling one technology in one of the poll modes will enable the same technology in other poll mode. Listen mode P2P, UICC , HCE and ESE are allowed to select. In LLCP , parameters in CONNECT PDU is allowed to select .



#### 4.2.3 NXP\_DTA\_UI\_SCR\_SCENERIO\_02: Analog Selection in Manual Mode

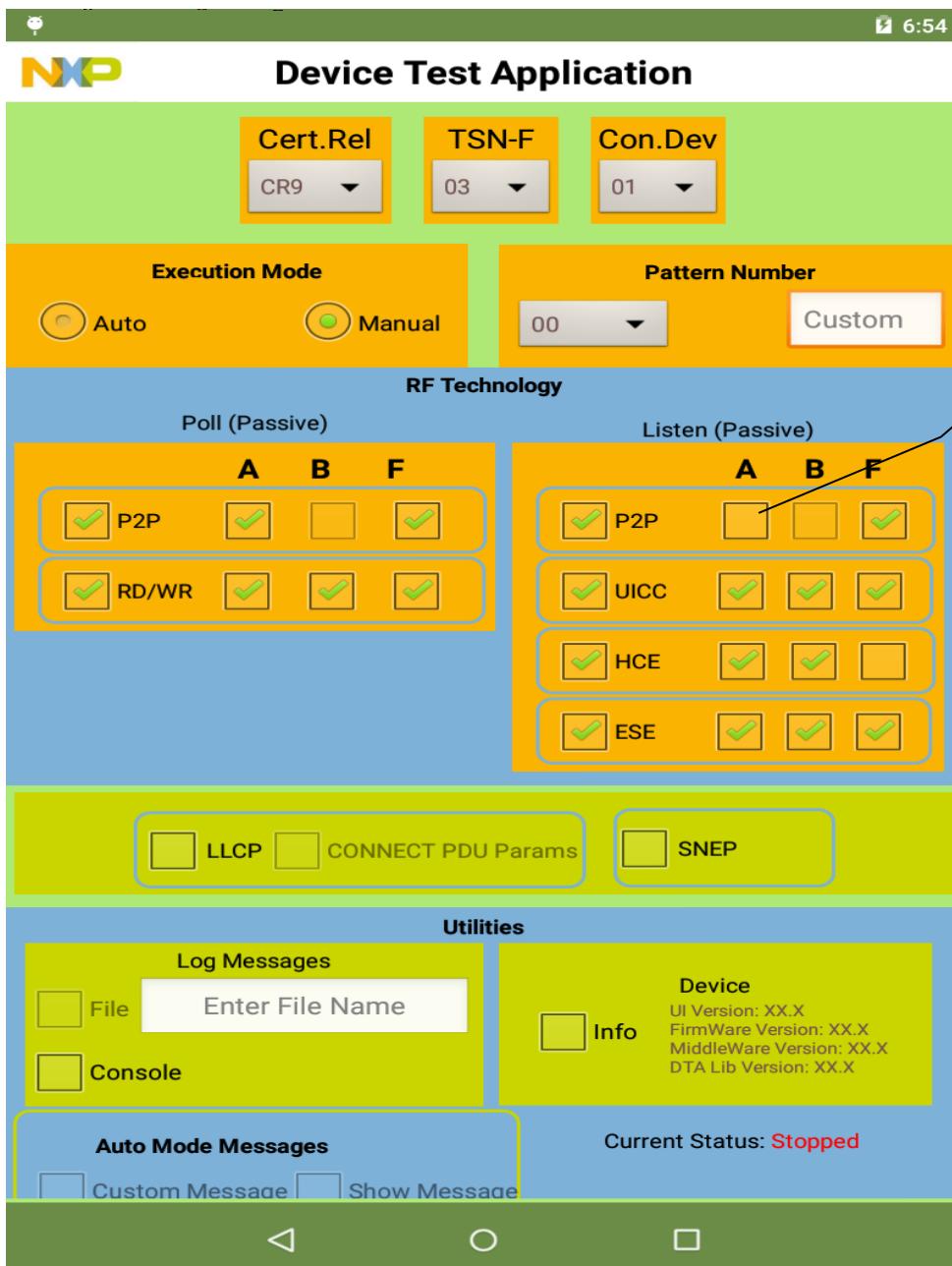
First select the CE mode with UICC. The custom pattern number is entered as 1000 and press RUN button then the application will start running in manual mode. The current status will be changed to first **Running** and the text color is in green. Now, all the selections are disabled.



#### 4.2.4 NXP\_DTA\_UI\_SCR\_SCENERIO\_03: De-selections in Manual Mode

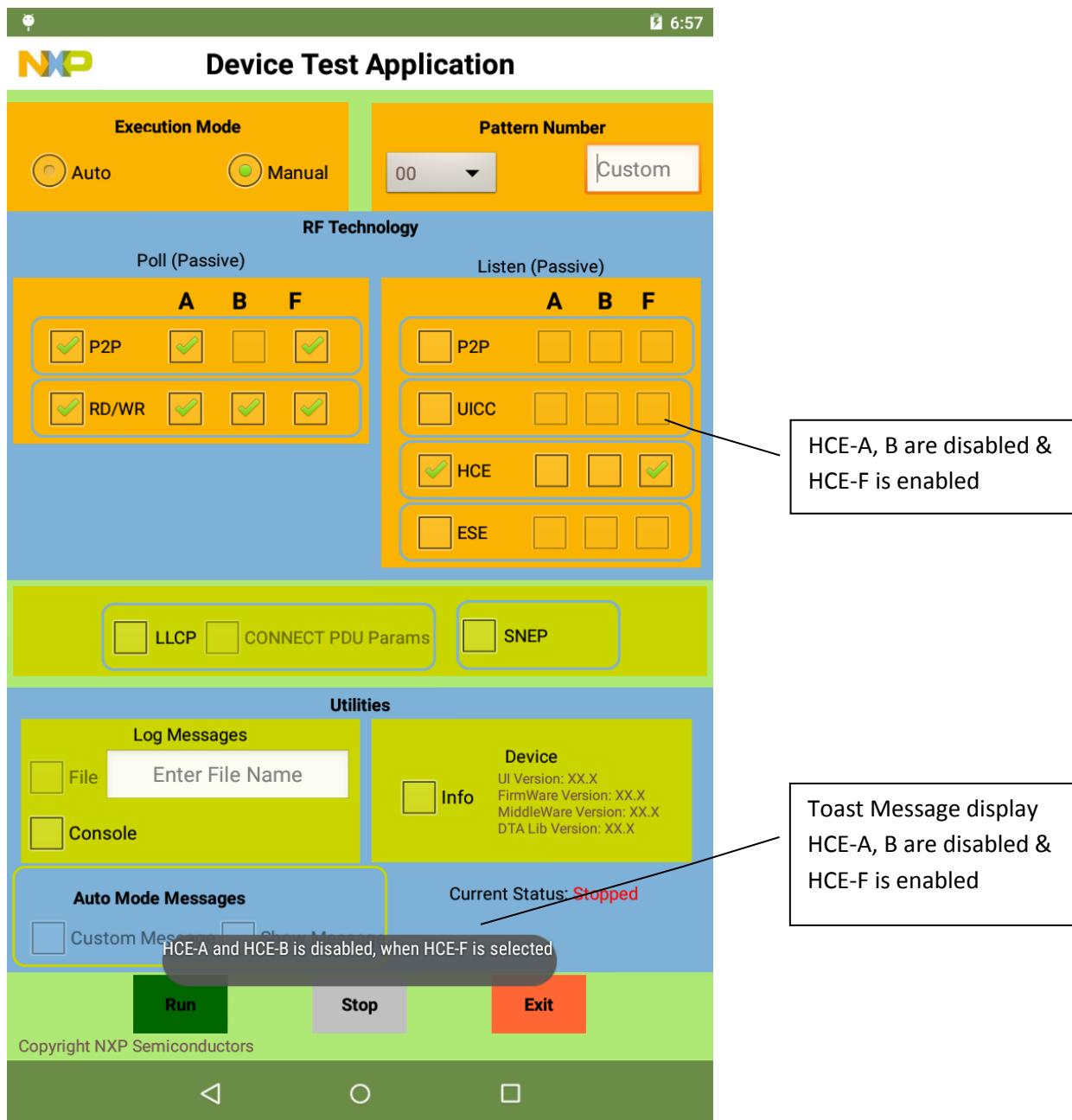
The application Current Status should be **Stopped** for de-selections. In the below screen the user has unchecked the 'A' RF Technology in P2P Listen mode. If all the technologies are unchecked in any mode, then the corresponding mode will automatically unchecked.

The Device Info check box is checked, which shows the device information, as soon as the Device Info check box is checked. If the user unchecks, then the info will not be shown.

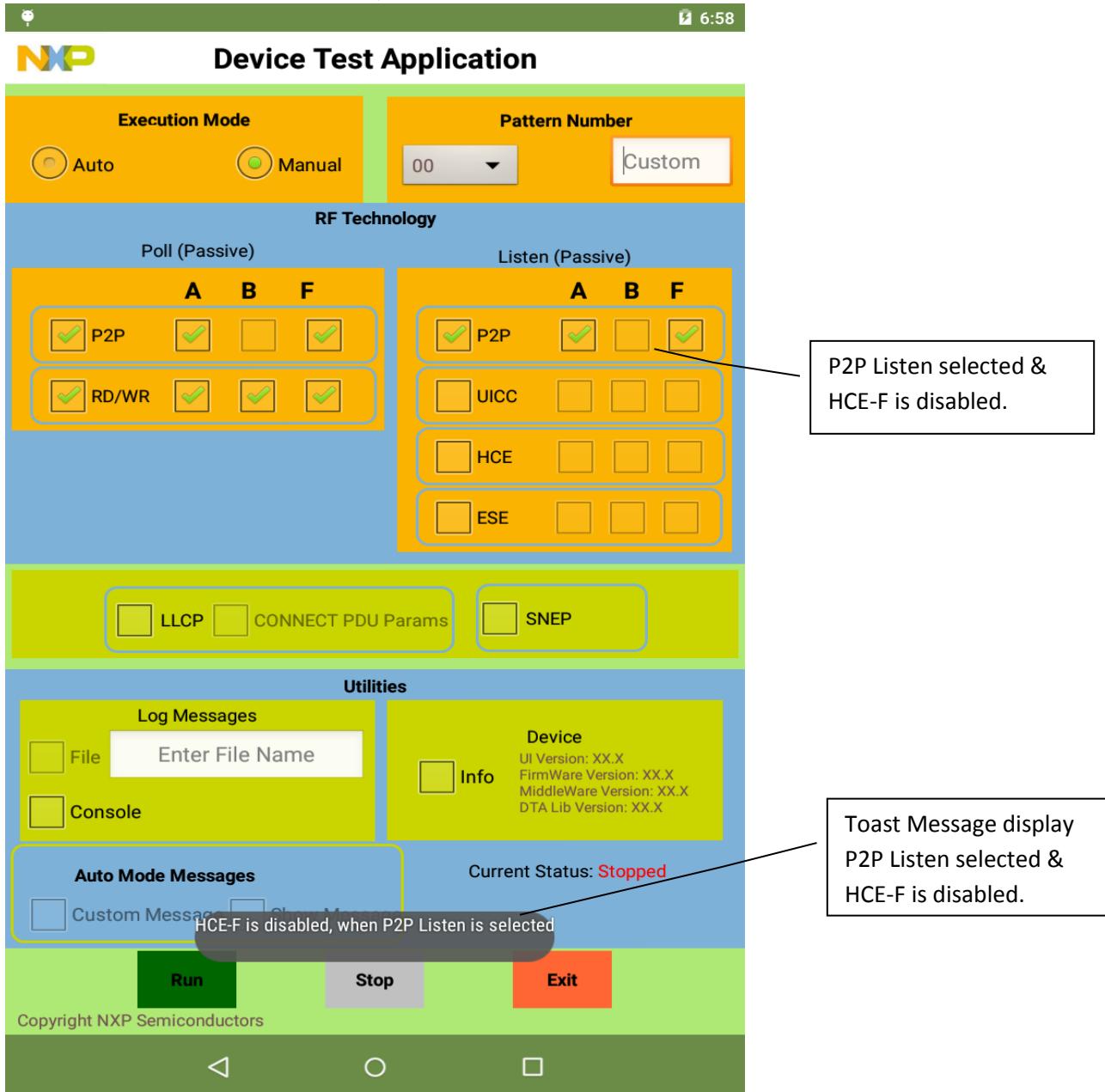


#### 4.2.5 NXP\_DTA\_UI\_SCR\_SCENERIO\_05: UI toast messages for HCE NFC-F:

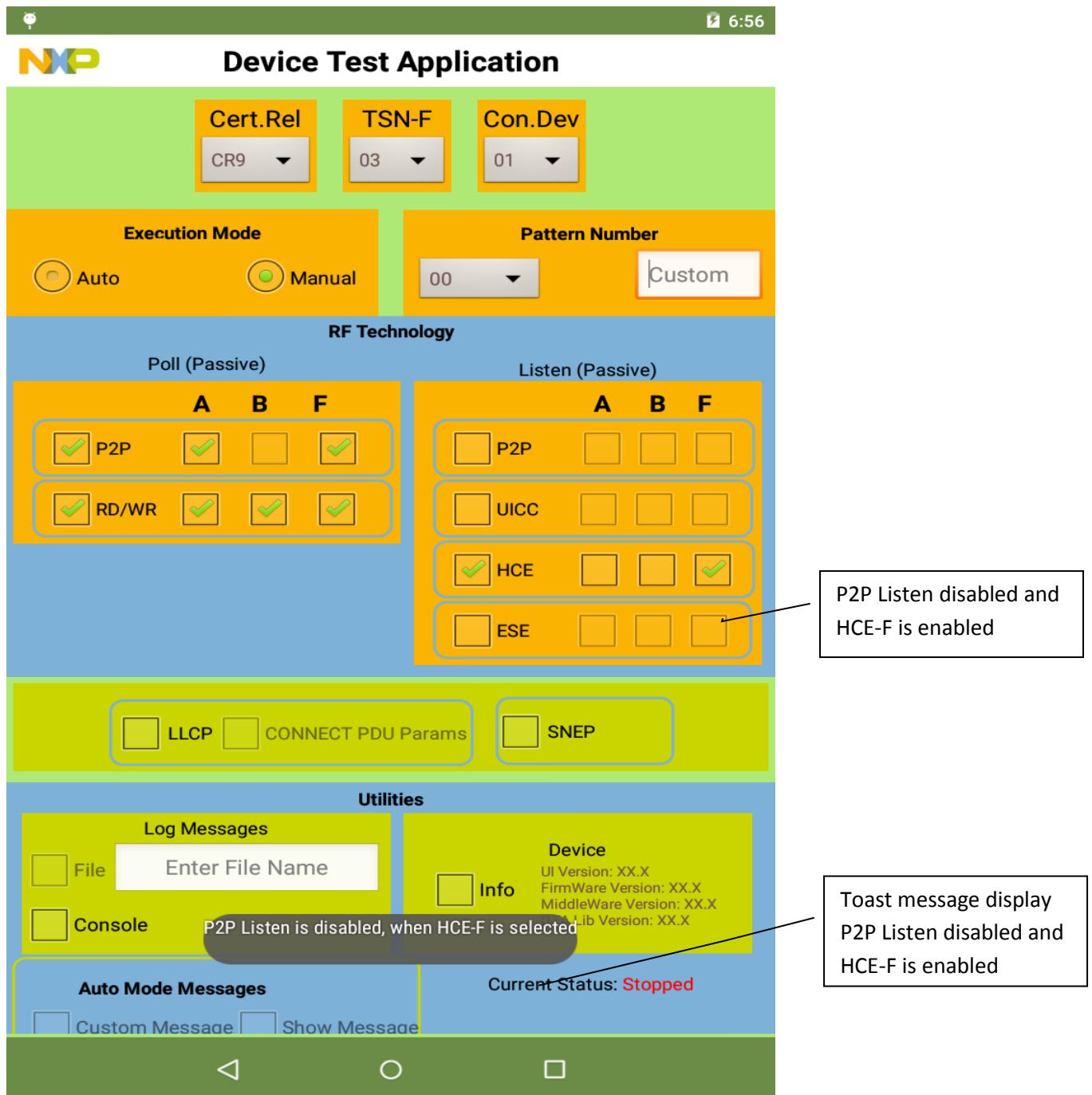
To run the Listen mode HCE NFC-F test case need to disable HCE NFC A & NFC B technology & enable HCE NFC F technology in Listen Mode.



