

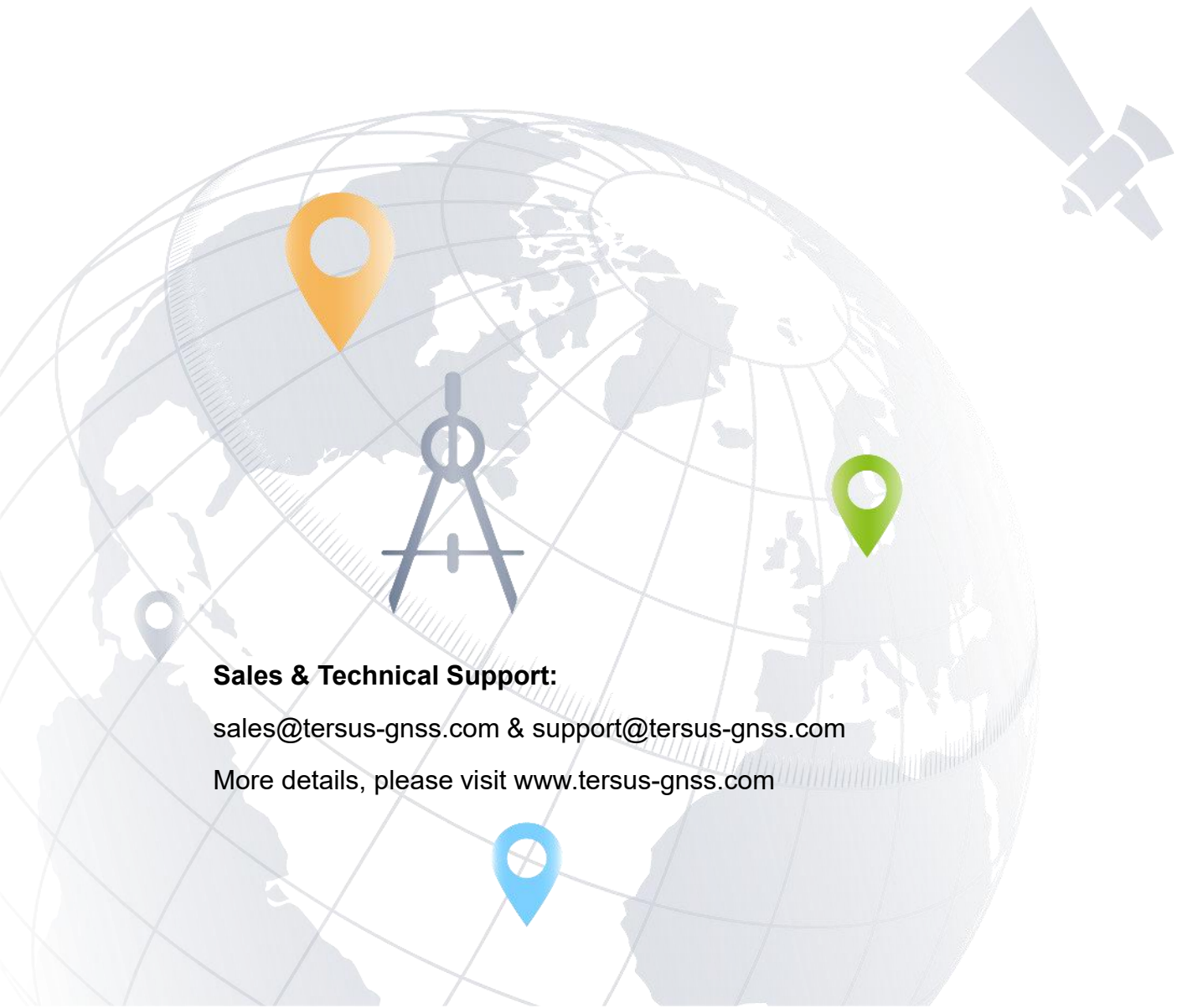


User Manual

Version V1.2-20210628

User Manual For Tersus TC20 Controller

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Revision History

Version	Revision Date	Change summary
1.0	20181224	Initial Release
1.1	20190701	Add accessories, firmware upgrade and google service framework installation
1.2	20210628	Upgrade Table1

1. Introduction

This chapter mainly introduces the overview and specification of the Tersus TC20 Controller.

1.1 Overview

The Tersus TC20 Controller is a rugged smart controller with design of 4.3" touch screen and an alphanumerical keypad. Equipped with powerful processor, it is perfect to adapt with Tersus Survey software. With professional IP67 rating, it is robust and reliable for harsh operating conditions.



Figure 1.1 The overlook of TC20 Controller –
Yellow



Figure 1.2 The overlook of TC20 Controller –
Red

1.2 Specification

Table 1 TC20 technical specification

System	
Operating System	Android 6.0
CPU	MTK MT6735 Quad-Core 1.3GHz
Memory	2GB RAM + 16GB ROM
External Flash	T-Flash , up to 64GB
Keypad Backlight	White
LCD	4.3"
Touch Screen	Capacitive Touch Screen
Camera	8M pixel, Auto Focus
Flash Light	High light Flash LED
Language	47 languages including Chinese, English, Filipino, French, Italian, Japanese, Korean, Malay, Portuguese, Romanian, Russian, Spanish, Turkish, etc.
GNSS	
Signals supported	A-GPS
Communication	
Wi-Fi	IEEE 802.11a/b/g/n
Cellular Mode	Dual SIM Dual Standby
SIM1 & SIM2	FDD-LTE 800 / 1800 / 2100 / 2600MHz TD-LTE 1900 / 2300 / 2500 / 2600MHz WCDMA 850 / 900 / 1900 / 2100MHz GSM 850 / 900 / 1800 / 1900MHz
Bluetooth	V4.1
USB	Micro USB for charging and data (OTG)
Audio Jack	3.5mm Audio Jack for Audio

NFC	Standard
Sensors	G-Sensor, Compass, Barometer, Light-Sensor, Gyro
Electrical	
Power	5V DC, 1.0A
Battery	6500 mAh
Battery Life	10 hours operation, 720 hours standby
Charging Time	4.5 hours (5V 2A input), 8 hours (5V 1A input)
Physical	
Dustproof & Waterproof	IP67
Shock	0.8m drop onto concrete
Dimension	210mmx87mmx31mm
Weight	495g (include battery)
Operating Temperature	-20 °C ~ +55 °C
Storage Temperature	-30 °C ~ +65 °C

1.3 Accessories of TC20 Controller

The accessories of TC20 Controller are listed below.

TC20 Lithium Battery (3.7V/6500mAh)



Figure 1.3 TC20 Lithium Battery

TC20 Charger (5V/1A)



Figure 1.4 TC20 Charger

Mini USB Cable

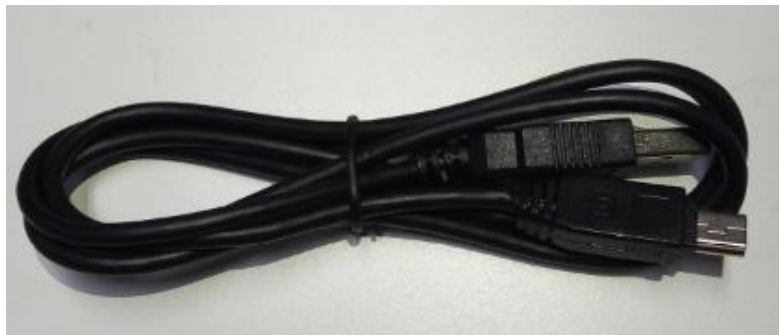


Figure 1.5 Mini USB Cable

- Functions:
1. Connect to the USB port of computer for data downloading;
 2. Connect to the charger to charge TC20 controller.

2. General Operation

This chapter introduces how to use Tersus TC20 Controller.

2.1 Starting to use TC20 Controller

Power on: Press and hold the power button for 3 seconds

Power off: Press and hold the power button for 3 seconds, select 'power off' in the menu option.



Figure 2.1 Four sides of TC20 controller

Menu Key: Select to show the available menu in current screen.

Home Key: Return to home screen. To view recent application, press and hold the home key.

Back Key: Return to previous screen.

Volume Key: Adjust the volume of the sound.

Reset Key: Shut down the controller when controller is abnormal.

Camera Key: Short press to enter camera in home screen. Long press the key to open torch

2.2 Insert the SIM card and T-Flash card

1. **Remove the back cover:** Loosen the screws on the back side – to rotate the screws anti-clockwise until open the back cover as shown in Figure 2.2.



Figure 2.2 Remove the back cover

2. **Take off the back cover:** Remove the back cover by lifting it up from the bottom part as shown in Figure 2.3.



Figure 2.3 Take off the back cover

3. **Put the SIM Card in the holder:** Put the SIM card into the slot touching the SIM contacts of the controller as shown in Figure 2.4.

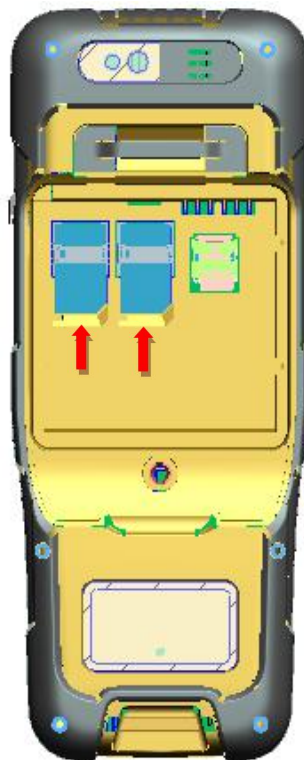


Figure 2.4 Put the SIM card in the holder

4. **Insert T-Flash card:** Open T-Flash card holder and insert T-Flash card into the slot, then close T-Flash card holder as shown in Figure 2.5.

