SE1000 Download Tool User Guide

SiEngine Technology Co., Ltd.

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Revision History

Revision	Date	Description
V1.1	2022-3-25	First release
V1.2	2022-7-28	Revise for SDK1.3 release 1. Optimized interface 2. Support GPT download 3. Add progress bar 4. Add emmc download
V1.4	2022-9-26	Revise for SDK1.4 release 1. Optimized interface 2. Support All lun GPT download 3. Support sparse image download
V1.5	2022-11-25	1. Optimize usb download speed 2. Do not need to reinstall the android adb driver each time you power on 3. No ddr training, no need to choose different download tools according to the board, also speed up the fastboot flash time 4. You can select a folder to download batch files 5. Partition cfg can select Ufs.xml 6. Add the usb sn display 7. Add auto fastboot flash check box
V1.6	2023-02-23	1. Add gpt erase 2. Support lun sparse
V1.7	2023-09-19	1. Update for recent download tool changes

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SE1000 Linux download tool user guide

SE1000 Download Tool User Guide

1.Introduction

SiEngine Download Tool is a tool used for downloading UFS on SE1000 chip, its basic principle is through the SE1000 USB2.0 port and use a upper to download the program.

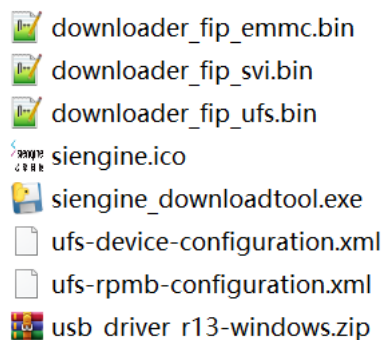## 1.1 What's in the download tool

Figure1-1 What's in the download tool

- downloader_fip_emmc.bin: fip file used to download the code to be downloaded to the EMMC
- downloader_fip_ufs.bin: fip file used to download the code to be downloaded to the UFS
- downloader_fip_svi.bin: fip file used to download the bare metal image
- siengine_downloadtool.exe: SE1000 USB Download file on the upper
- usb_driver_r13-windows.zip: adb fastboot driver
- ufs-device-configuration.xml: UFS configuration file
- ufs-rpmb-configuration.xml: UFS RPMB configuration file

1.2 Introduction to upper computer software

1: Select storage area. You can choose UFS, EMMC. After SE1000 usb2 connect to the computer, a usb serial number will be shown in this area.

2: Bottom area.

Click "fastboot flash" to load the fastboot file

Click "browser" to select the file to download. The selected file will be displayed in the text box after selection.

Click "oem" to send the contents of the oem command setting area to EVB. Oem cmd, which can send instructions to the chip. (oem command setting area You can send "oem setufs LUN LBA" to specify which LUN and LBA to download. LUN number is 0 by default, and LBA is 0 by default.)

Click "download" to download the selected file.

Click "batch download" to download all LUN files in One click.

Click "GPT download" to download GPT partition file.Click "GPT enable" to enable GPT.

Click "partition cfg" to set the size of the UFS LUN.

Click "rpmb enable" to enable ufs rpmb. Click "rpmb disable" to disable rpmb.

3: Log printing area, will print the download information.

4: Progress bar area. This area shows the real-time progress of the download.