To run P2P test cases in Listen mode, deselect HCE NFC-F.



When HCE NFC-F technology enabled in DTA application, it will disable P2P A & F technology with Toast message.

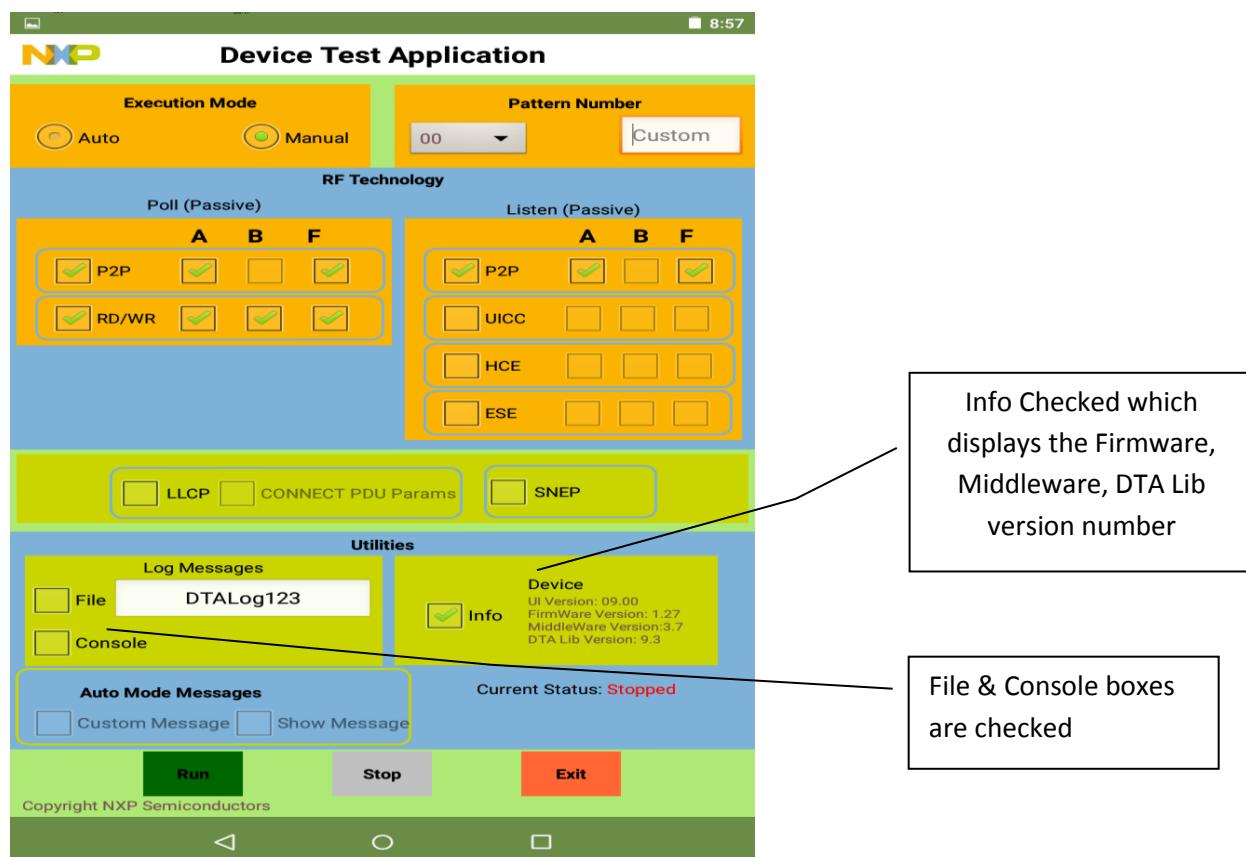


#### 4.2.6 NXP\_DTA\_UI\_SCR\_SCENERIO\_04: Device Info and Log Messages

Similar to the screen “NXP\_DTA\_UI\_SCR\_SCENERIO\_02”: User has checked the Info box, which shows the device version info.

The user has deselected the RF Technology type B in both Poll & Listen modes.

Also the user has checked the console box to see the system message logs on a separate console. The user has entered the file name and checked the File check box to write system log messages on to the SD card. By default the system logs will be stored in the directory “/sdcard/nxpdtalog/”. User need not to enter the file extension. By default it will be stored as “.txt” In the below case it logs will be stored in “sdcard/nxpdtalog/dtalog123.txt”. If the user clear the file name by pressing back button then the check box will be unchecked automatically.

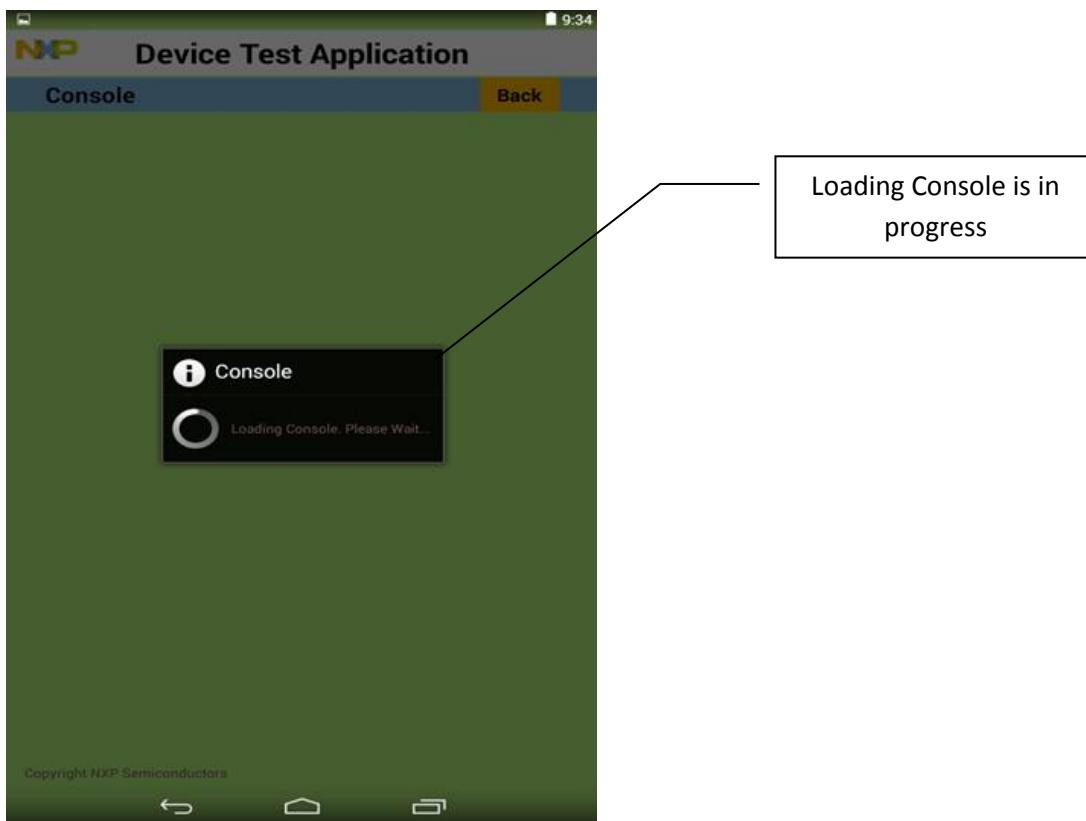


#### 4.2.7 NXP\_DTA\_UI\_SCR\_SCENERIO\_05: Console output

As soon as the user presses the RUN button then the new screen will open which shows the log in the console with Loading Console and displays the entire system log in the next screen. If required we can filter the log. This will take a little time about 2 to 5 seconds to appear the log as the system is busy in collecting the entire log. **No other selections are possible during DTA and logs are being captured.**

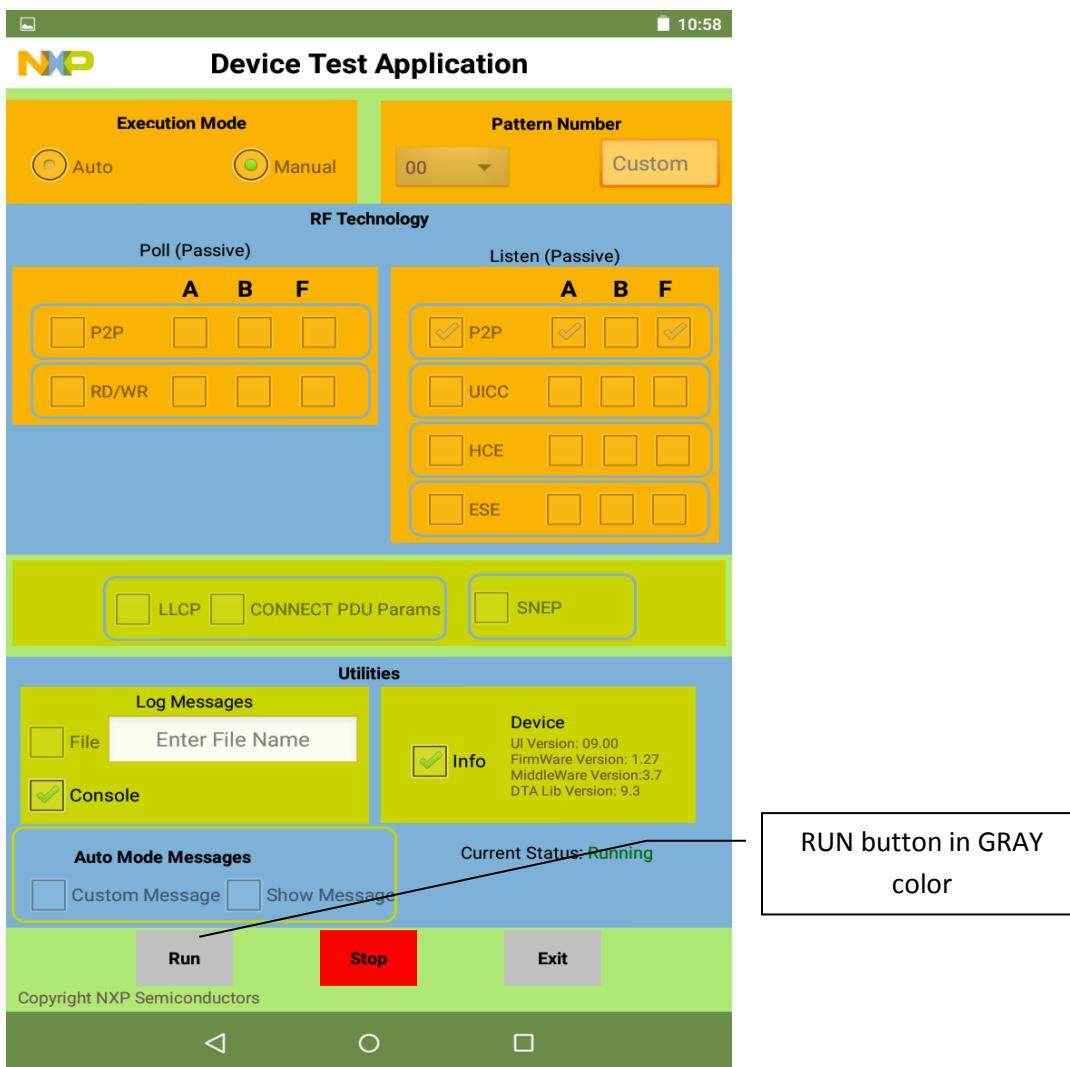
The user will have option to scroll up and down.

To go back to the main screen the user need to press Back button provided on the top right corner.



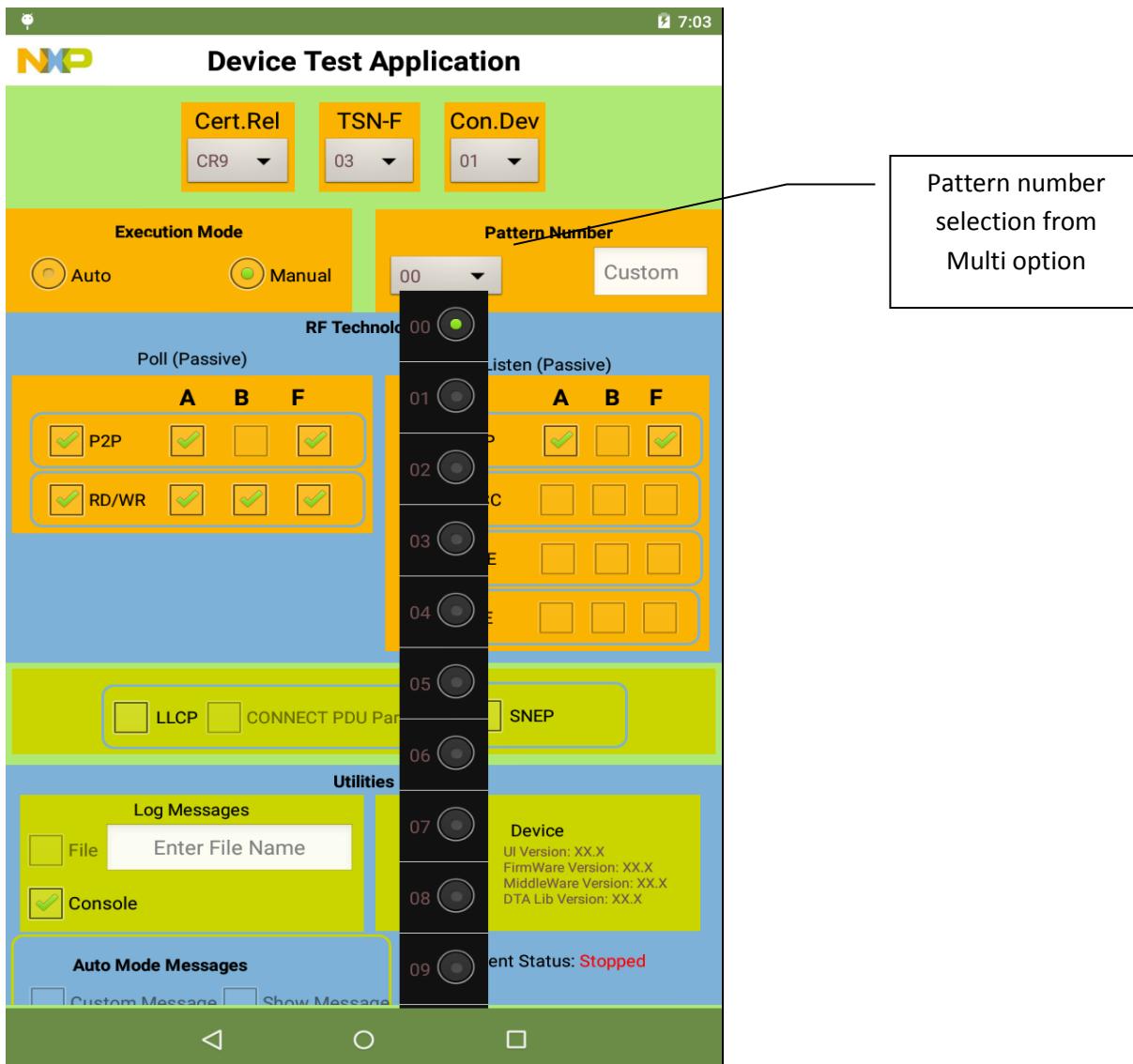
If the user wants to come back to the console, being in the main screen, the user is expected to press on the RUN button which in GRAY color now. This can be repeated during the time the application is running and the console check box is checked.