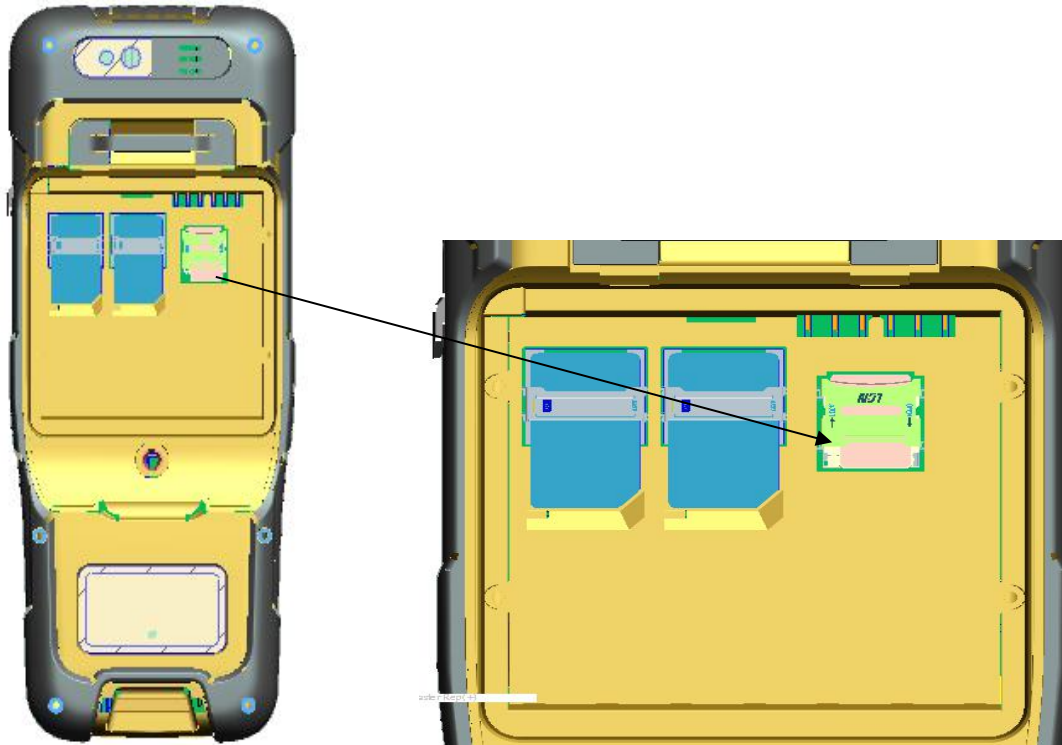


Figure 2.5 Insert T-Flash card

5. **Insert the back cover:** Insert the back cover and rotate screws clockwise to lock the back cover as shown in Figure 2.6.



Figure 2.6 Insert the back cover

Note: Please power off the controller before plug in or pull out the SIM card.

2.3 T-Flash card

1. Connect USB, turn on USB storage.

It automatically pops up USB connected interface after connecting USB, and then click Turn on USB storage to use the T-Flash as USB storage.

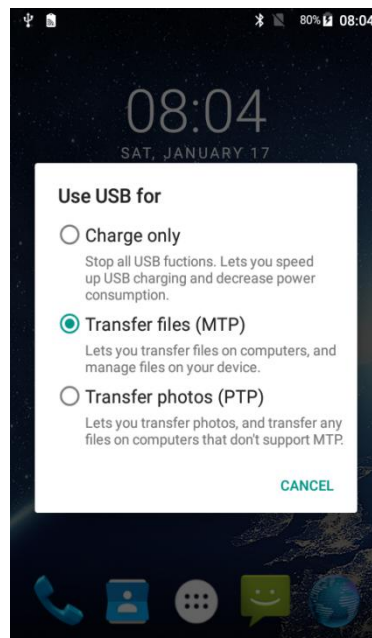


Figure 2.7 Select USB function

2.4 Using of Touch Screen

Single Click: To select an icon. For example, click dial to open the keypad which will be displayed on the screen.

Double Click: To zoom-in or zoom-out. For example, to zoom-in or out of a

photo, click twice when viewing a photo or browsing on the internet.

Hold: press and hold the screen, icon or input box to get more operation options.

- 1) Long-Time Click a picture in the gallery list interface, the status bar prompts to select a picture, you select to share or delete.
- 2) Long-Time Click the blanks of home screen to add home screen shortcut.
- 3) Long-Time Click the blanks of home screen wallpaper sources can be selected.

Drag the screen: You can drag the screen to view more applications which are not displayed in one screen.

Scratch the screen: A screen of information cannot be displayed scratch scrolling display hidden information.

2.5 Home Screen operations

You can use various functions of the controller screen through the touch screen. Click the icons to open the applications. View all applications by clicking an application tab.

The controller has a default screen. You can add multiple screens. After adding multiple screens, about scratching the screen to switch the screen between each other, and at any point of a long blank screen to add widgets, wallpaper settings, enter the settings.

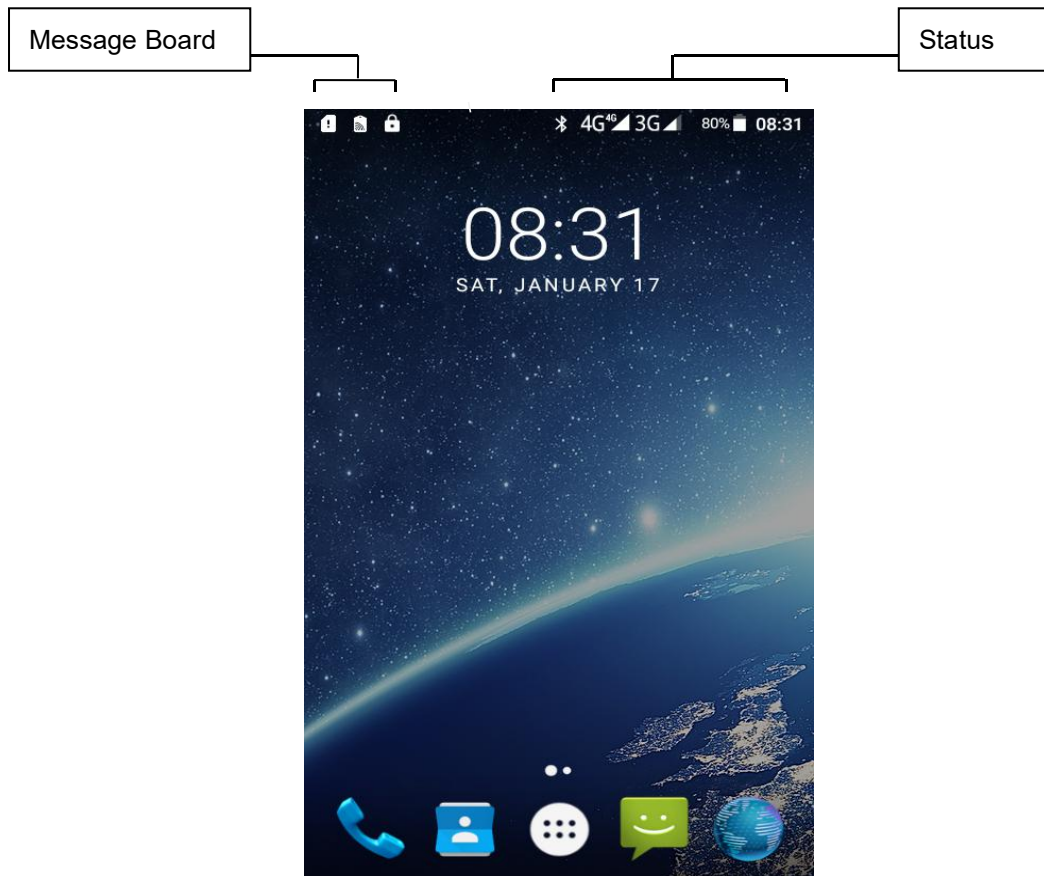


Figure 2.8 Home screen

◆ Create shortcuts and widgets

Click the main screen and then Pop-up list of application. Hold and click the application icon which you want to add a shortcut. Interface blue transparent box will pop up analog screen area. Drag the application icon to the area you want to place, release the hand that add. To add widgets the same way as add a shortcut. Applications and widgets interface switching mode, you can click application and widget or slide the screen. As shown the following figure:

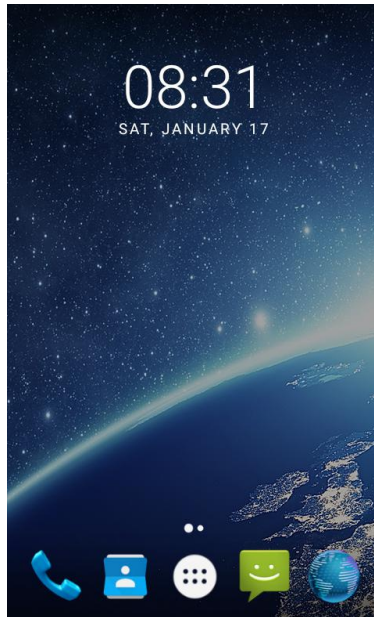


Figure 2.9 Main screen

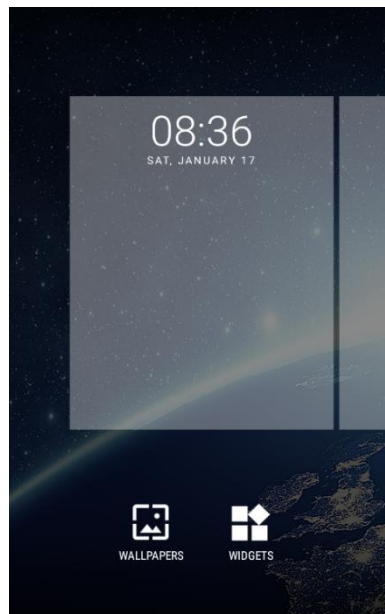


Figure 2.10 List of applications

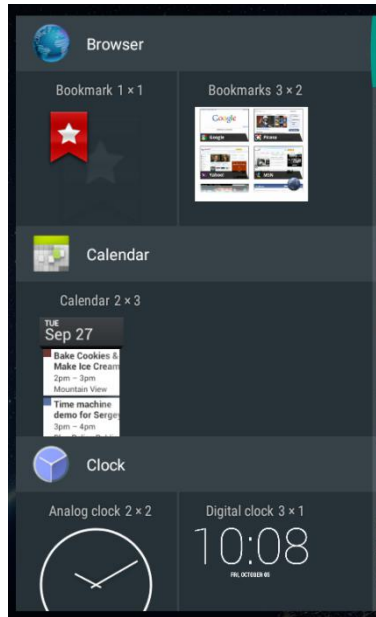


Figure 2.11 Choose the application to be dragged

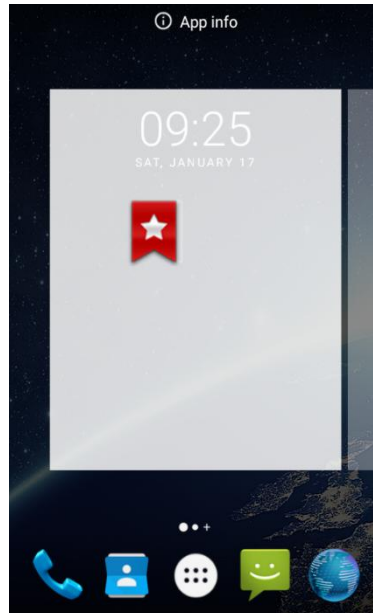


Figure 2.12 Drag the icon to the area

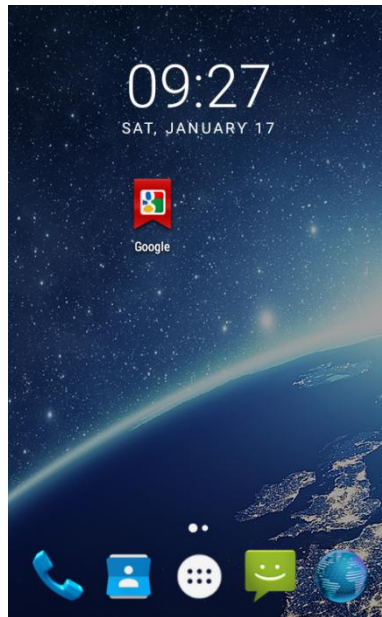



Figure 2.13 Release hand and icon is added

◆ Delete the shortcuts and widgets

To delete an object, tap and hold the object, then drag it towards the top of the screen  Remove. When the object become gray let go of it and the selected object will be deleted.