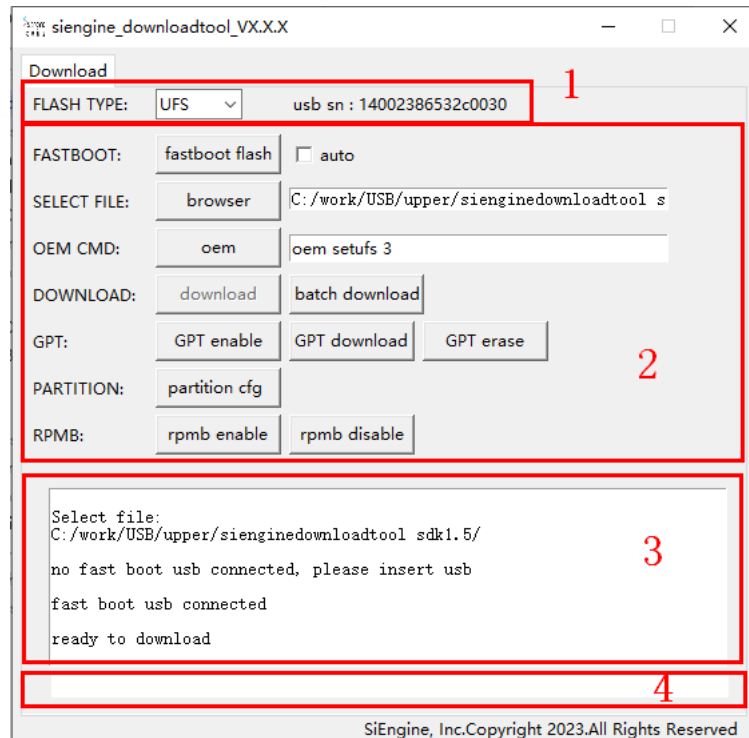
Figure1-2 Upper User Interface

2.Download steps for UFS
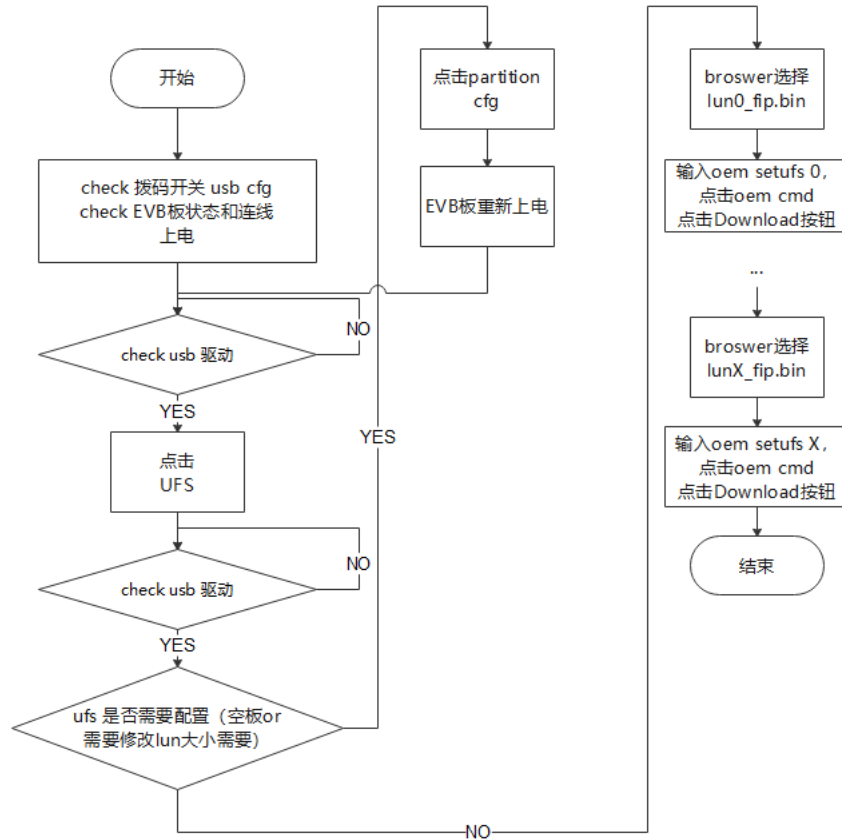
The basic operation flow of download for UFS :