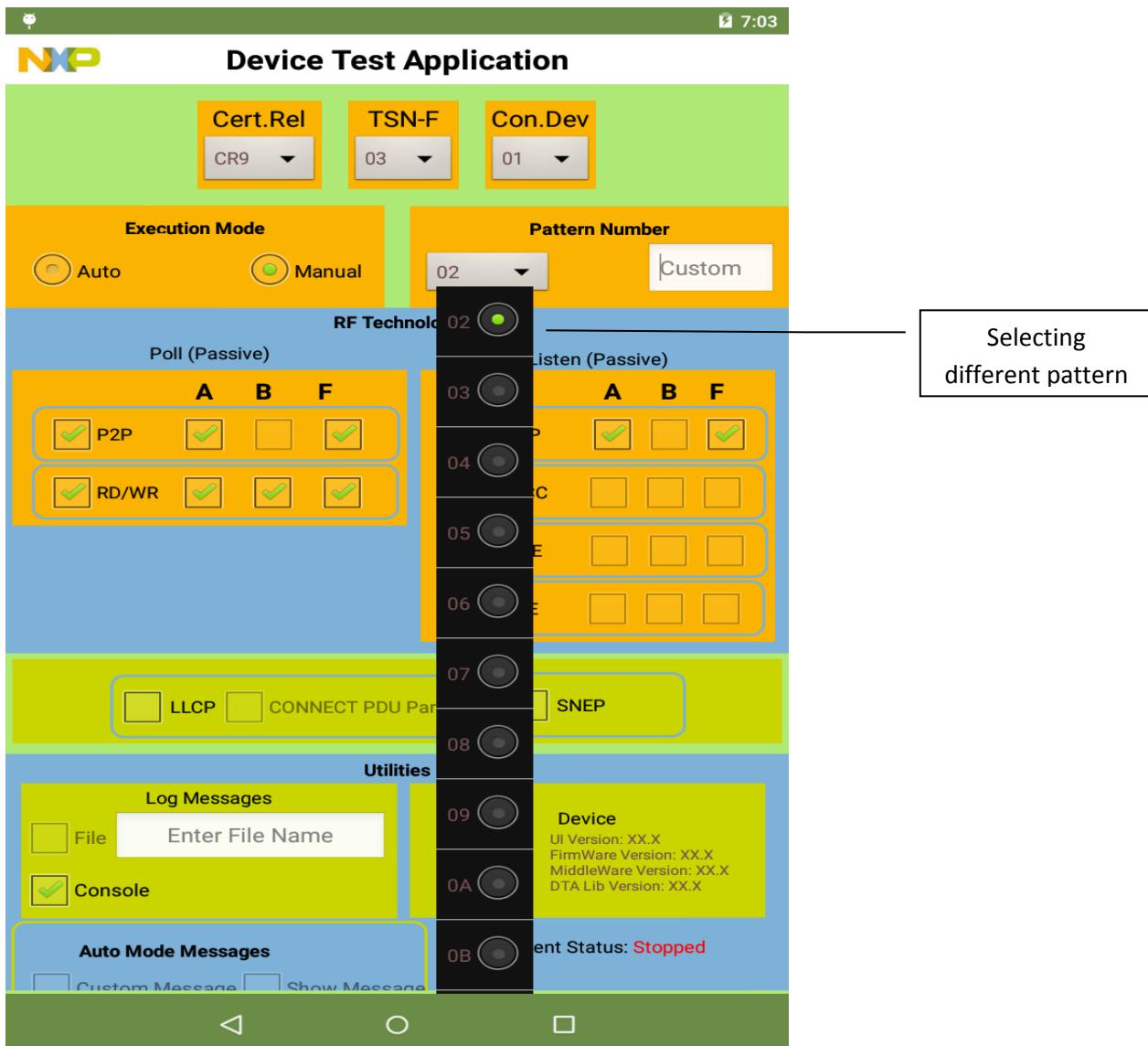
#### 4.2.8 NXP\_DTA\_UI\_SCR\_SCENERIO\_06: Multi Pattern Number Selection In Manual Mode

The user selecting the pattern number form Multi option drop down, see the Custom selection is cleared.



#### 4.2.9 NXP\_DTA\_UI\_SCR\_SCENERIO\_07: Different Multi Pattern Number Selection

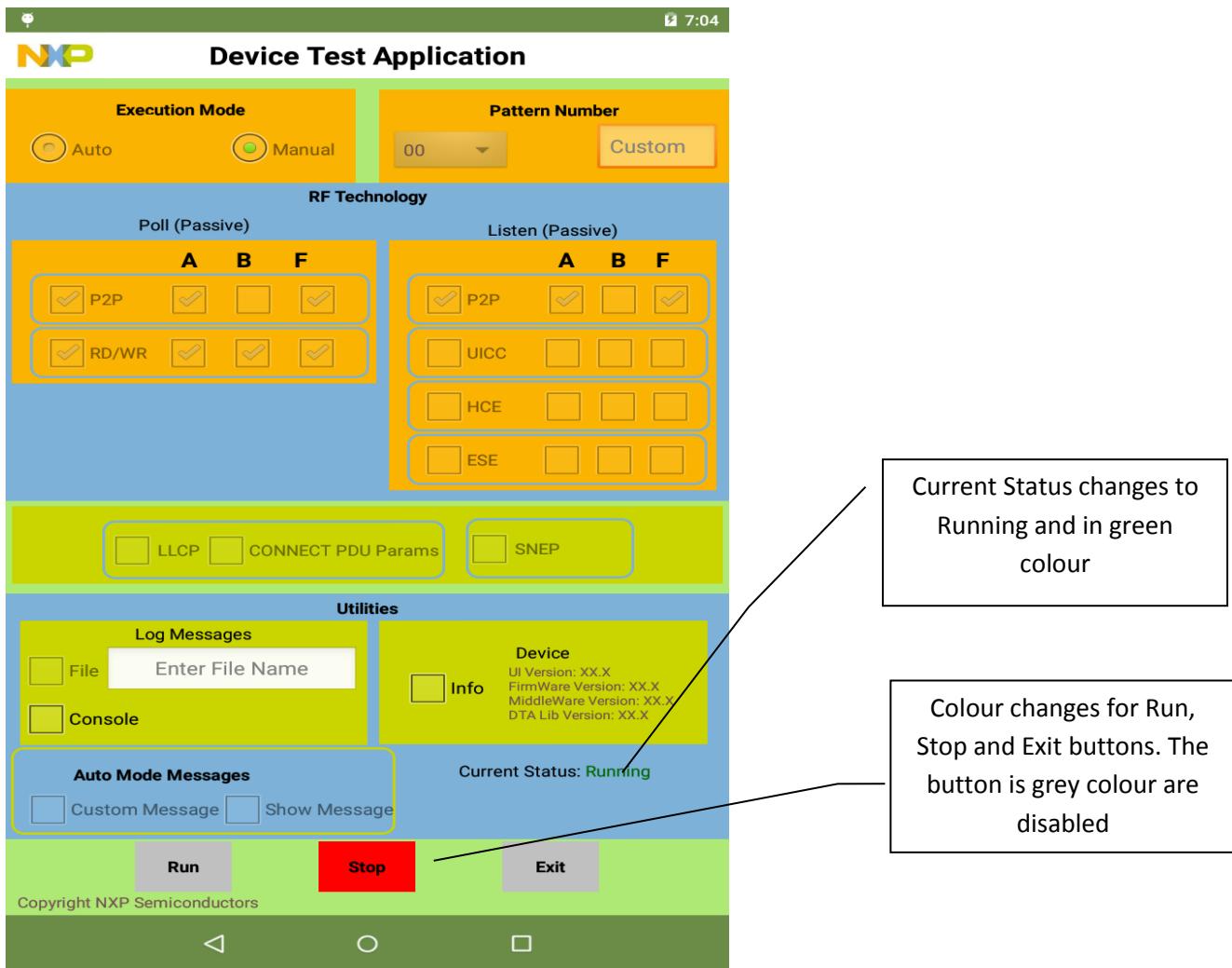
Different pattern number selection using Multi pattern number drop down when the application is stopped.



#### 4.2.10 NXP\_DTA\_UI\_SCR\_SCENERIO\_08: Running in Manual Mode

In this screen, the user press RUN button then the application will start running in manual mode. The current status will be changed to **Running** and the text color is in green. During running, no other selections are allowed.

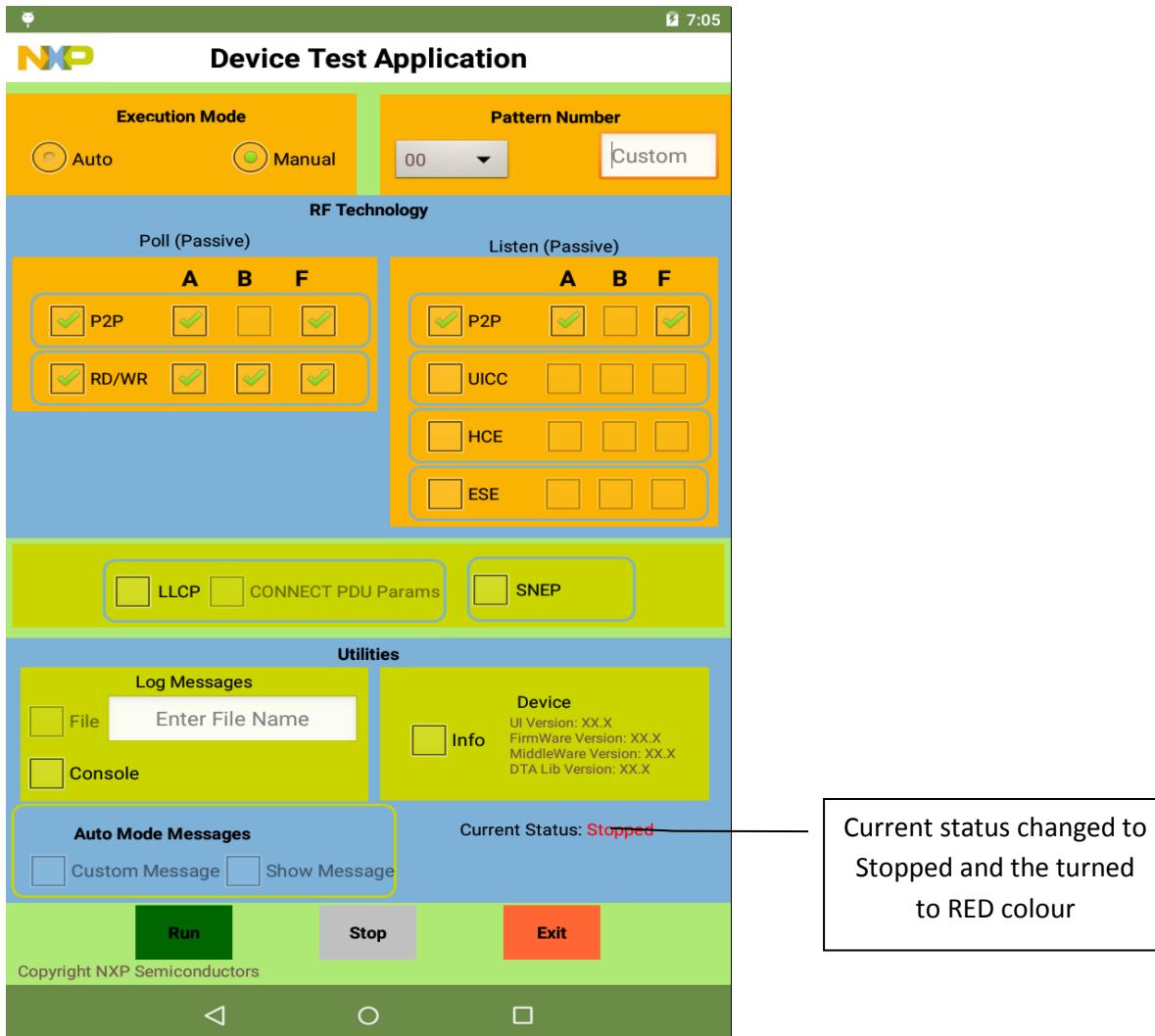
The RUN button will turn to GREY color. STOP to RED color & Enabled to use. EXIT to GREY color.



#### 4.2.11 NXP\_DTA\_UI\_SCR\_SCENERIO\_09: Stopping in Manual Mode

In the previous screen the user pressed Stop button to stop the application. Now the application has stopped as shown in the current screen. The current status is changed to Stopped and is in red color.

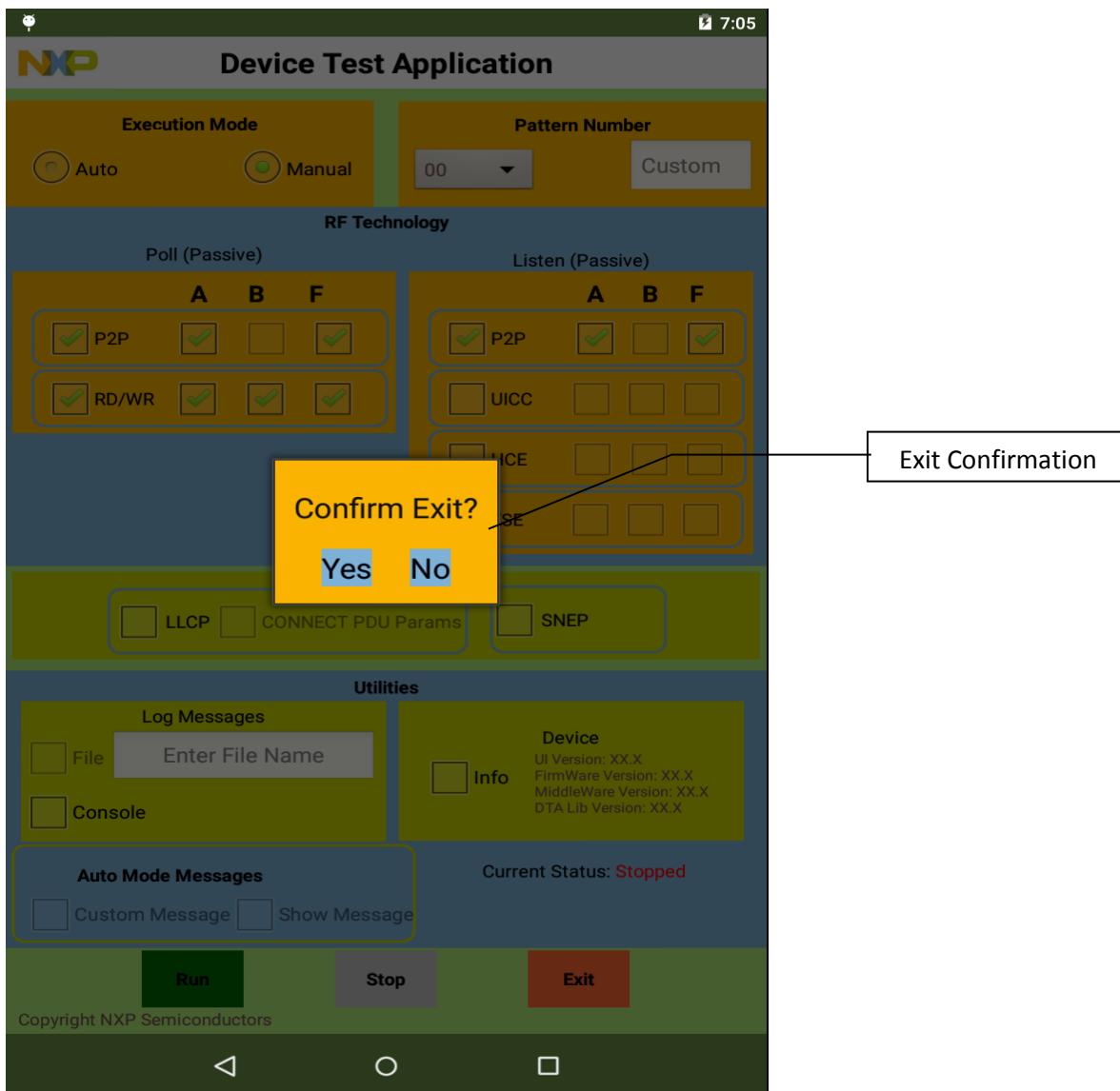
Now all the options are enabled for selection except the Custom Message and Show Message options in Manual mode.