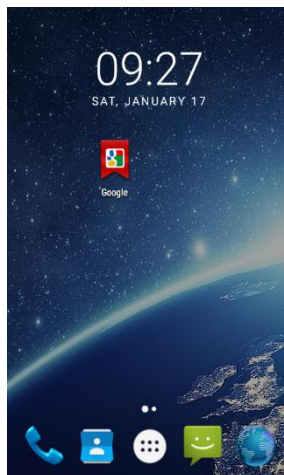


Figure 2.14 Tap the icon to be deleted

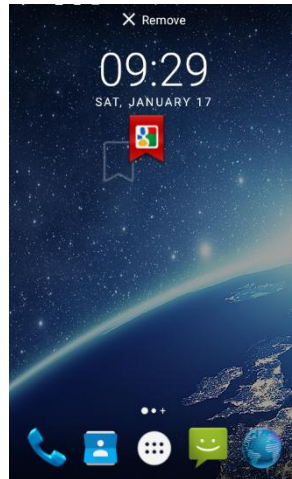


Figure 2.15 Hold and drag the icon

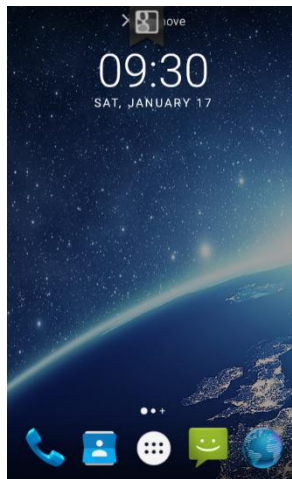


Figure 2.16 The object becomes gray



Figure 2.17 The shortcut is deleted

◆ Lock the screen

Lock the controller in order to avoid useless operation and to save the battery by press the power button.

The controller will automatically lock when it is not being used for some time.

◆ Set wallpaper

- ◆ Long press Home screen pop-up "wallpaper" and "widgets" button. Click the "wallpaper" button to enter the setup screen wallpaper. Slide the bottom of the screen wallpaper zoom view can be switched wallpaper. After Select to set wallpaper, Click "Set wallpaper" that wallpaper setting is completed. As shown the following figure:

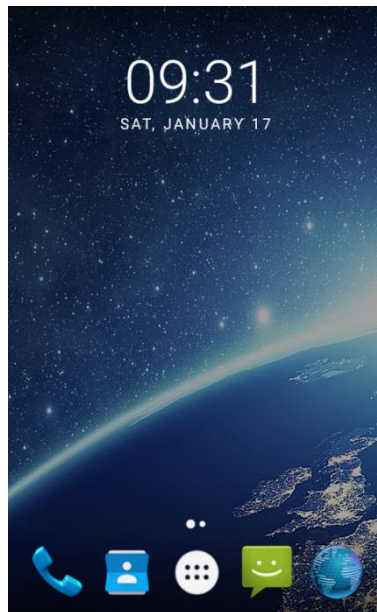


Figure 2.18 Home screen

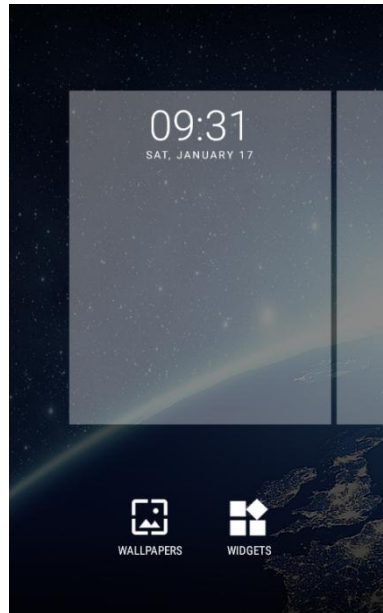


Figure 2.19 WALLPAPER & WIDGETS



Figure 2.20 Select wallpaper



Figure 2.21 Set wallpaper

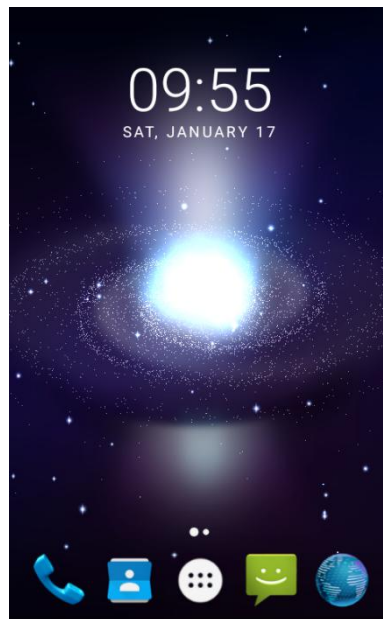


Figure 2.22 Home screen with new wallpaper

◆ **Unlock the controller**

Press the power button to enter the unlocking interface, then slide up and unlock.

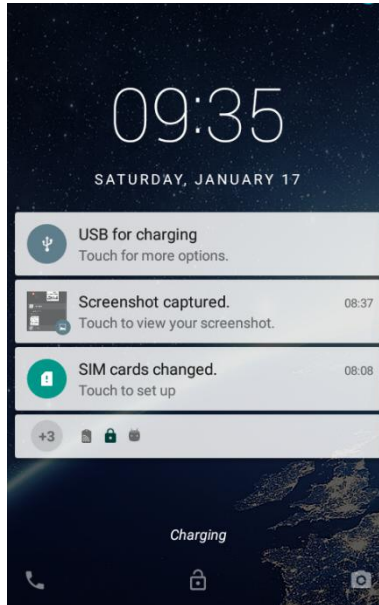


Figure 2.23 Locked home screen

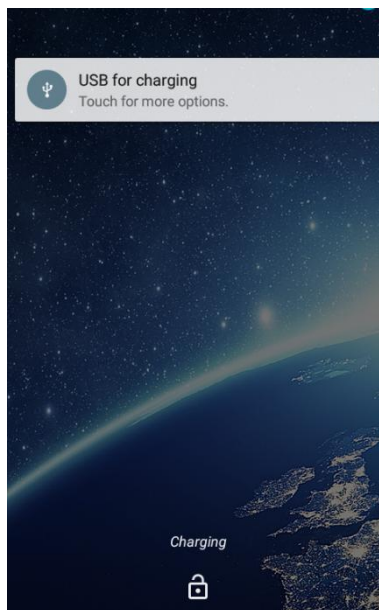


Figure 2.24 Slide up

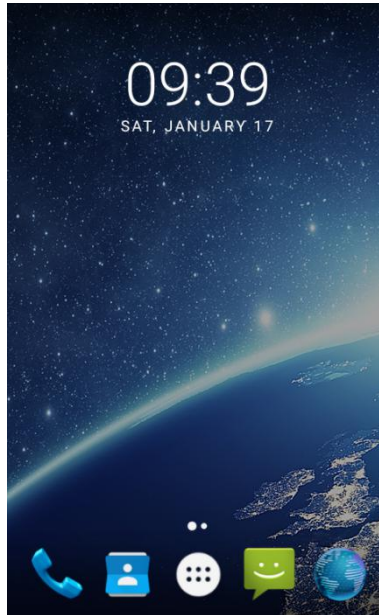


Figure 2.25 Unlocked home screen

◆ Message board

Drag the status bar of any screen can open the message board. Click the icon in the upper right corner to bring up the settings interface and various parameters setting interface. As shown the following figure:

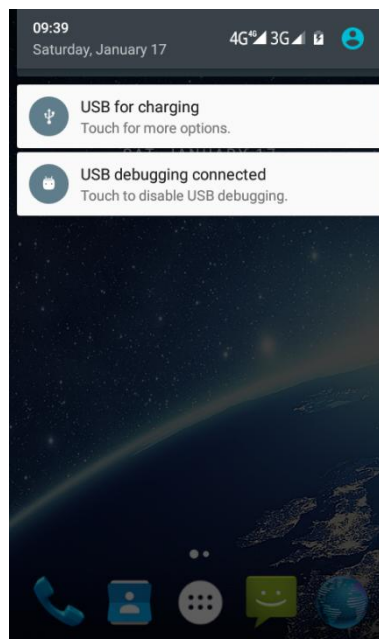


Figure 2.26 Status bar on the screen

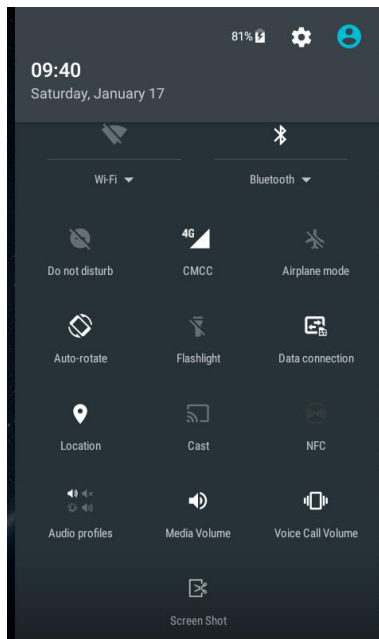


Figure 2.27 Message board

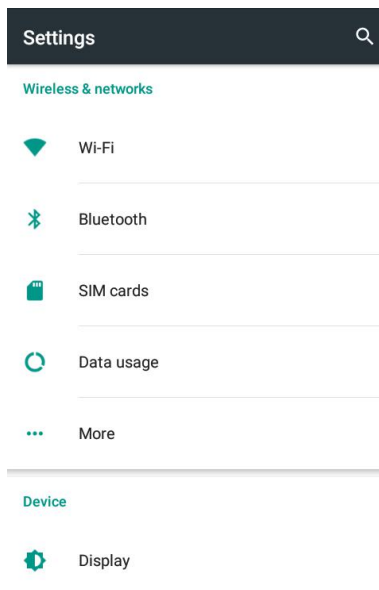


Figure 2.28 Settings interface

◆ Manage applications

Install applications: Found in the file manager to install the software (. APK), then follow the prompts step by step installation

Uninstall application: Enter **Settings->Apps->Downloaded**, then will be able manage and remove installed applications.