Figure2-1 Basic Operation Flow

2.1 Preparing the Test Environment

Connect the serial port cable and USB2.0 cable to the EVB and switch the BOOT CFG DIP switch (sw1-1) to the USB BOOT CFG mode. The power cable is in the upper right corner of the board. Then restart the EVB.
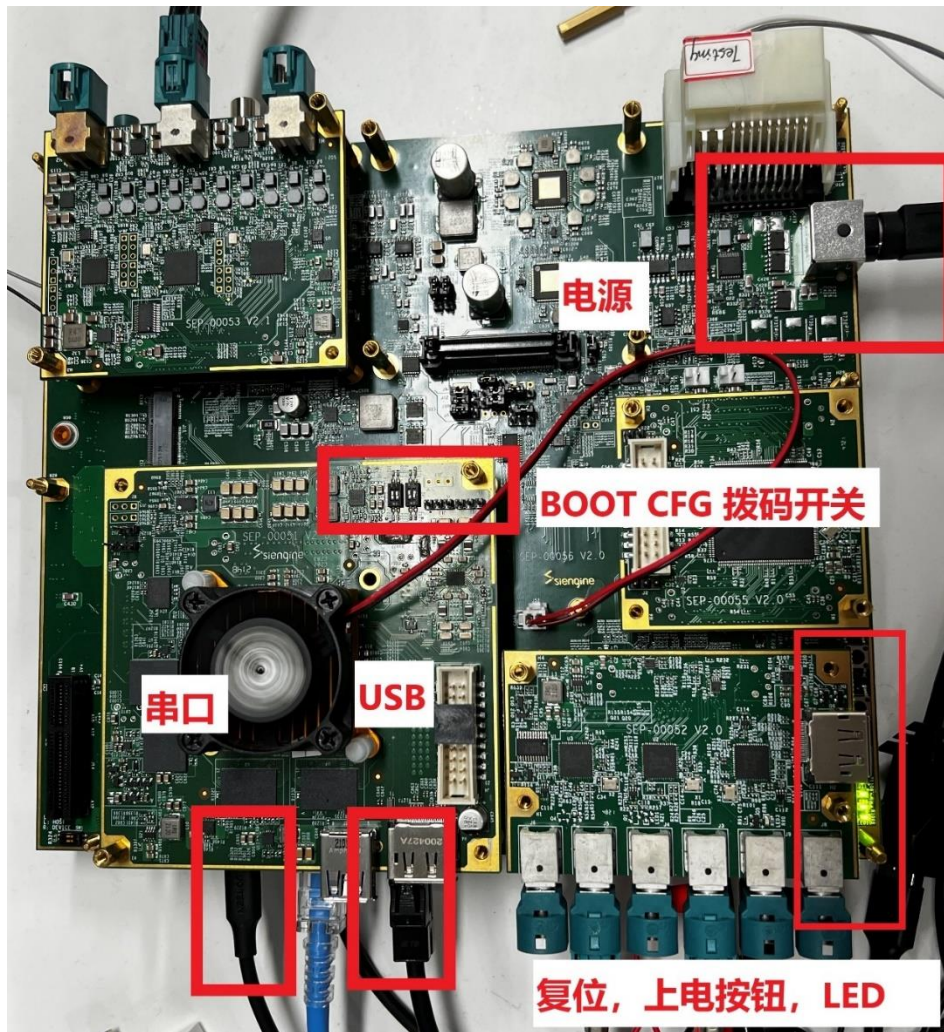
Figure2-2 Preparing the Test Environment 1
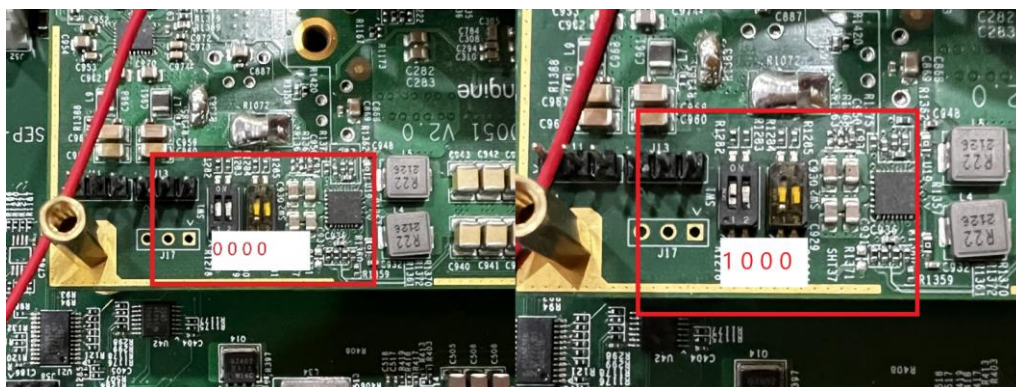
Figure2-3 Preparing the Test Environment 2

Open the serial port assistant, select the serial port with the smallest serial number, connect the power cord, and power on (press the power button on the board, the top button of the reset button , and the top button of the LED lights up after pressing it).

Open device manager on PC, it indicates that the PC has installed android ADB driver, and the driver installation step can be skipped.

If you see as, the computer does not have an Android ADB driver installed. Do not skip

the driver installation step.
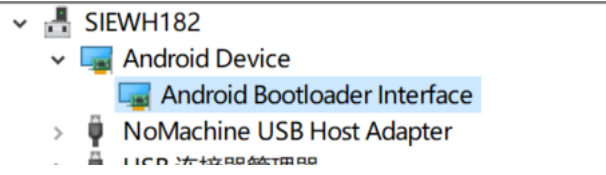
Figure2-4 Preparing the Test Environment 3

Figure2-5 Preparing the Test Environment 4

2.2 Installing drivers

1）Right click on Android2.0 and click "update driver".