#### 4.2.12 NXP\_DTA\_UI\_SCR\_SCENERIO\_10: Application Exit

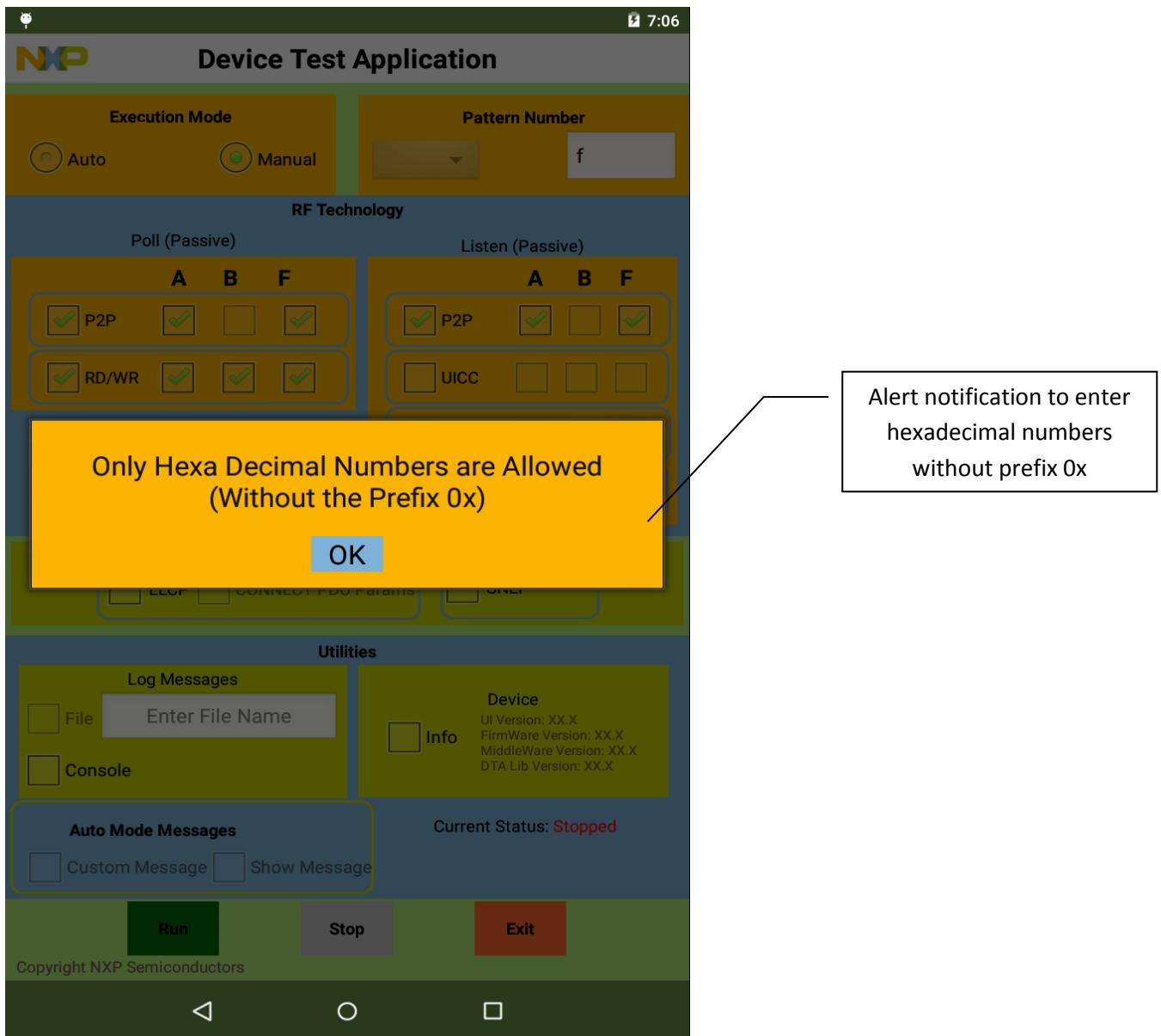
If the user press Exit button when the application is in Stopped state, then a pop-up alerts the user for Exit confirmation.

If YES then exits otherwise remains in default screen.



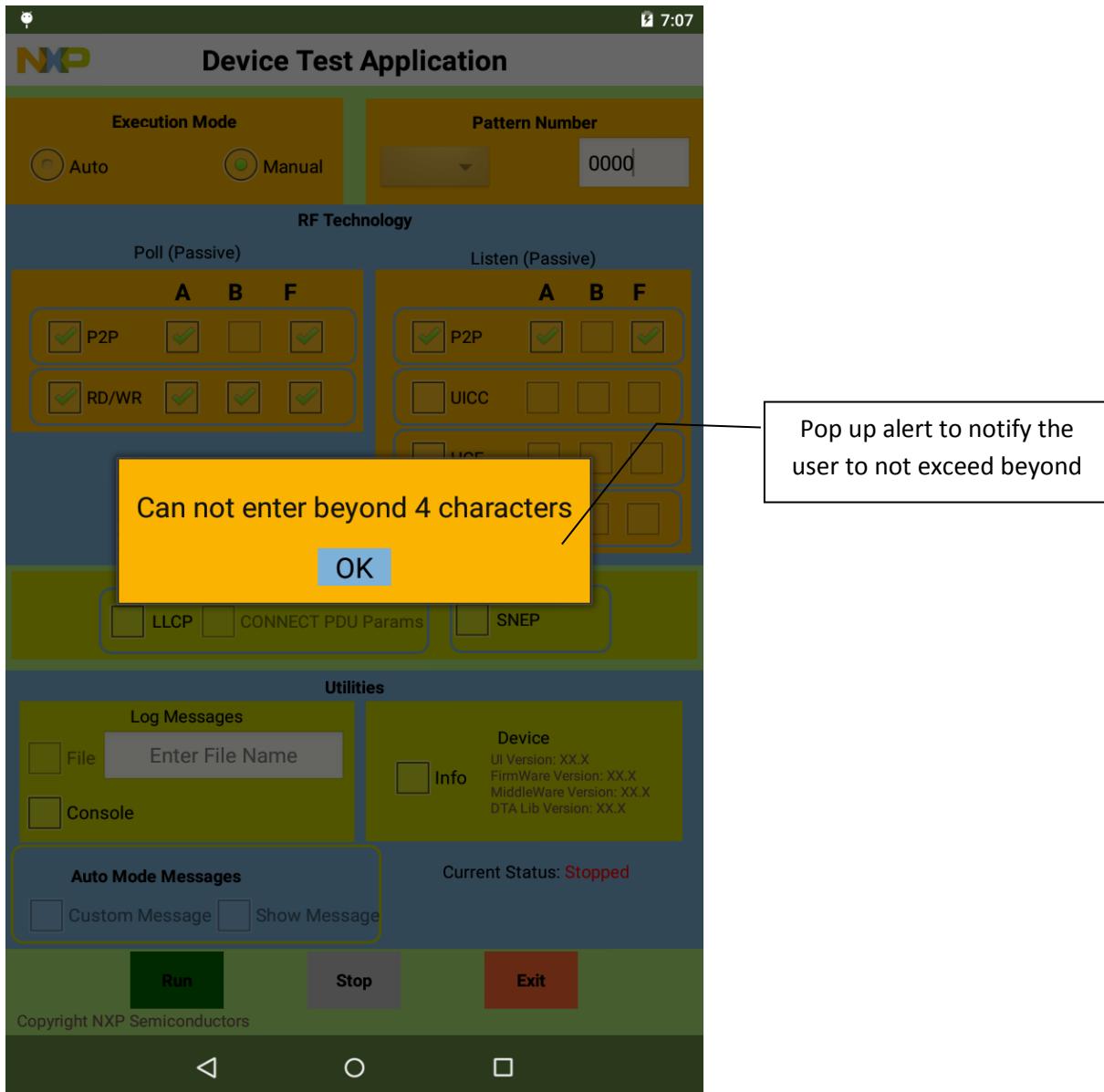
#### 4.2.13 NXP\_DTA\_UI\_SCR\_SCENERIO\_11: Pattern Number Format Exception in Manual Mode

If user tries to enter custom pattern number other than hexadecimal number (Range 00 – OF) then alert will pop-up notifying the user to enter only hexadecimal number without the prefix 0x.



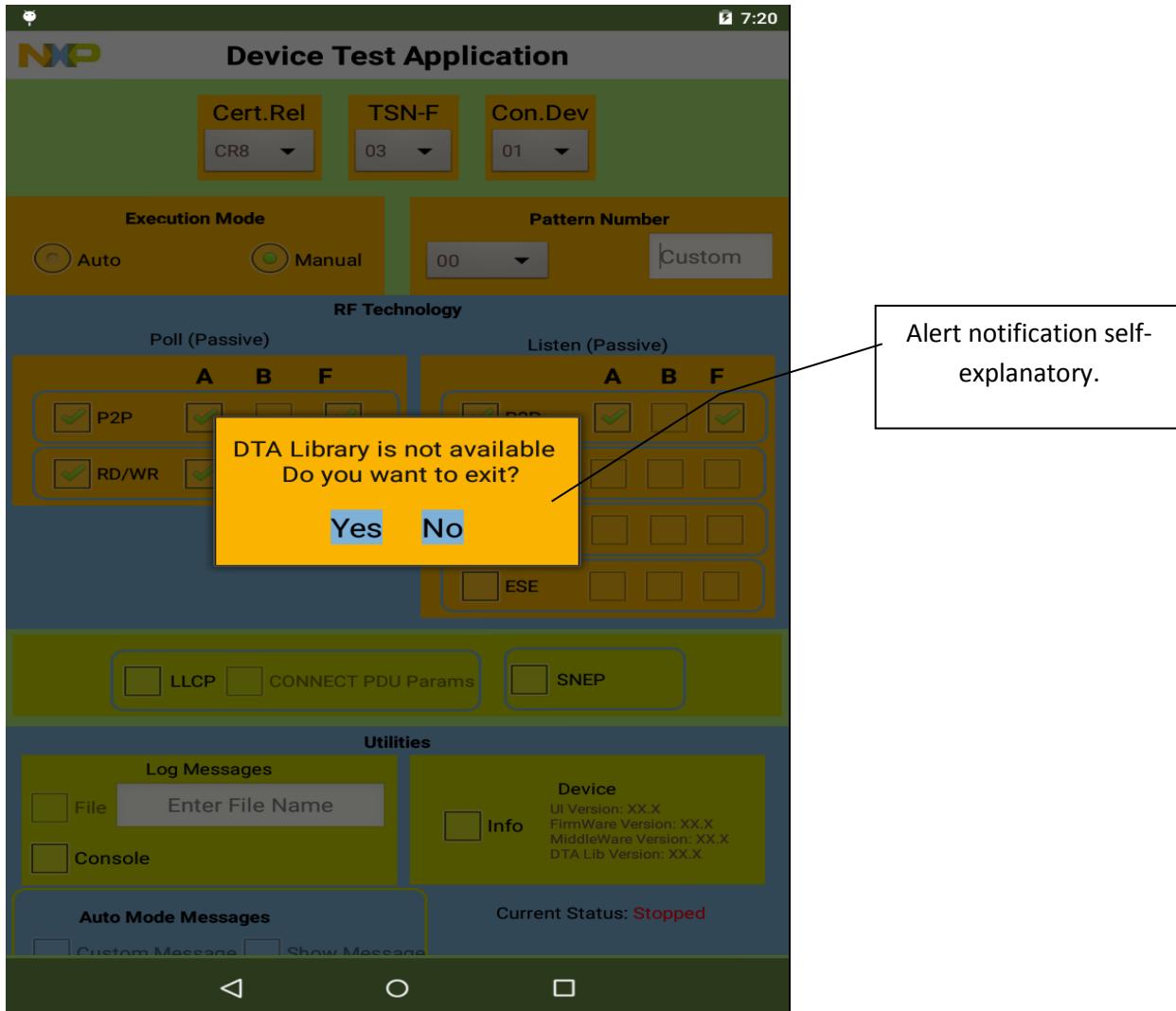
#### 4.2.14 NXP\_DTA\_UI\_SCR\_SCENERIO\_12: Pattern Number Beyond 4 Characters Manual Mode

If the user tries to enter the custom pattern number more than 4 characters then pop-up alerts the user to press OK. Four valid characters will be registered. This is applicable only in manual mode.



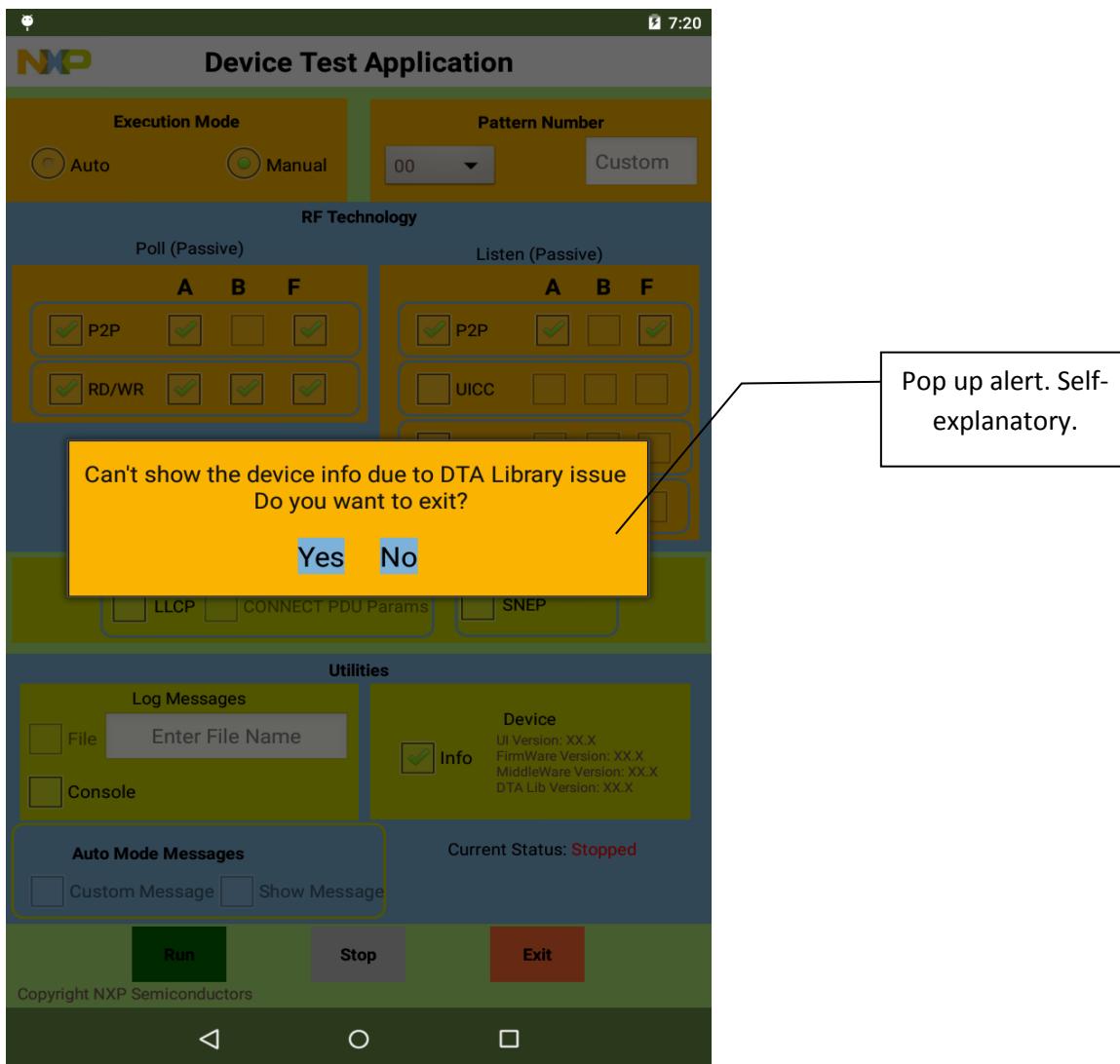
#### 4.2.15 NXP\_DTA\_UI\_SCR\_SCENERIO\_13: DTA Library File Missing While Launching App