◆ Recently used applications

Press and hold the home key, the screen will display a window which shows your recently used applications. Click the icon to open the application.

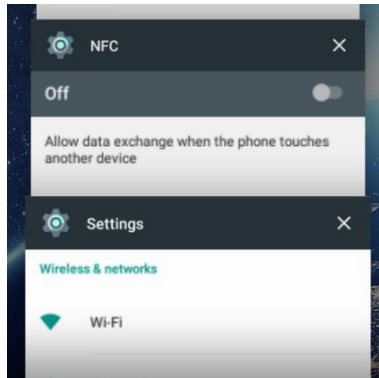


Figure 2.29 Recently used applications

2.6 Extend the battery life

Some functions may use up more power, which eventually shorten the battery life. You could:

- Close all the wireless connection when not in use Bluetooth, Wi-Fi or GPS.
- Reduce the brightness and shorten the screen timeout to save battery, or press power key to shut down the screen when the controller is not in use.
- Close any automatically synchronized applications such as Email, calendar, contacts and other.
- Some applications which are downloaded could also shorten the battery life.

2.7 Firmware Upgrade

Please follow below detailed steps to upgrade firmware for TC20 controller. The firmware file can be downloaded on Tersus official website or obtained from Tersus Technical Support via email support@tersus-gnss.com.

Ensure the TC20 controller is in the **POWER OFF** state, plug the mini USB cable and connect it to the computer. If the mini USB cable is already connected, please unplug the cable and reconnect it to the TC20 controller.

1. Install the driver

Unzip the driver installer zip file (Driver_Auto_Installer_EXE_v5.1612.03.rar). Find the execution file (DriverInstall.exe) and right click choosing 'Run as administrator' to install the driver on the computer. Restart the computer after the installation is completed.

2. Configure upgrade tool and upgrade firmware

Unzip the upgrade tool (SP_Flash_Tool.1620.rar) in a folder, find the execution file (flash_tool.exe) and double click to open it which is shown as below.

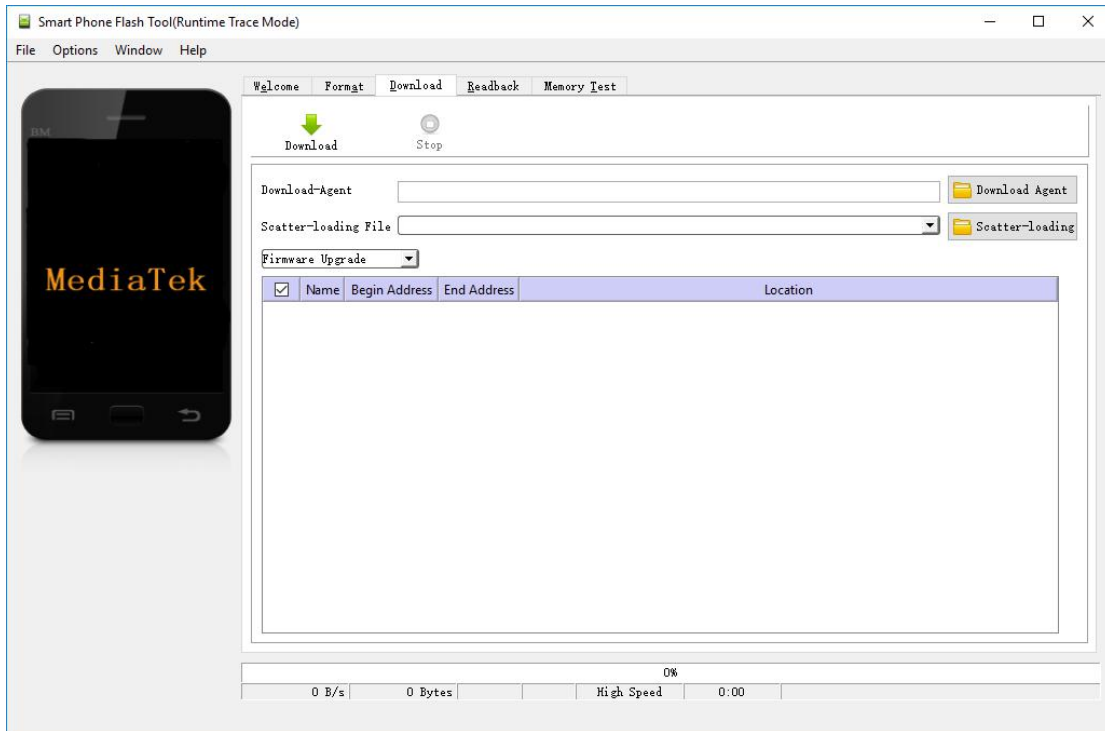


Figure 2.30 Flash tool interface

Click [Download Agent], select [MTK_AllInOne_DA.bin] file in the flash tool folder which is shown as below.

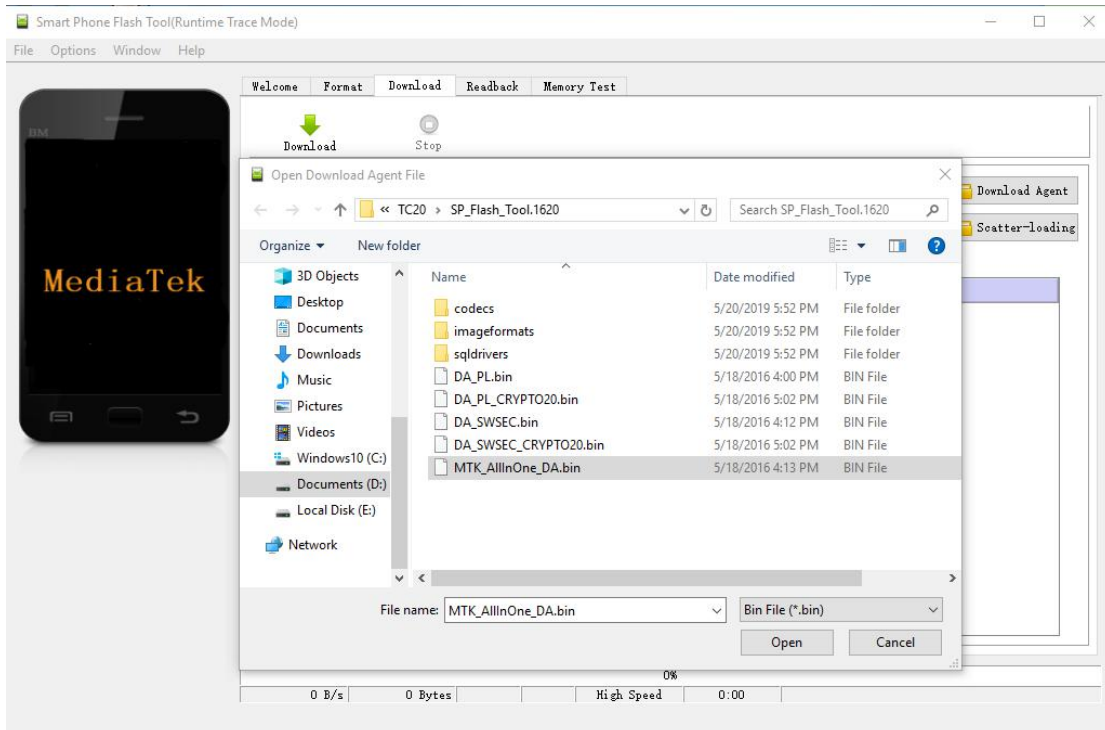


Figure 2.31 Select file for Download Agent

Click [Scatter-loading], select the scatter file MT6753_Android_scatter in the upgrade file folder which is unzipped from the firmware zip file in advance.

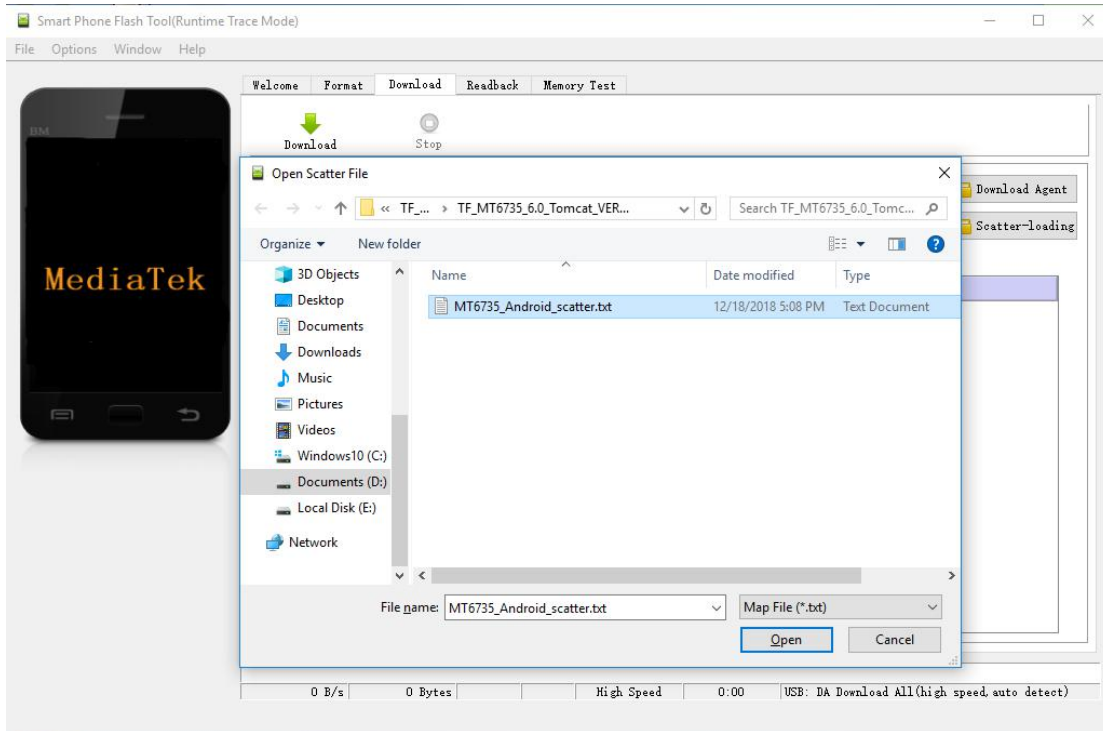


Figure 2.32 Load Scatter file

Select [Firmware Upgrade] as the upgrade mode which is shown as below.

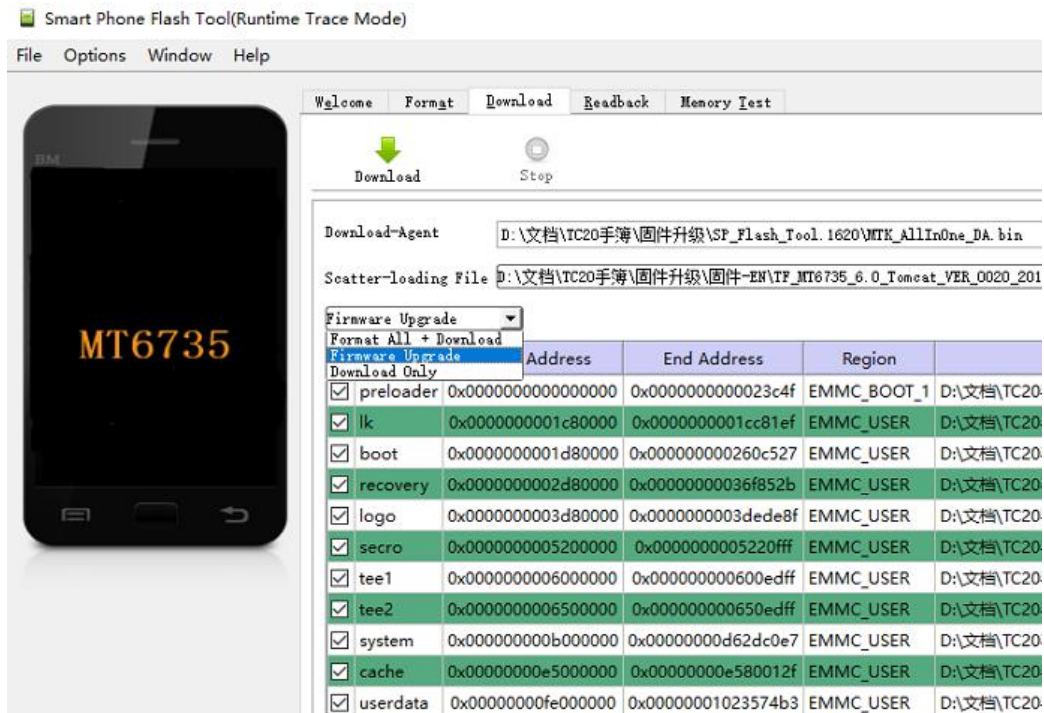


Figure 2.33 Select Firmware Upgrade mode

Click [Download], and the [Download] becomes gray to enter to downloading status which is shown as below

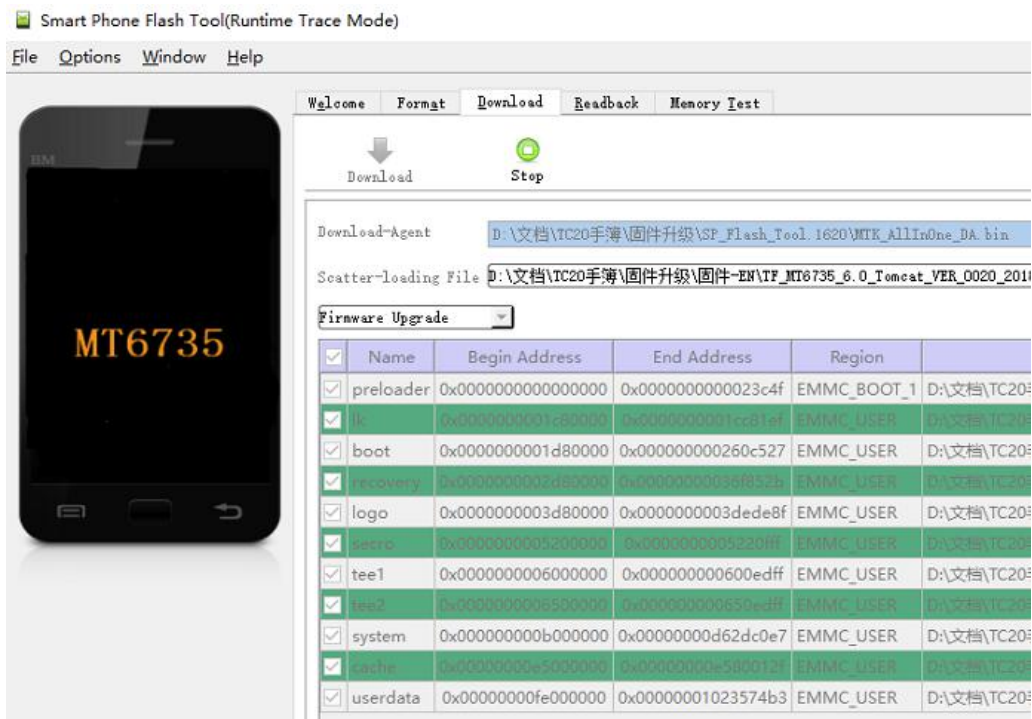


Figure 2.34 Click Download button

After the download process is completed, the upgrading starts automatically.

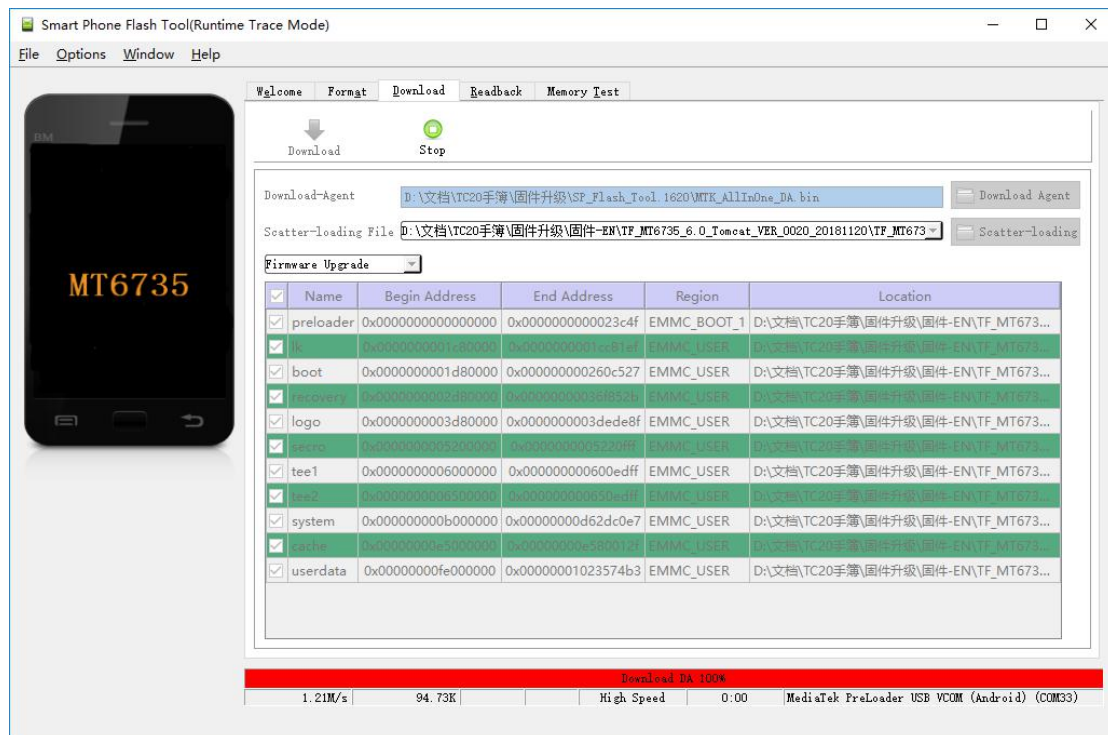


Figure 2.35 Upgrading is ready to start

The upgrading is in progress.

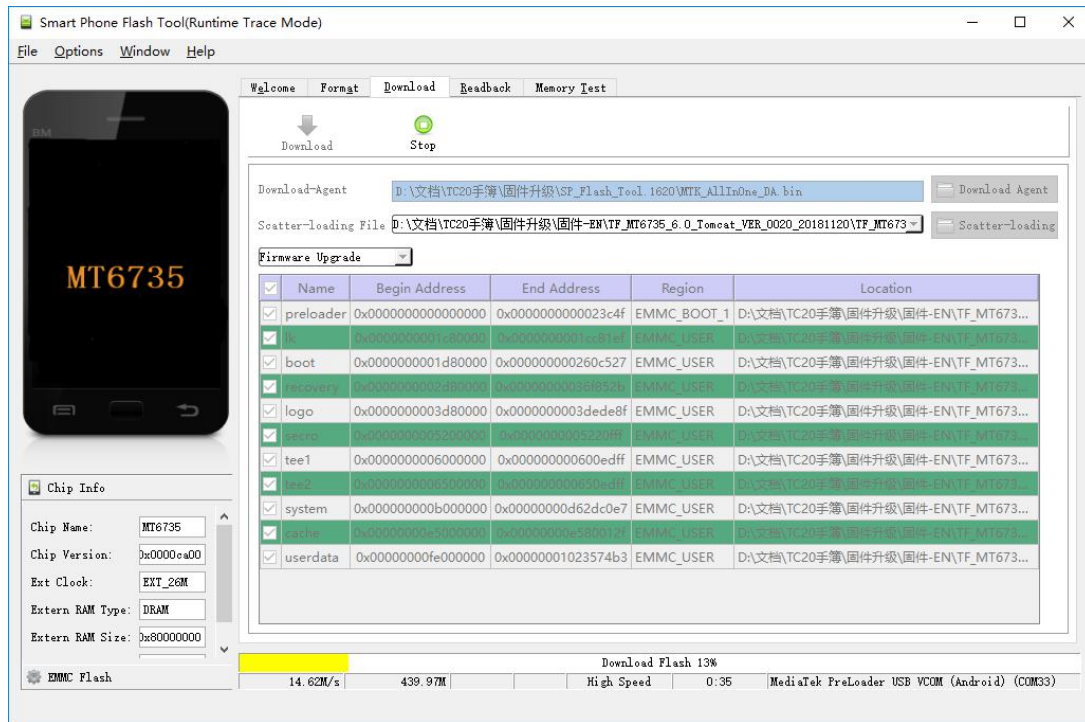


Figure 2.36 Upgrading in progress

When the upgrading is completed, it will prompt out 'OK' to indicate that the upgrading is completed.