If by any chance, the library file is missing then, the exception is handled in such a way that the application should not crash unexpectedly. The user has the option to select YES or NO. If Yes, then the application will exit and NO it go back to the default screen. For now it is designed to work only UI functionality. **In this case DTA Library functionality will not work. We can think of blocking some functionality based the latest DTA library architecture which implementing with new JNI API's.**



#### 4.2.16 NXP\_DTA\_UI\_SCR\_SCENERIO\_14: Devi Info Issue due to DTA Library file Missing

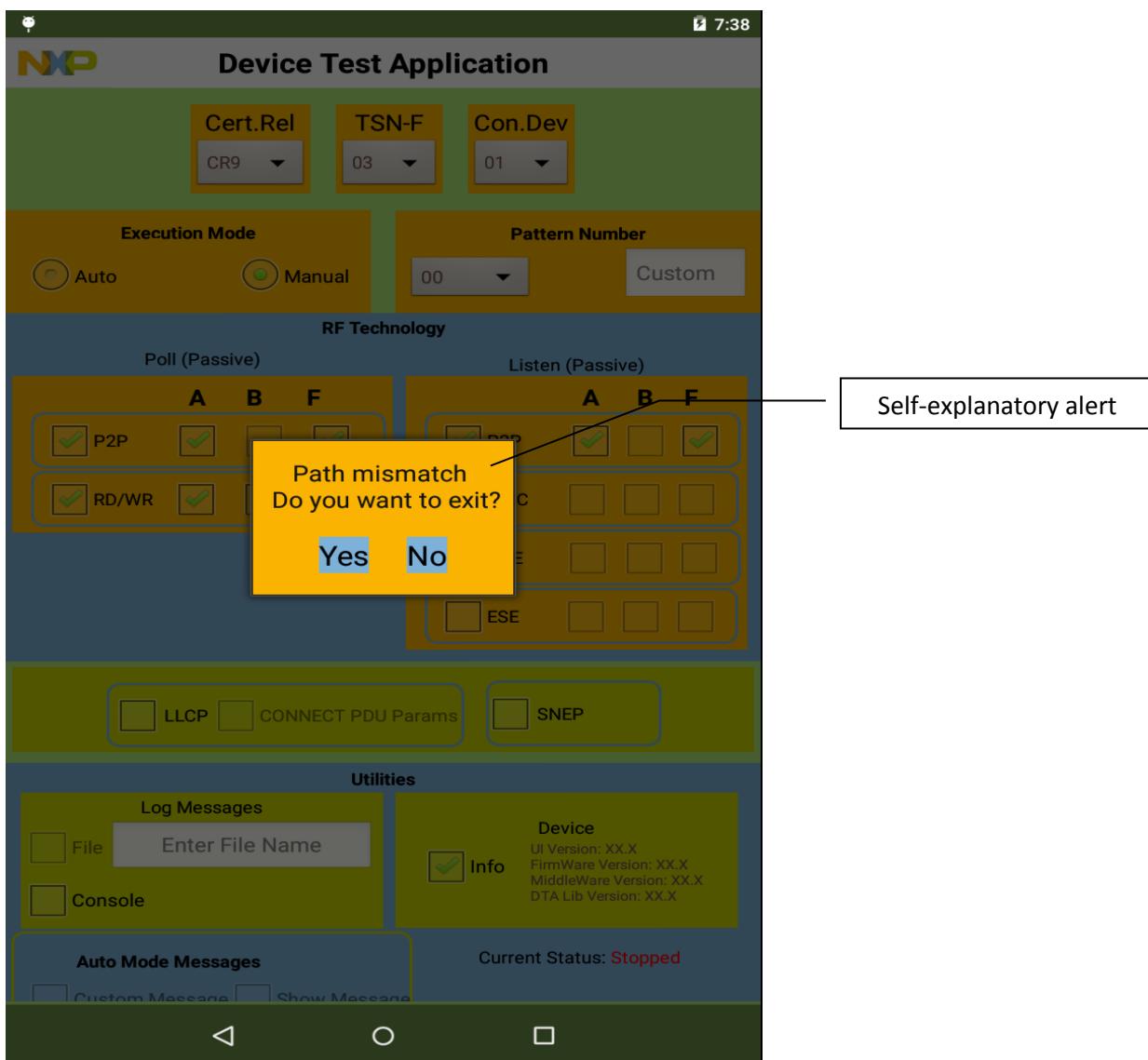
If the user press NO in the last screen scenario and tries to select the Info, then the user will be notified with “**Can’t show the device info due to the DTA Library issue**”. If the user presses YES then the application will exit else will go back to the default screen.



#### 4.2.17 NXP\_DTA\_UI\_SCR\_SCENERIO\_15: DTA Library (Class) Path Mismatch App Launching

If the library file is available and if the class path mismatch the user will be notified with the alert “Path mismatch”.

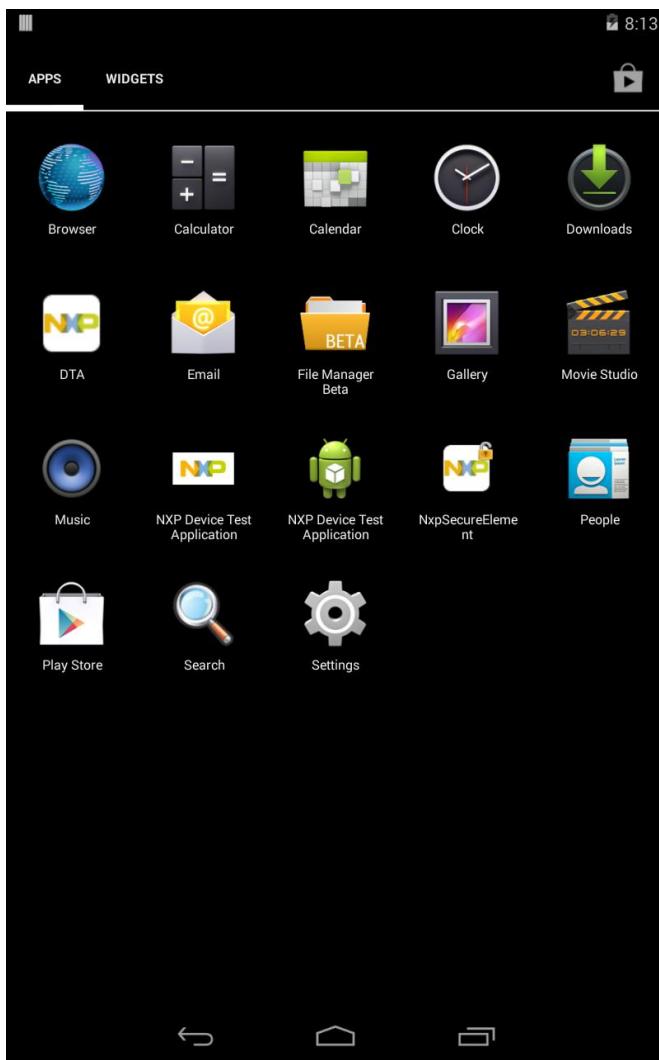
Even this case device info can't be fetched form the DTA Library.



#### 4.2.18 NXP\_DTA\_UI\_SCR\_SCENERIO\_16: File Manager

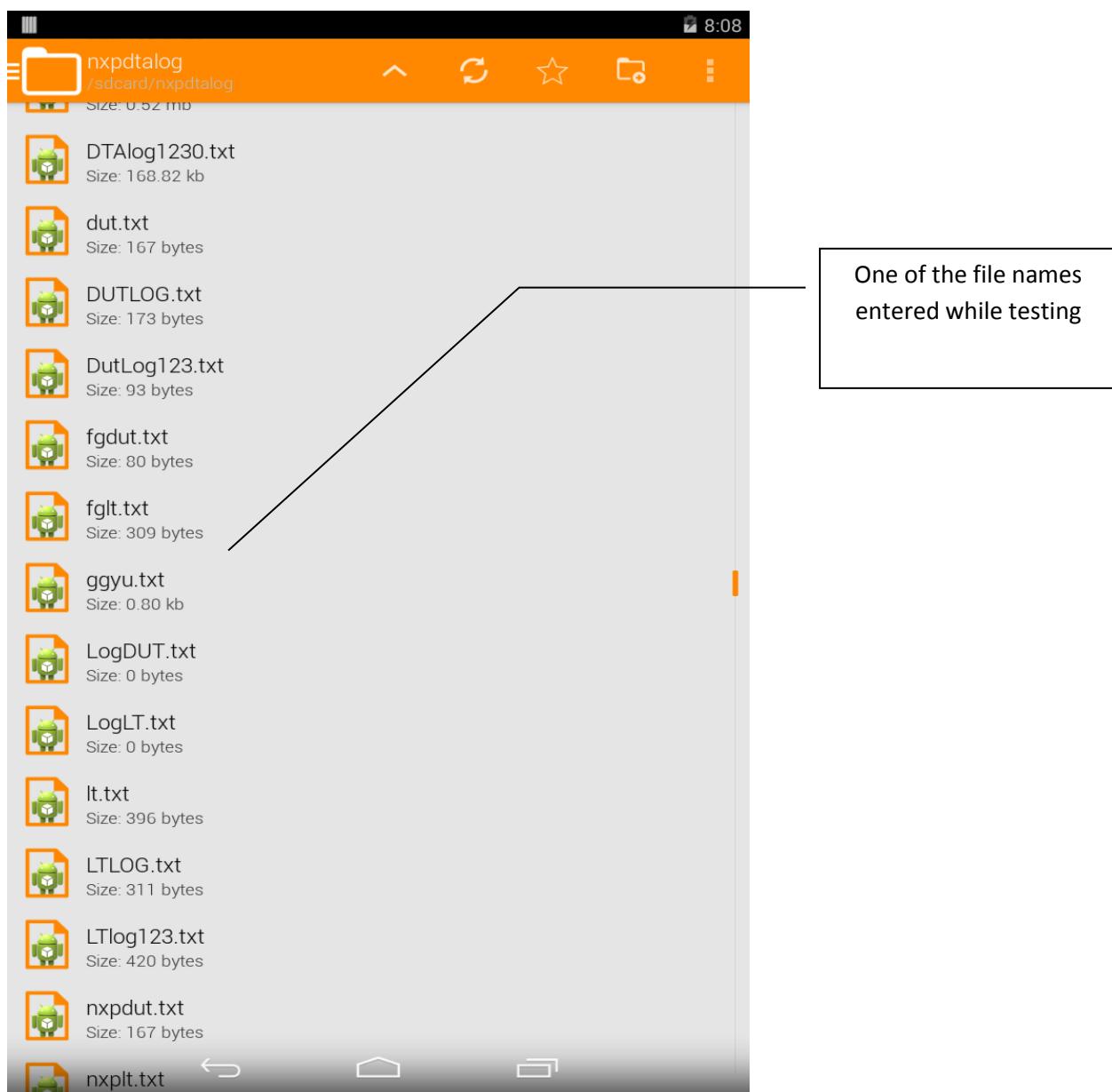
As explained earlier by default the log will be stored at the location “/sdcard/nxpdtalog/”. If the user likes to see the logs, then user has to go the file manager and open the path.

This is applicable to the System Logs, DUT logs and LT logs.



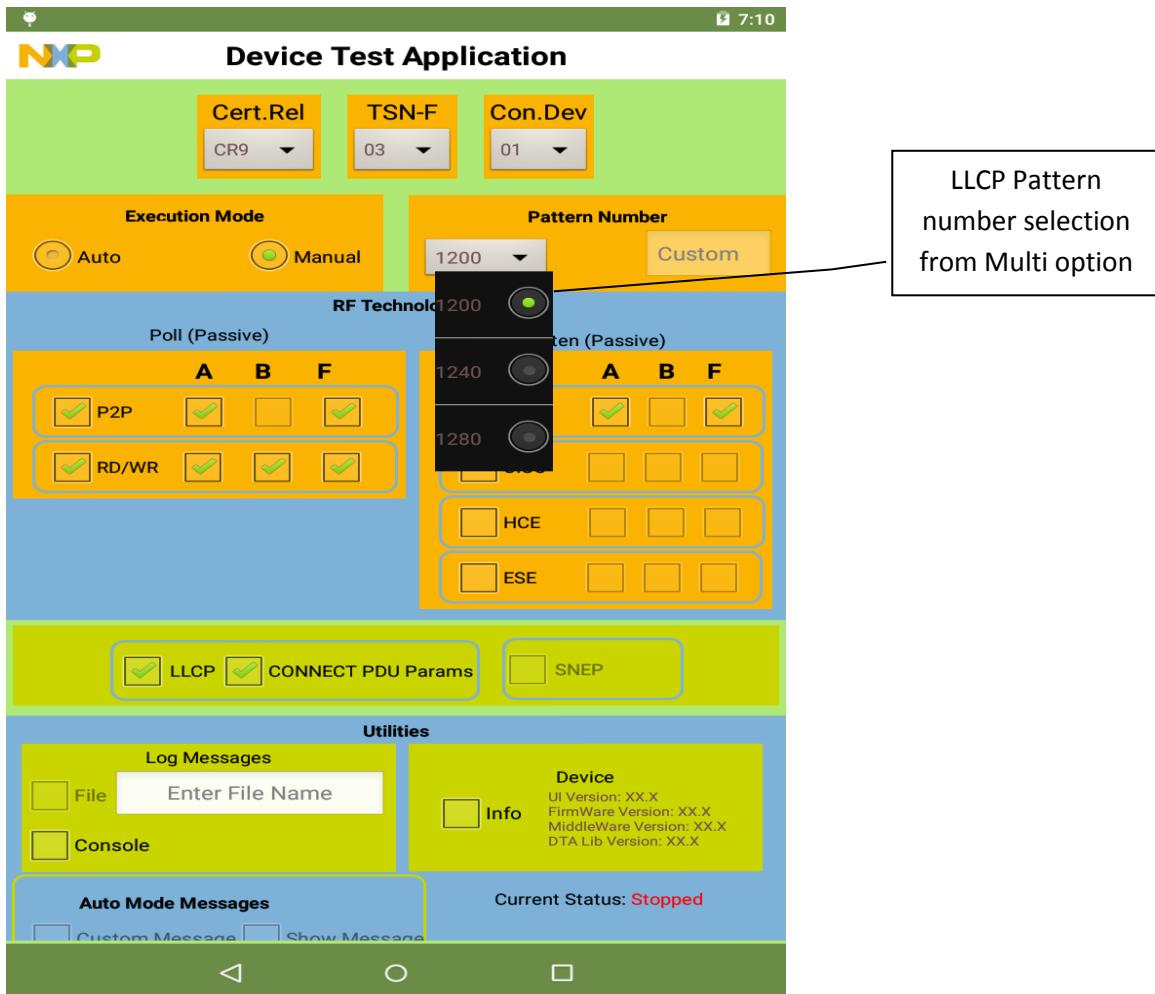
#### 4.2.19 NXP\_DTA\_UI\_SCR\_SCENERIO\_17: Browsing for Logs

The path to be browsed to view the logs: “/sdcard/nxpdtalog”



#### 4.3.1 NXP\_DTA\_UI\_SCR\_SCENERIO\_18: LLCP Pattern Number Selection.

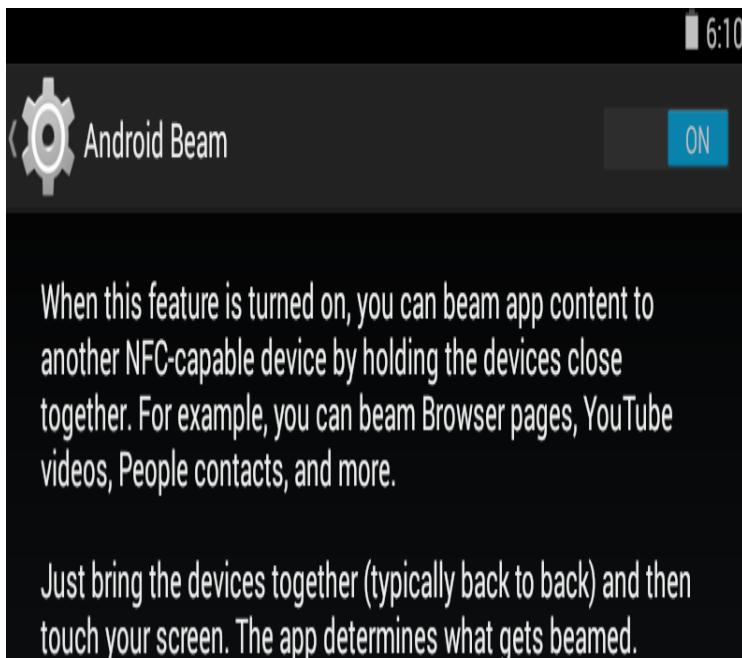
Select LLCP from DTA to run the LLCP test cases. LLCP pattern numbers are enabled in Multi pattern drop down list. Select the appropriate pattern number and press RUN button then the application will start running in manual mode. The current status will be changed from **stopped** to **Running** and the text color is in green. Now, all the selections are disabled. Parameters in CONNECT PDU are enabled by default when LLCP is selected. **Disable this option if IUT is not required to send parameters in CONNECT PDU.**