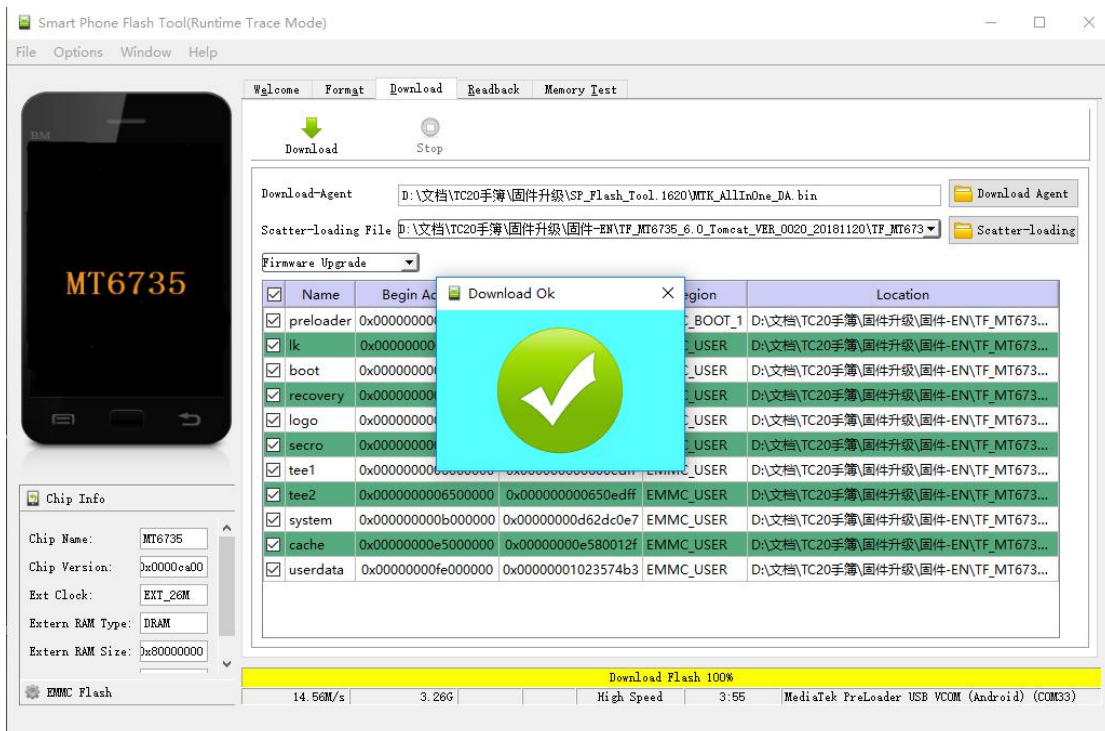


Figure 2.37 Upgrading is completed

Unplug the mini USB cable from TC20 Controller, power on the TC20 Controller for normal usage.

3. Issues of upgrading failure

In the power-off state, and the mini USB cable is plugged to be ready for upgrading, it is not in the download mode to upgrade automatically in fact. At this time, it is needed to check the Computer Management whether there is download port. Because in the power-off state, it automatically enters the download state within a few seconds when plugging the mini USB cable, however it enters charging status after a few seconds. Therefore, if the computer cannot recognize the download port, it is necessary to unplug and plug the mini USB cable. The following figure shows that the computer recognizes the download port. Restart computer if there is still not download port recognized by unplugging and plugging USB cable.

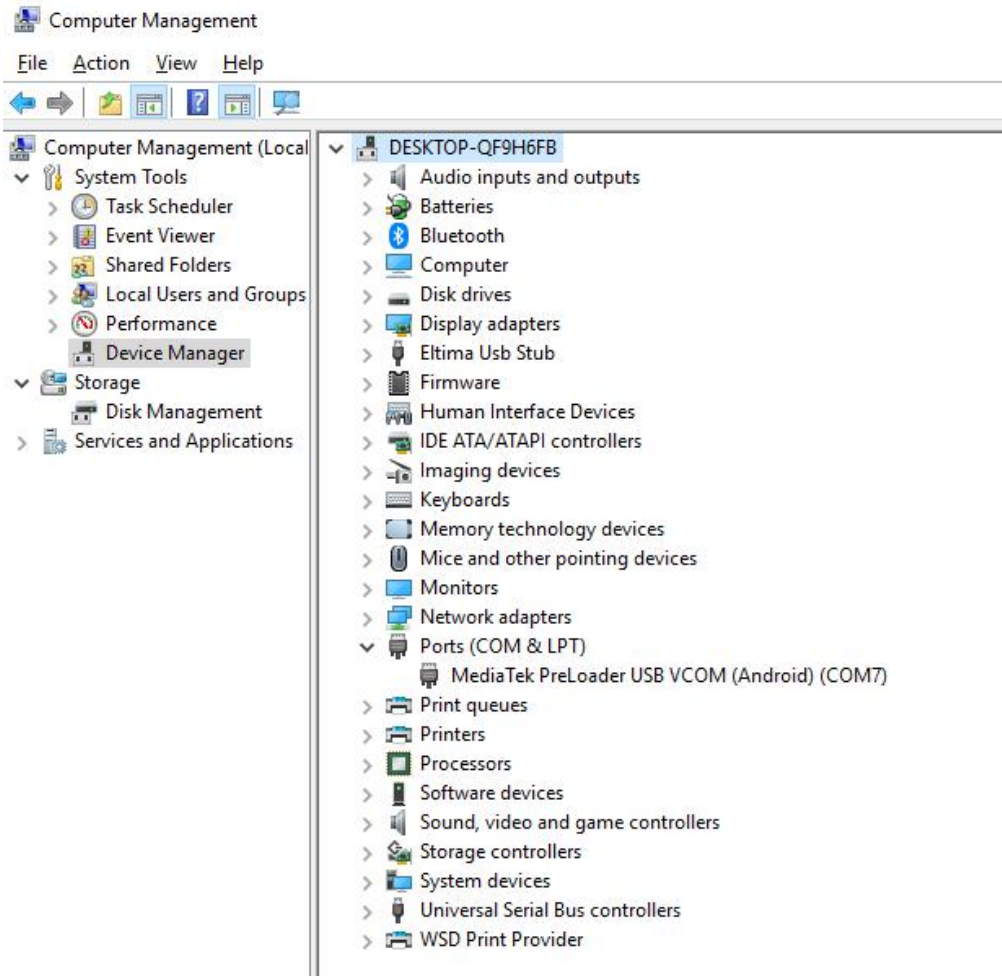


Figure 2.38 Download port is recognized in the Computer Management

2.8 Google Service Framework installation

If the Google Service Framework is not pre-installed in the TC20 Controller, please follow below detailed steps to install Google Service Framework. The related software and app can be obtained from Tersus Technical Support via email support@tersus-gnss.com.

Ensure the TC20 controller is in the **POWER OFF** state, plug the mini USB cable and connect it to the computer. If the mini USB cable is already

connected, please unplug the cable and reconnect it to the TC20 controller.

1. Open 'SN Writer' software

Unzip the SN Writer tool software to a known location, find the execution file 'SN Writer.exe' and double click it to open this software in the folder X:\SN_Writer_tool_exe_v1.0_1528.00_All_In_One\Output which is shown as below.

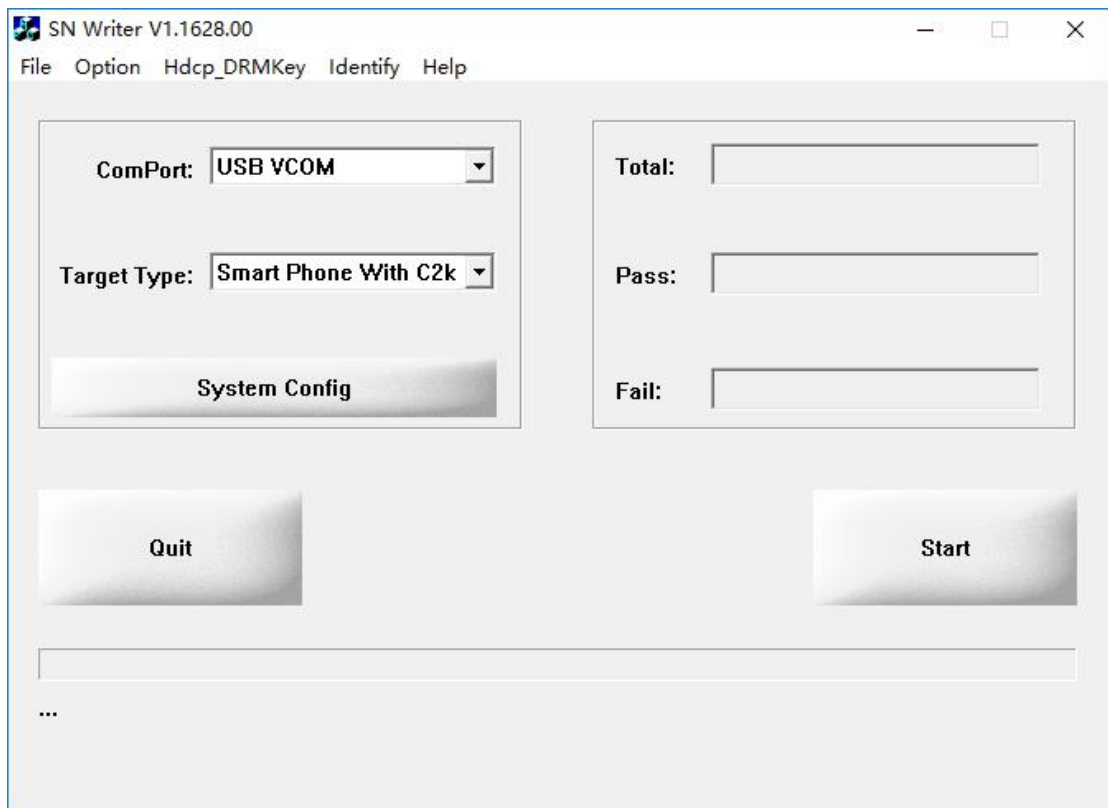


Figure 2.39 SN Writer main interface

2. Configure software and write SN

Click [System Config] in the SN Writer main interface to open the configuration window which is shown as below. Check the box in front of Barcode in the Write Option. Click [MD1_DB] to browse the firmware file folder and select the file with the name starting with BP (anyone of the two files starting with BP works). Click [AP_DB] to select the file whose name starts with AP.