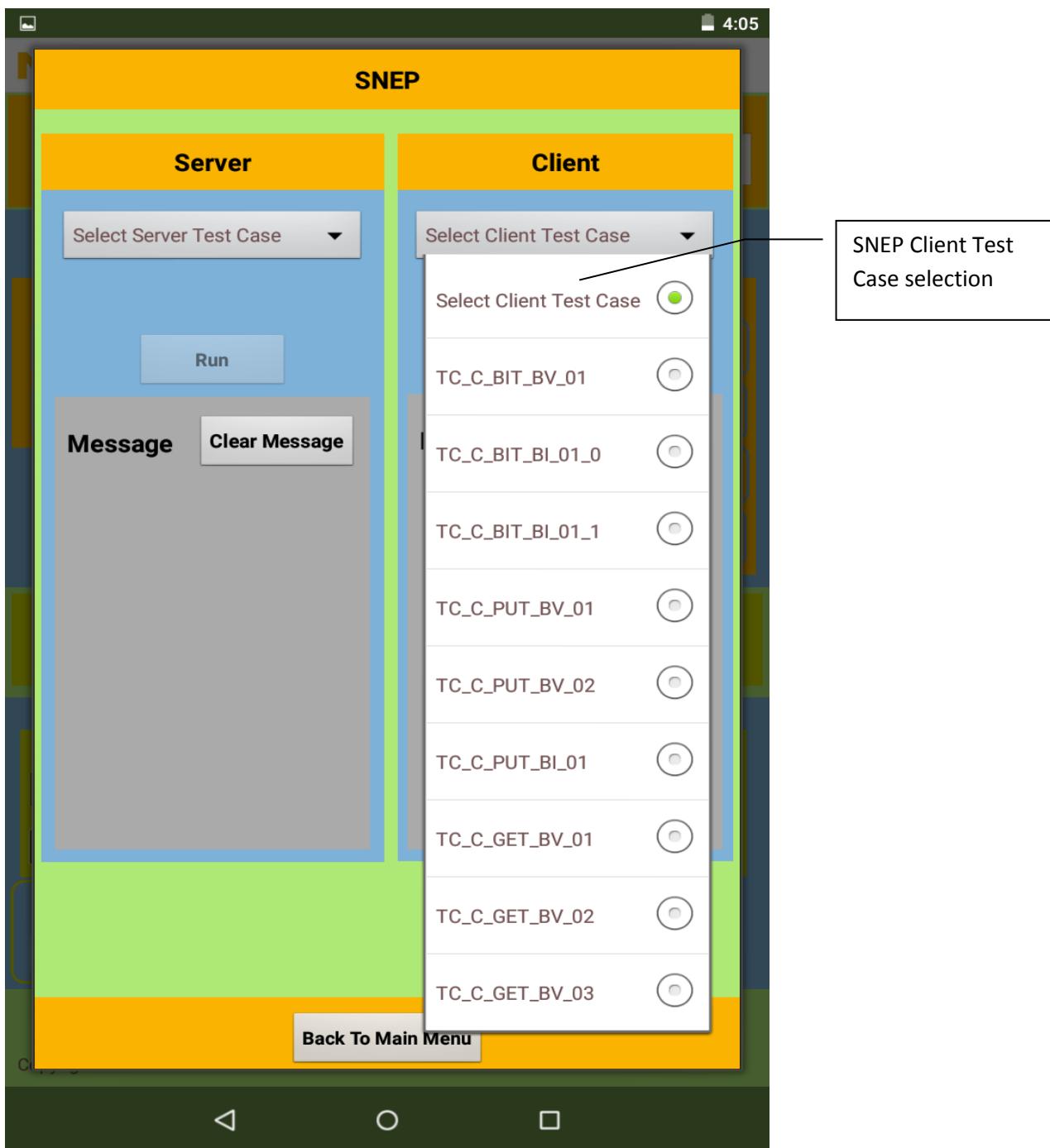
#### 4.3.2 NXP\_DTA\_UI\_SCR\_SCENERIO\_19: SNEP

To Run the SNEP test cases:

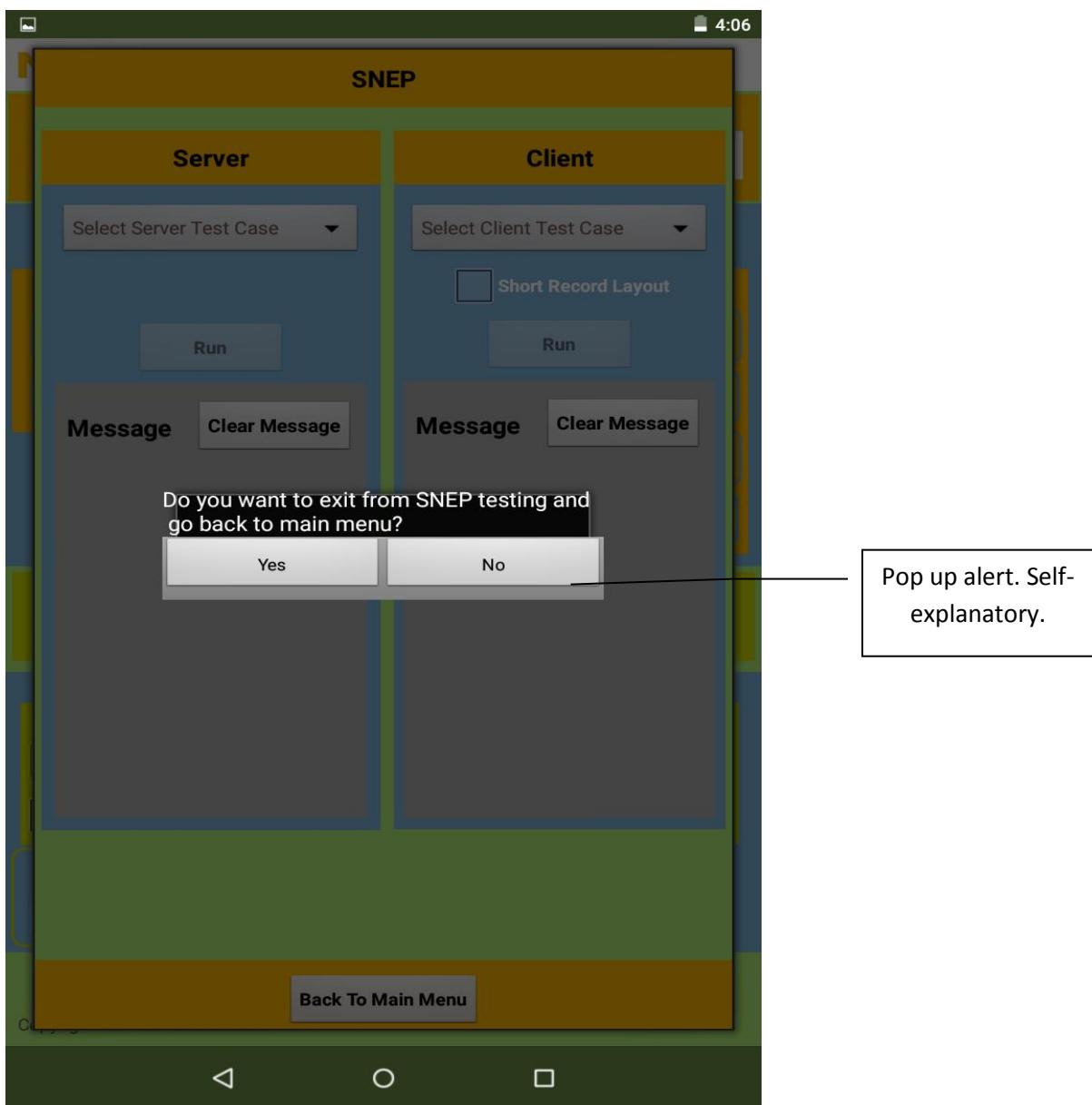
**Android beam shall be set to ON:** Settings->More->Android Beam







- Select the SNEP client test case ID and press RUN.
- The selected SNEP client test case ID settings will be applicable only for particular selected test case ID, not for other test case ID's.
- Press **Back to Main Menu** button to come back to main screen from SNEP screen



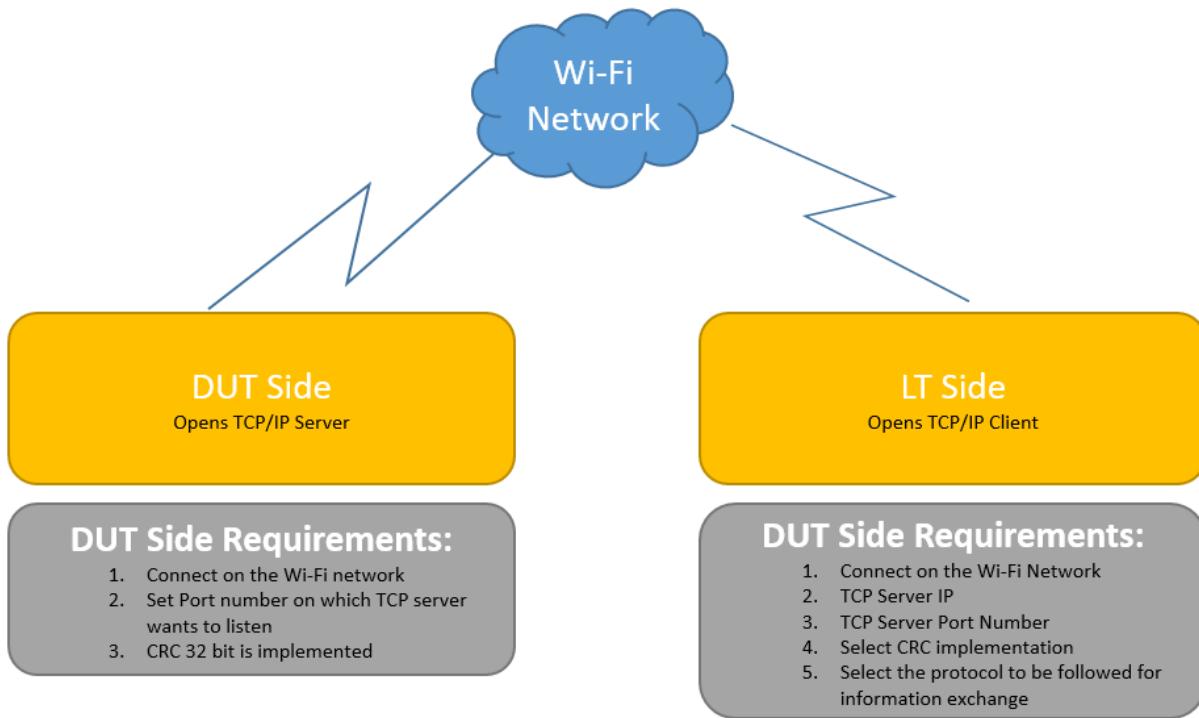
## 5. Testing Using DTA Automation with Micropross: Phase-I

Currently testing using DTA Automation supports the following:

1. Digital Protocol Test Cases
2. LLCP Test Cases (**Not supported**)
3. Analog Test Cases (**Not supported**)
4. SNEP Test cases (**Not supported**)
5. Type 1-4 Tag Operation Test Cases (**Not supported**)

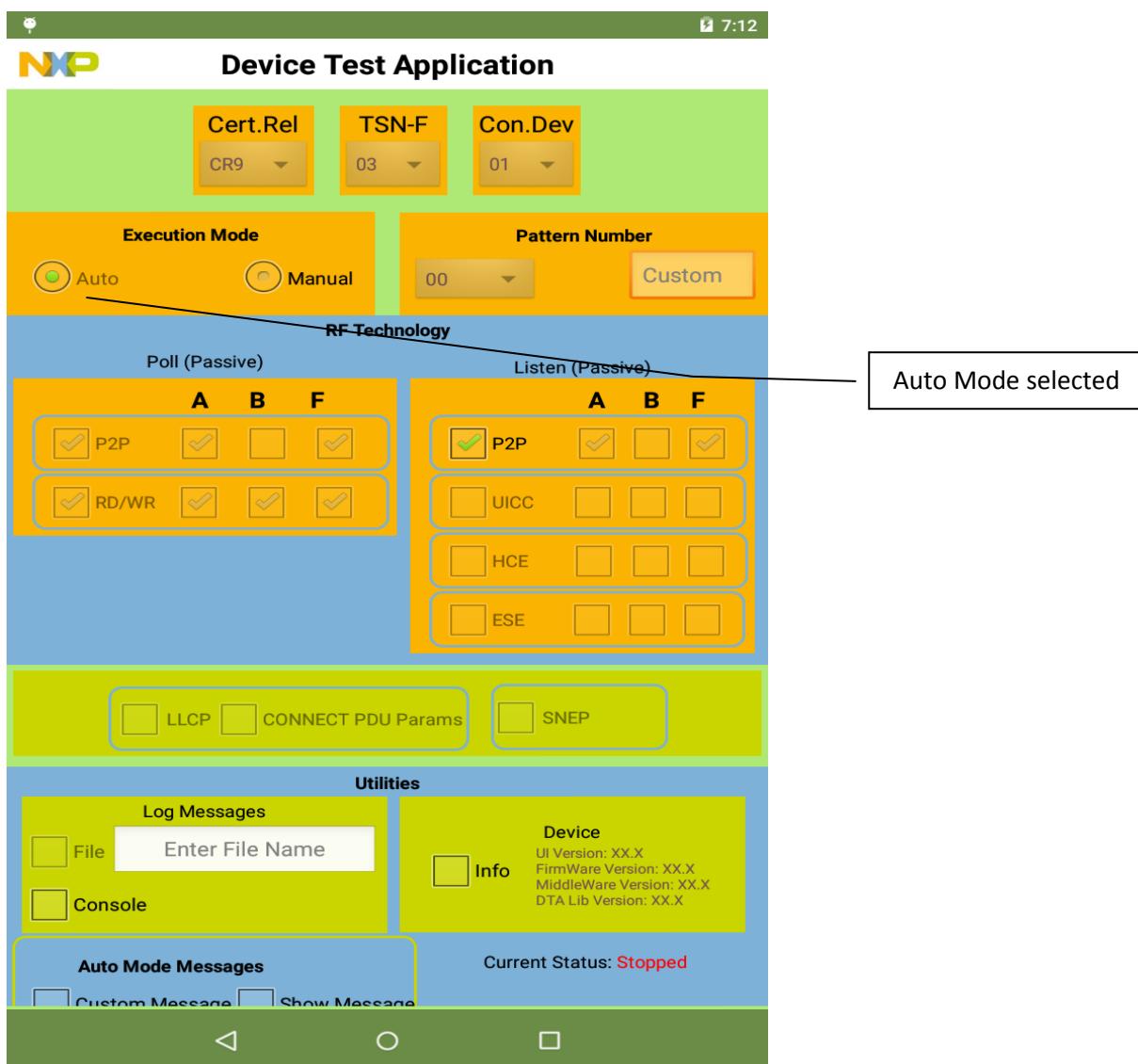
**Note: Physical changeover of the DUT id required for Listen and Poll mode test cases.**

With the Micropross tool the DTA automation is implemented using the following architecture:

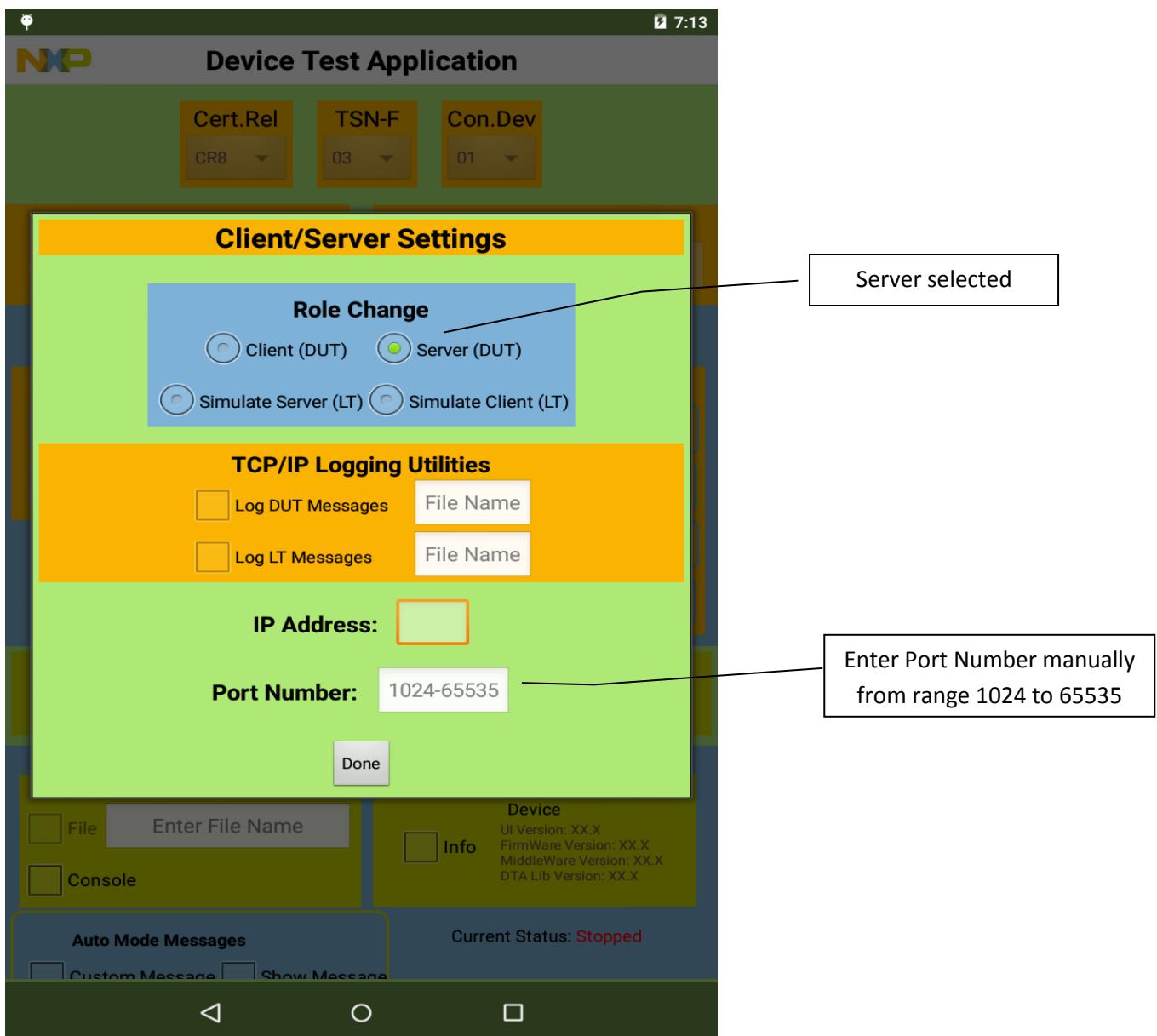


## 5.1. NXP\_DTA\_UI\_SCR\_SCENERIO\_20 – DUT Side Settings for DTA Automation:

Launch the DTA application. In DTA UI main screen select Auto mode from the Execution Mode and it displays Client/Server setting screen.

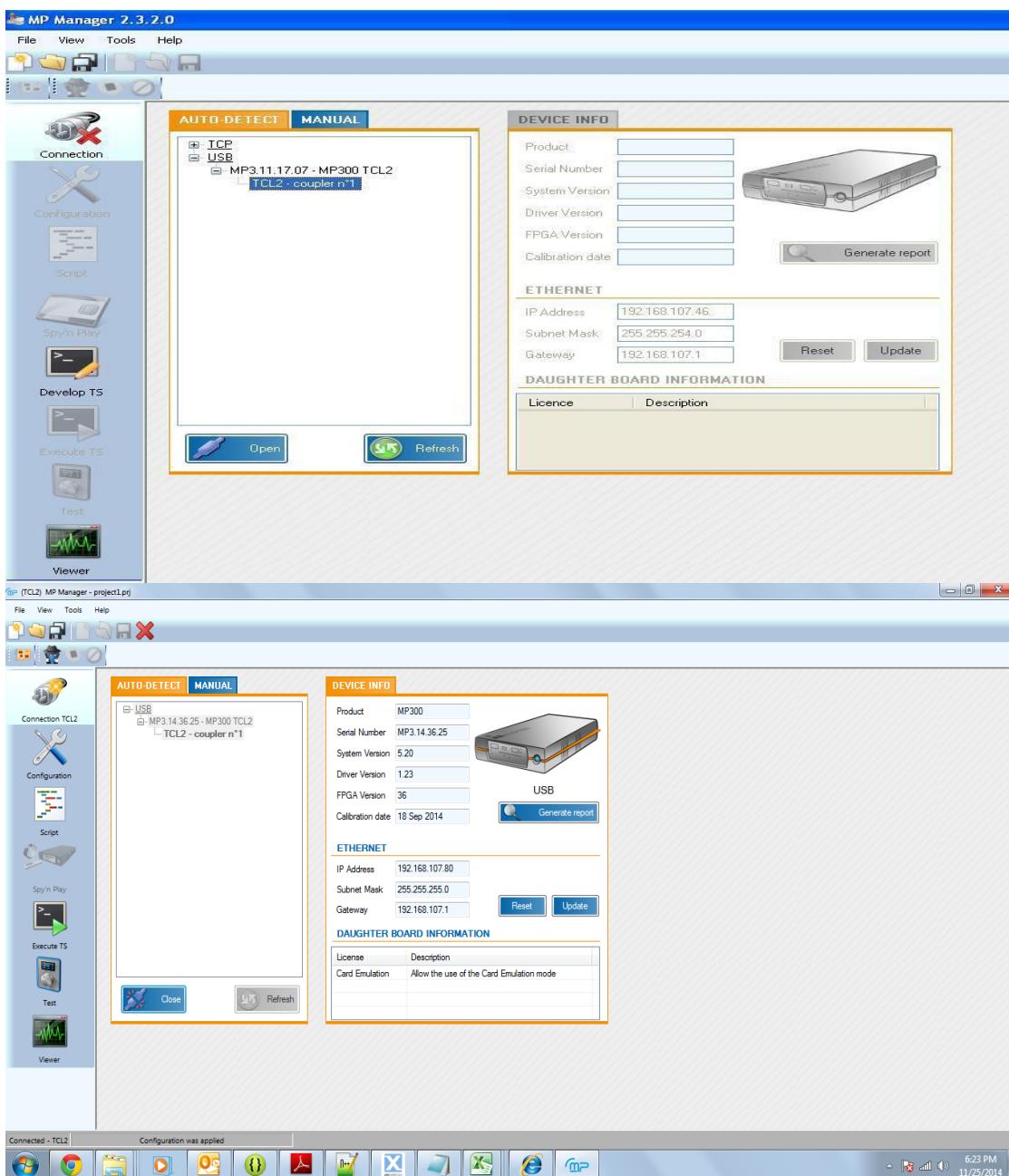


In Client/Server Settings screen, select Server (DUT) and enter port number (port number range: 1024 - 65535) on which the DUT wants to listen to TCP/IP Clients (Ex: 1111) and press ‘Done’ button. After this run the DTA automation by pressing ‘Run’ button in DTA main screen.

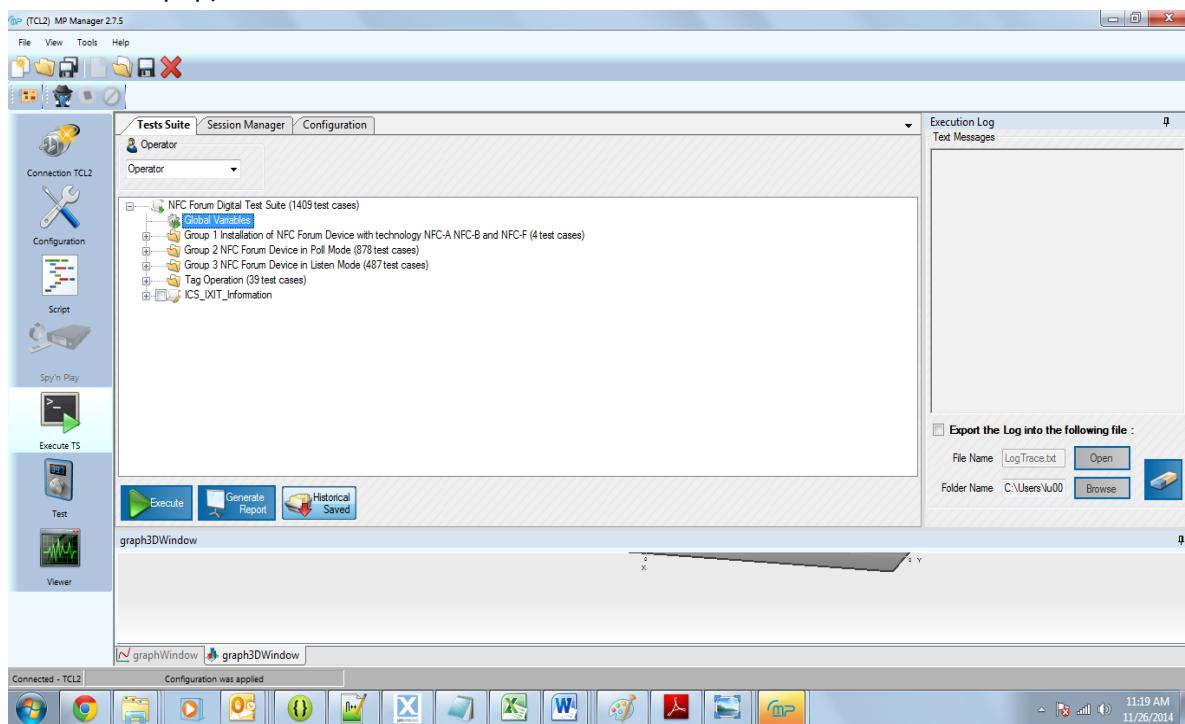


## 5.2. NXP\_DTA\_UI\_SCR\_SCENERIO 21 – LT Side (MP Connection Setup) for DTA Automation

In MP Manager select ‘Connection’ and click on ‘Open’, then MP Manager is connected to the MP300 TCL2 product and displays the product’s information.



In MP Manager click on 'Execute TS' and then open NFC Forum Digital test suite (NFC Forum Digital Test Suite.mpep) and double click on '**Global variables**' as shown in the below screen:



Set the Global Variables for testing using DTA Automation as shown in the below screen

**View Global Variables**

Name	Description	Value
SIMULATION_TIMEOUT	Timeout in ms of the waiting event...	10000
VERIFY_RAPDU	Set to True if you want to check t...	False
Verbose	If True, all informations about acc...	True
EVENTS_DATATION	Give the datation of the events (o...	Nano seconde
LMA_USED	Reserved for Future Used : extra ...	False
IS_DTA_ACTIVATED	Activates NFC Forum DTA Autom...	True
DTA_CNX_STR	DTA Automation remote DUT con...	192.168.0.101:1111
DTA_CRC_TYPE	Determines the type of CRC used	CRC16
DTA_VENDOR_ID	Determines the vendor ID	PRO

Buttons on the right: Export, Import.

Bottom buttons: New, Modify, Delete, Close.

**Global variables:**

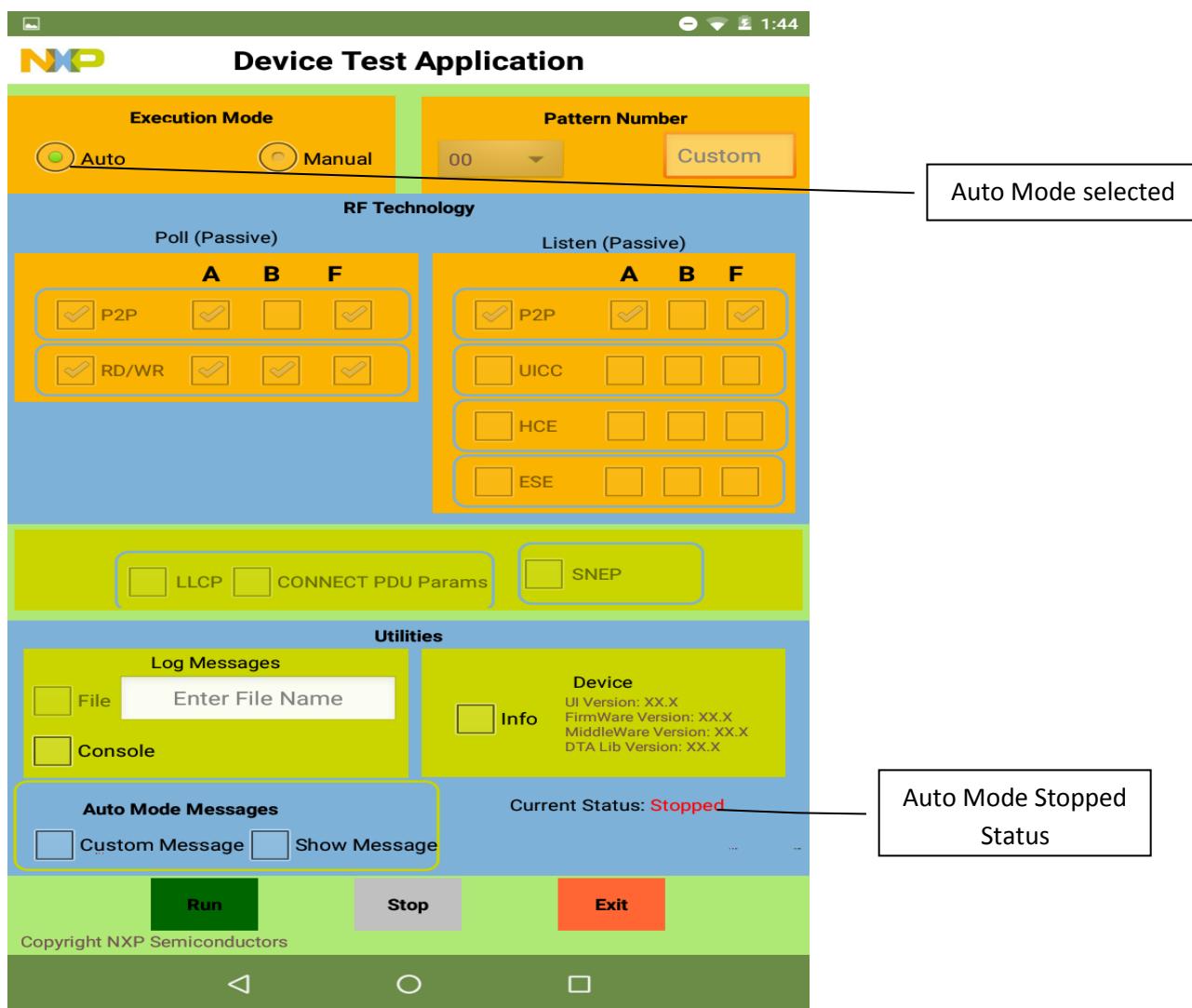
1. **IS\_DTA\_ACTIVATED:** This parameter indicates whether the DTA Automation is activated. If this variable is set to TRUE then LT works with DTA automation & if set to FALSE then LT works with manual DTA.
2. **DTA\_CNX\_STR:** This is the connection string passed to the DTA Automation. It's composed of the DUT IP address and the DUT port on which the server is listening for the DTA Automation, both separated by a colon. Here, DUT opens TCP/IP Server.
3. **DTA\_CRC\_TYPE:** This variable indicates the Cyclic Redundancy Check type. Two CRC types are available. CRC16 and CRC32. Currently CRC32 is implemented at DUT side. So, it mandatory to choose CRC32.
4. **DTA\_VENDOR\_ID:** The vendor ID is related to the DTA Automation implementation of the DUT. Currently both LT & DUT support PRO mode for data exchange.