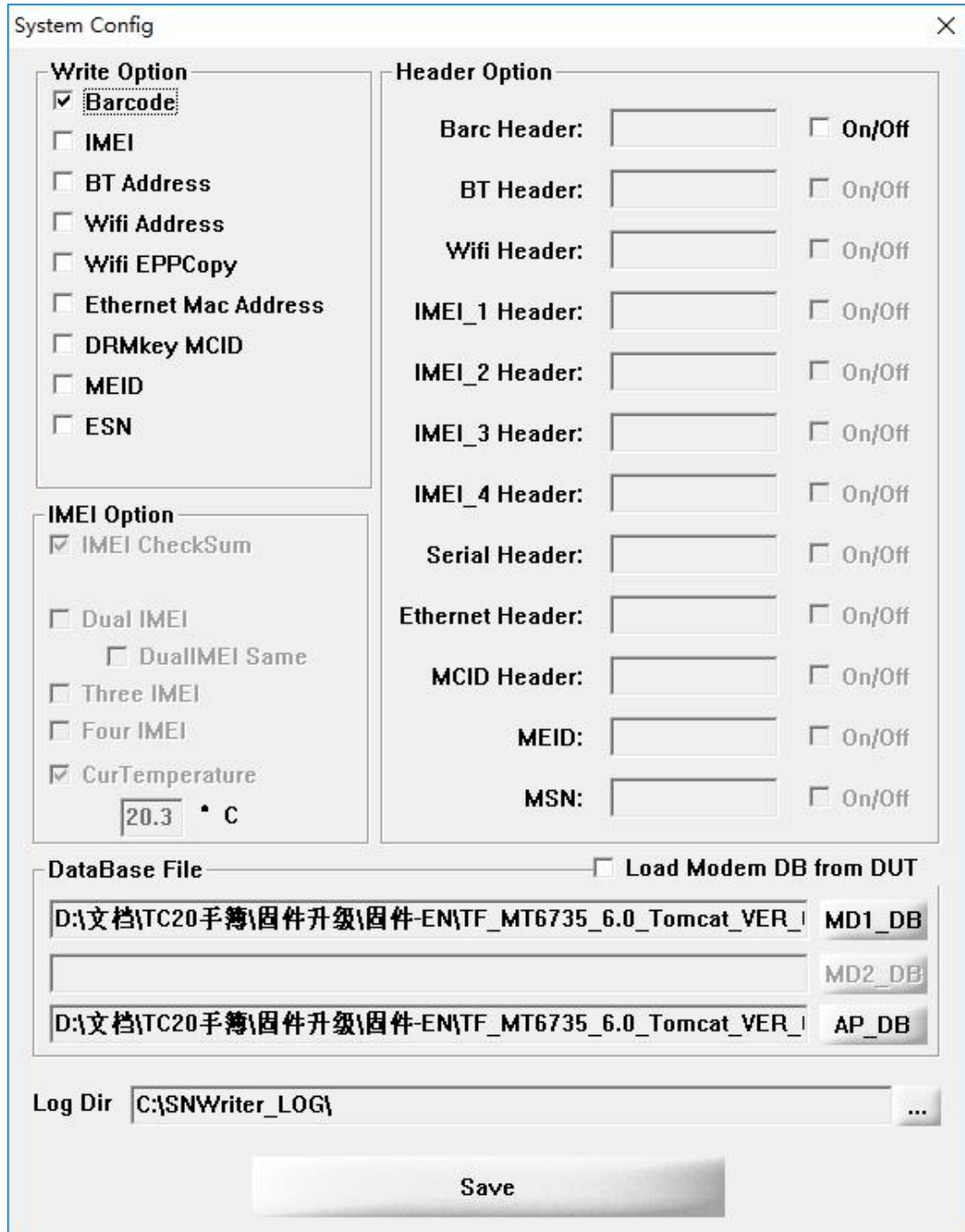


Figure 2.40 System Config of SN Writer tool



Figure 2.41 Files in the firmware file folder

Click [Save], back to the main interface and click [Start]. Fill in the barcode with the 16-digit SN number and click [OK] to start the SN writing. The 16-digit SN number can be found on the label affixed on the back of TC20 Controller.

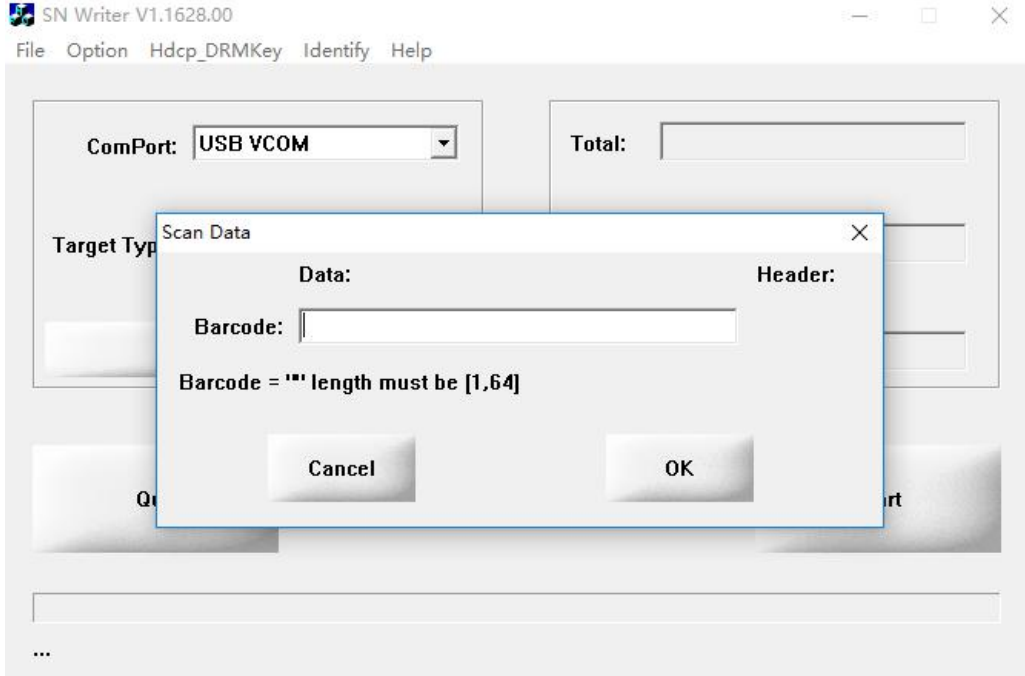


Figure 2.42 Fill in SN number

The SN Writing is in progress as shown below.

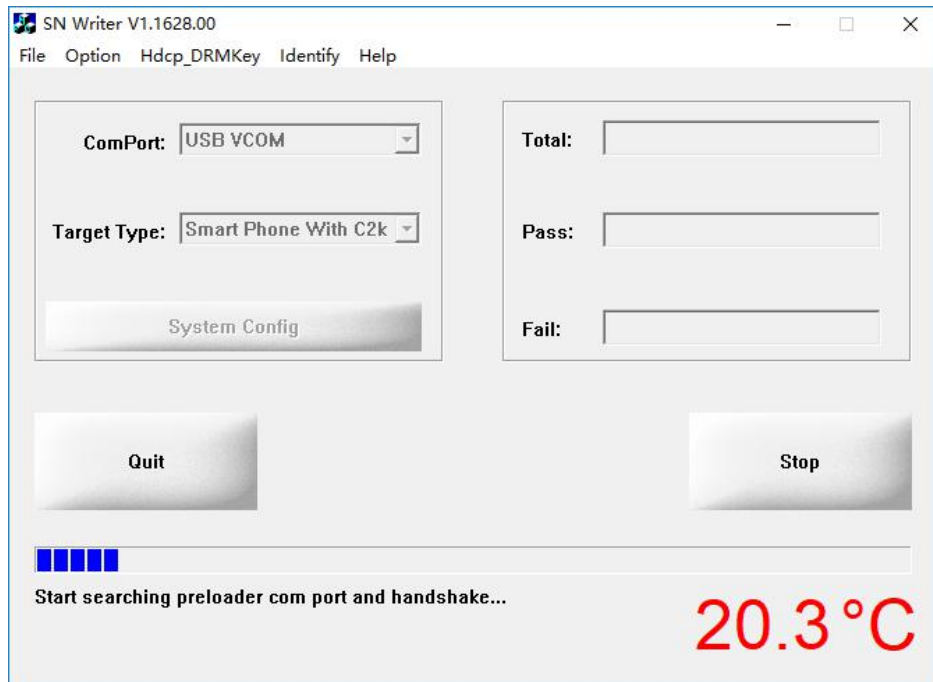


Figure 2.43 SN writing in progress

When it prompts PASS, the SN is written into TC20 Controller successfully.