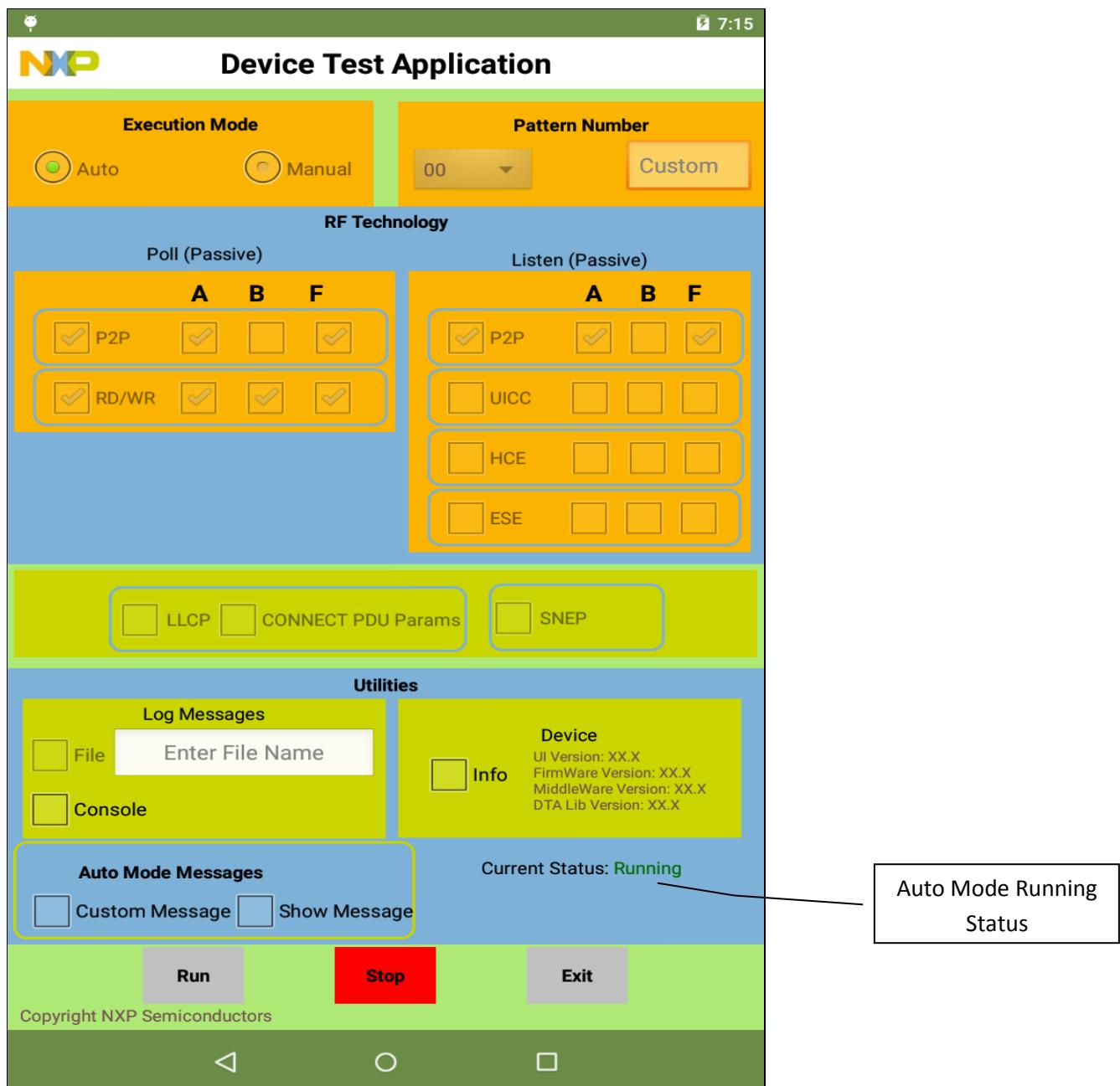
**5.3. NXP\_DTA\_UI\_SCR\_SCENERIO 22: Running in Auto mode for testing**

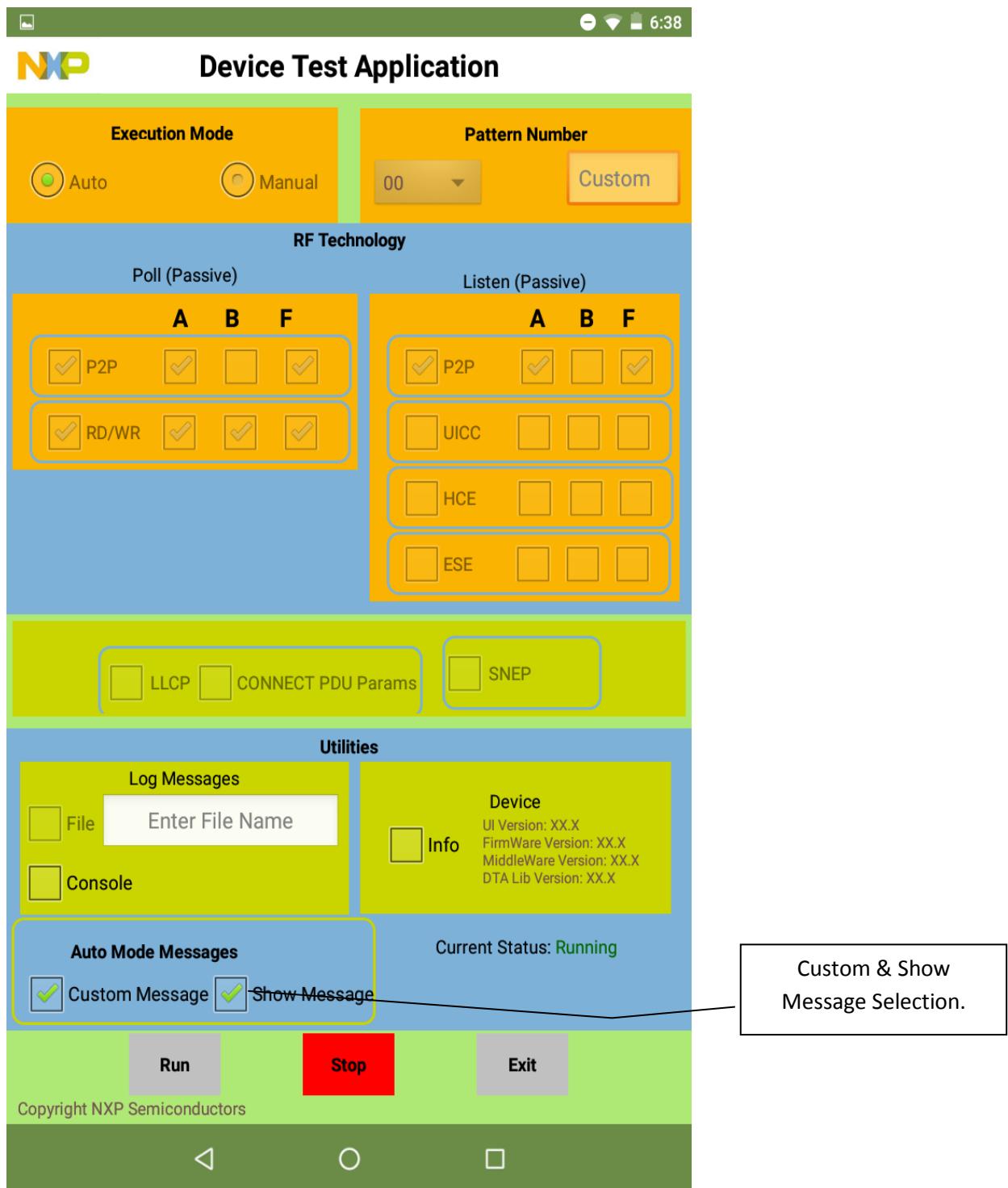
Once the settings are configured at the both the ends.

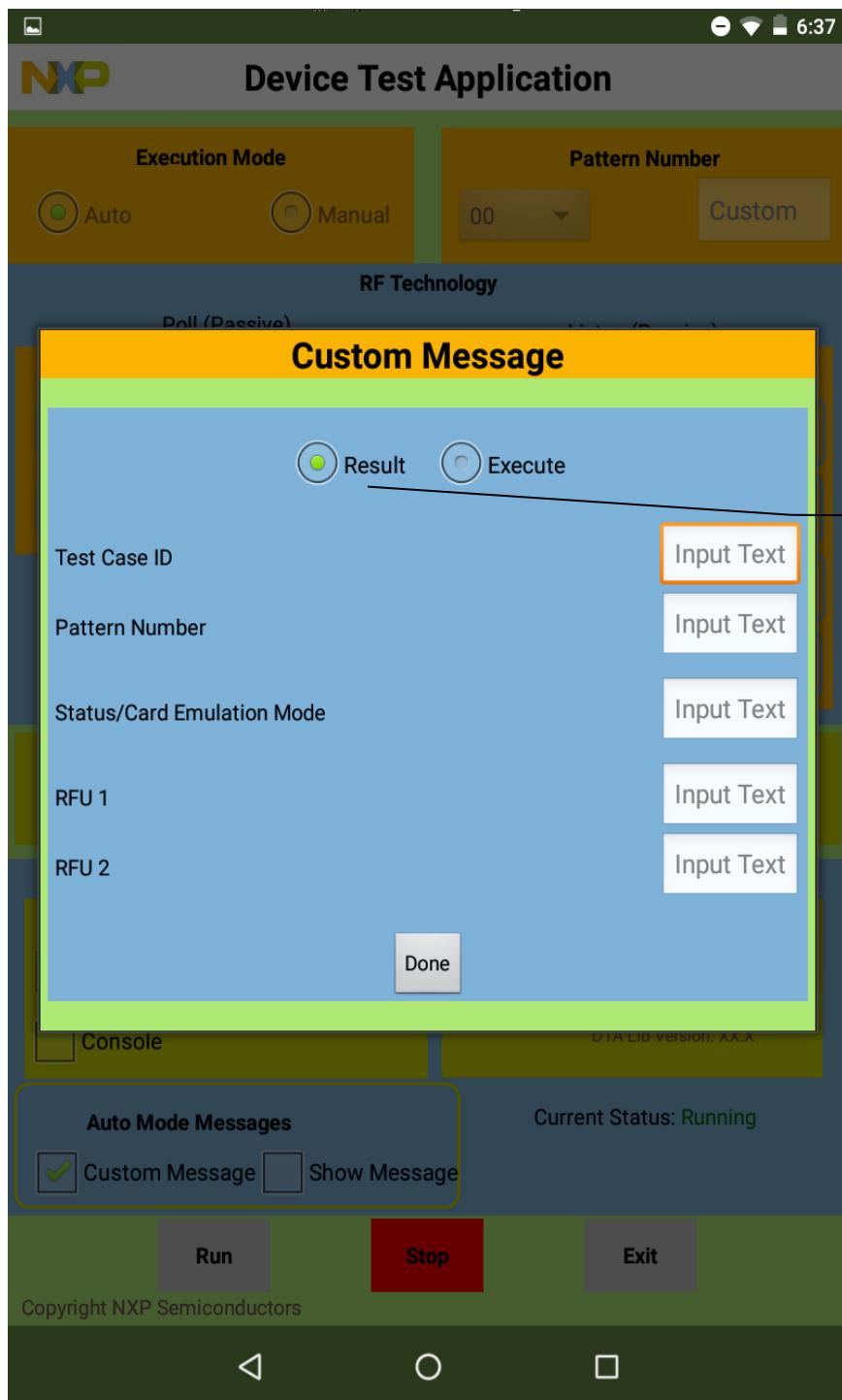
Select the applicable or all test cases which are required to be tested at the LT Side.

Click on Execute button at LT side which will start executing all the selected test cases.

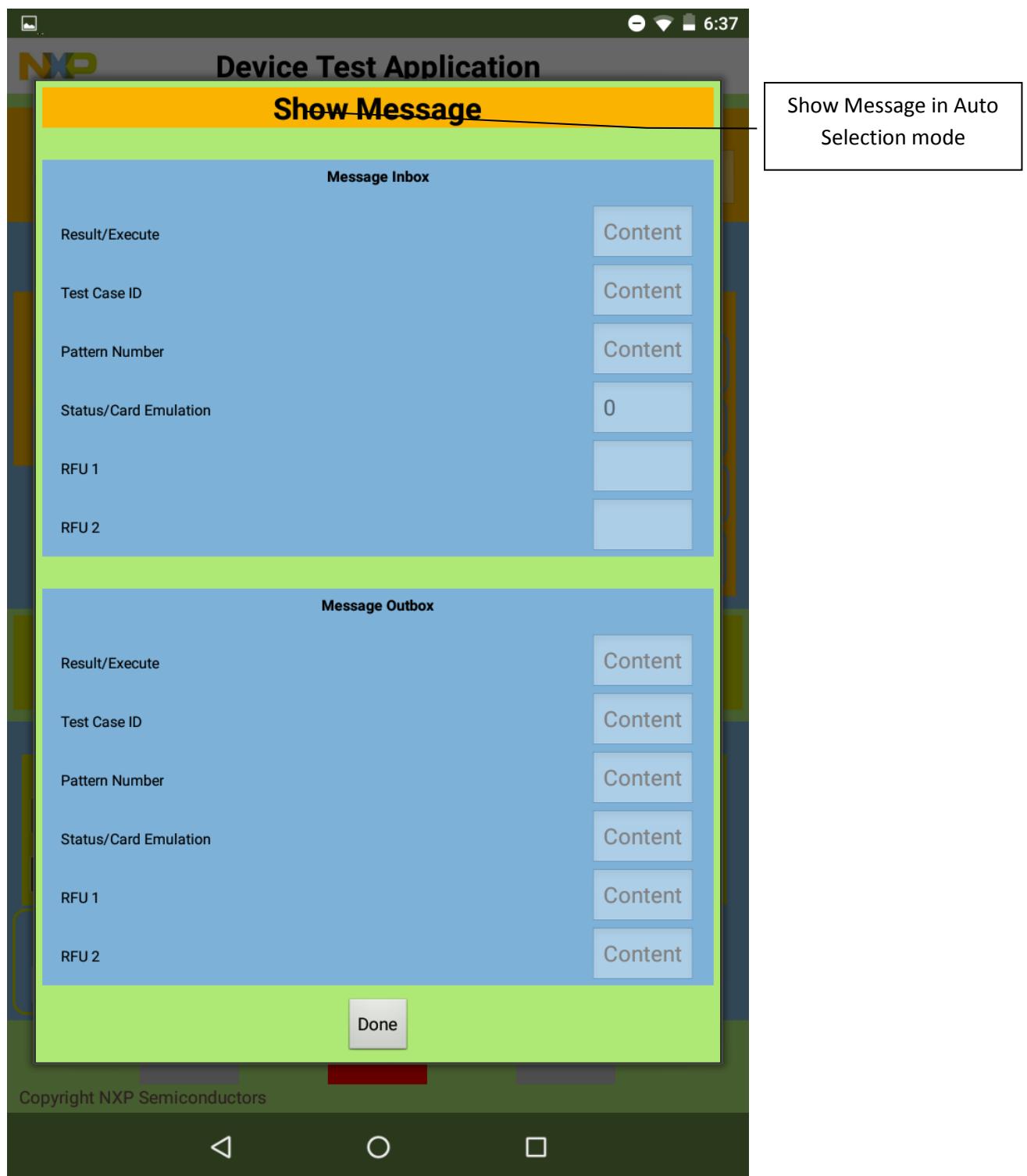








Result & Execute for  
Custom Message in  
Auto Selection mode



## 6. References

- None

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