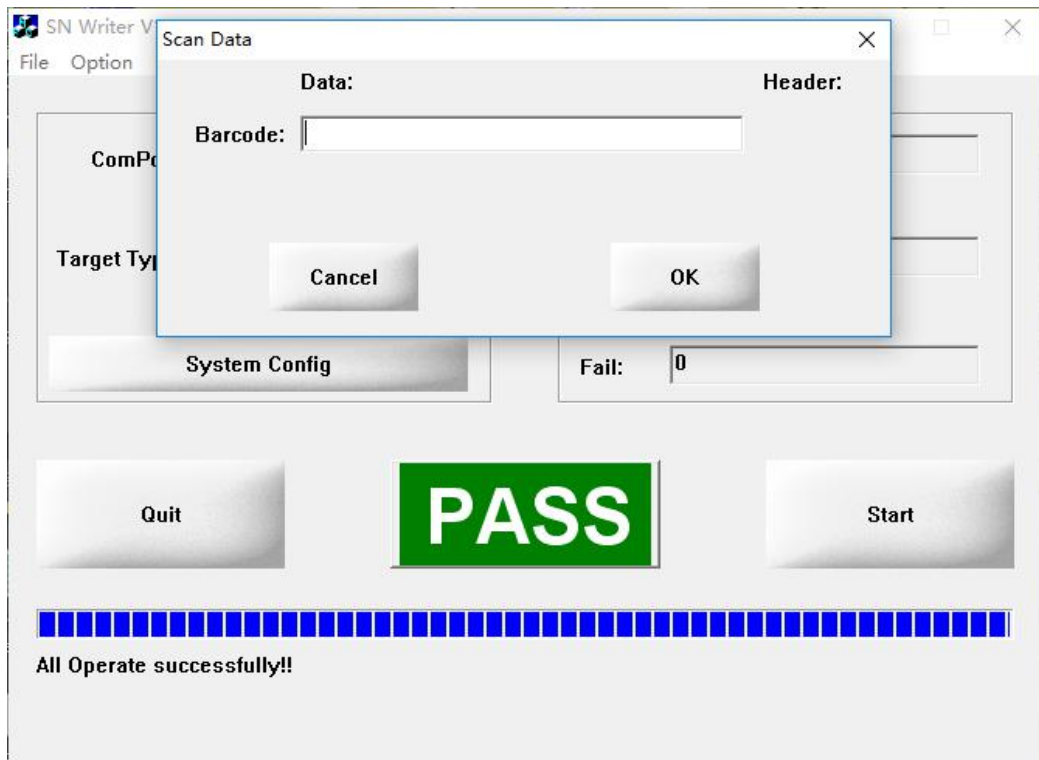


Figure 2.44 Successful operation indication

POWER ON the TC20 Controller to start the following steps. Ensure the mini USB cable is connect with the computer and select 'Transfer files (MTP)' for USB option.

3. Install 'Device ID' App

Copy the 'Device ID.apk' file from the computer which is obtained from Tersus Technical Support, and paste it in the internal storage of TC20 Controller as shown below.

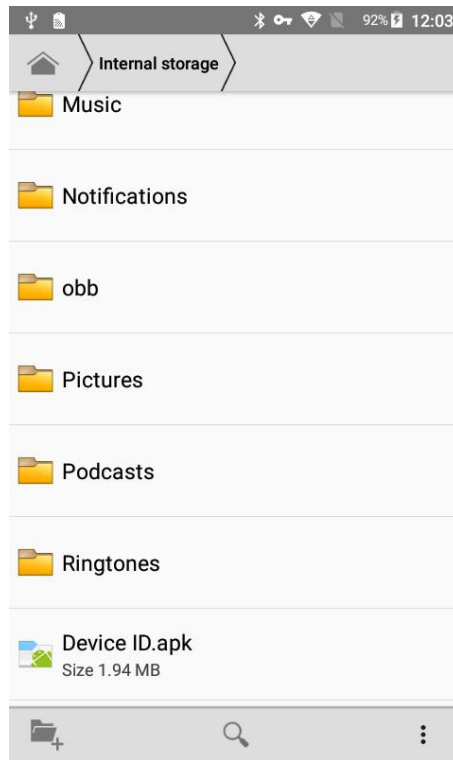


Figure 2.45 Device ID.apk is pasted in TC20 internal storage

Click 'Device ID.apk' and then click [INSTALL] to install this app on TC20 Controller.

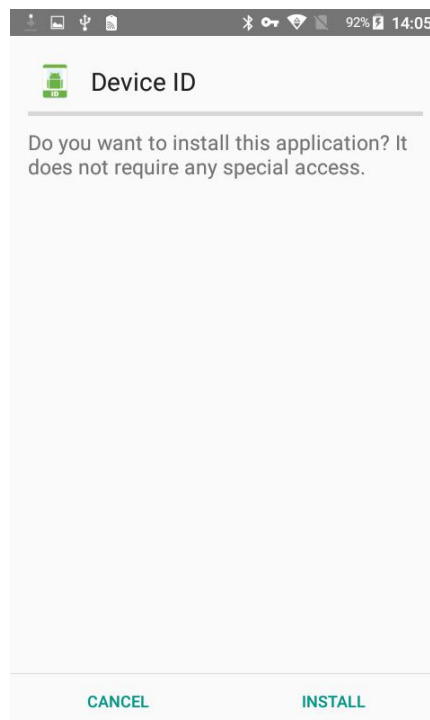


Figure 2.46 Install Device ID app

After the Device ID app is installed successfully, click [OPEN] to open this app.

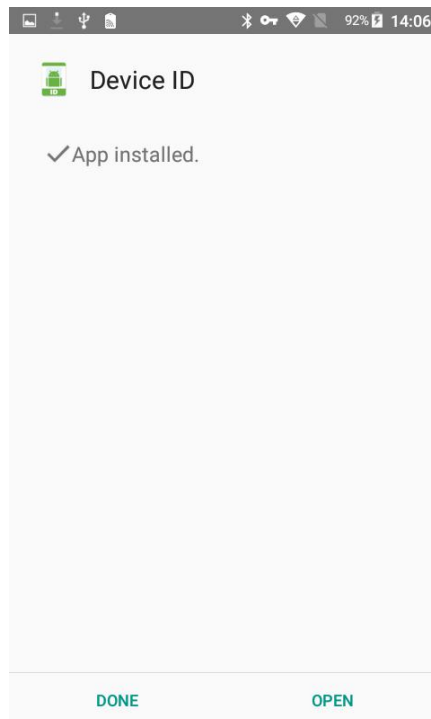


Figure 2.47 Device ID app is installed

Tap the Google Service Framework to copy the ID in the Device ID app.

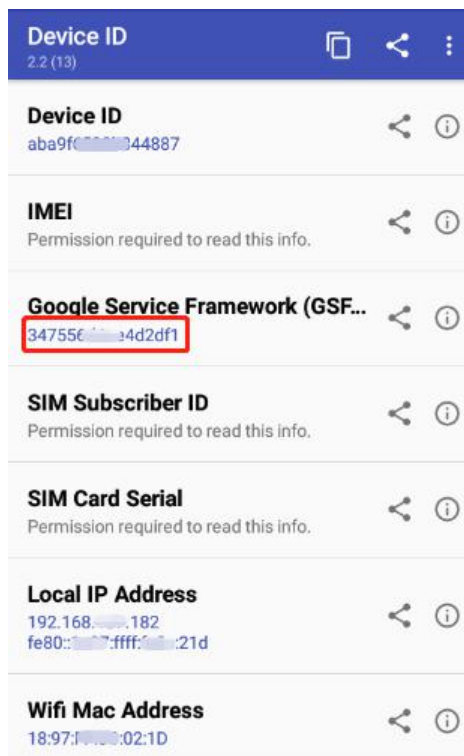


Figure 2.48 Check Google Service Framework ID

4. Register device

Open <https://www.google.com/android/uncertified/> in the web browser of a computer or a mobile phone which can access internet. Paste the above Google Service Framework Android ID below and click [REGISTER].

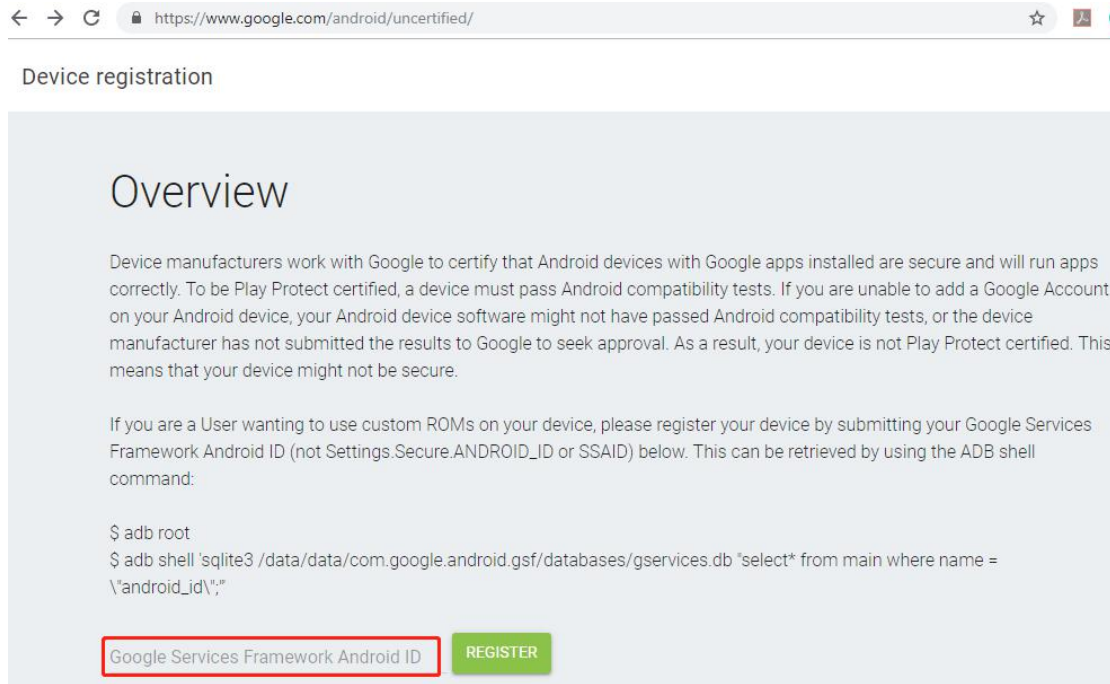


Figure 2.49 Register device on Google.com

After the device registration is completed, the google service framework is installed in TC20 Controller successfully. Now you can use google service freely on TC20 Controller.

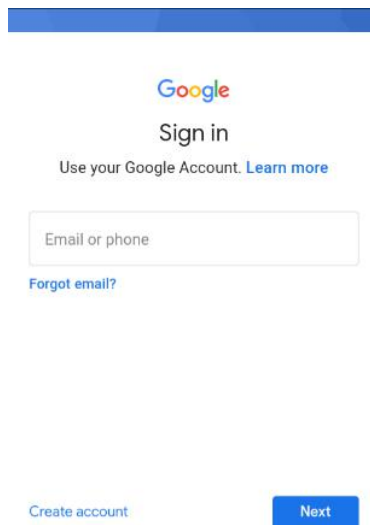


Figure 2.50 Google sign in interface

3. Terminology

DC	Direct Current
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
LED	Light Emitting Diode
SN	Serial Number
SIM	Subscriber Identification Module
USB	Universal Serial BUS

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