Figure2-6 Installing Drivers 1

2）Select browse my computer to find drivers.

Figure2-7 Installing Drivers 2

3）Select let me choose from the list of drivers available on my computer.
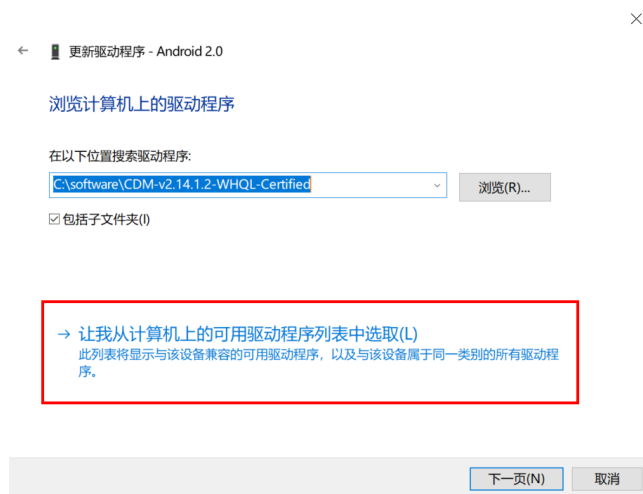
Figure2-8 Installing Drivers 3

4）Click "Next Page."

Figure2-9 Installing Drivers 4

5）Click "Next page."
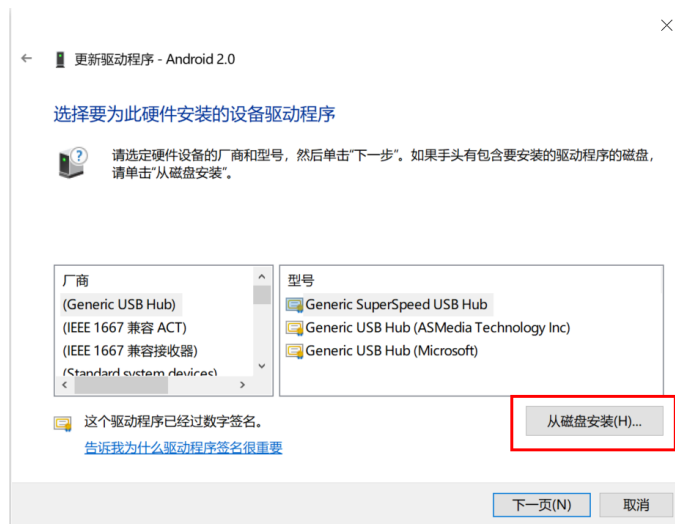
Figure2-10 Installing Drivers 5

6）Click "Browse".
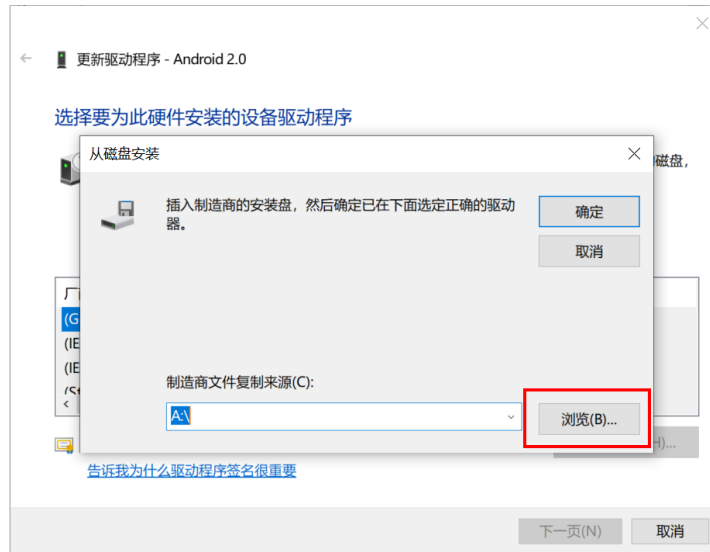
Figure2-11 Installing Drivers 6

7）Decompress usb_driver_r13-windows.zip in the installation package and select the file android_winusb.inf. Click "open".
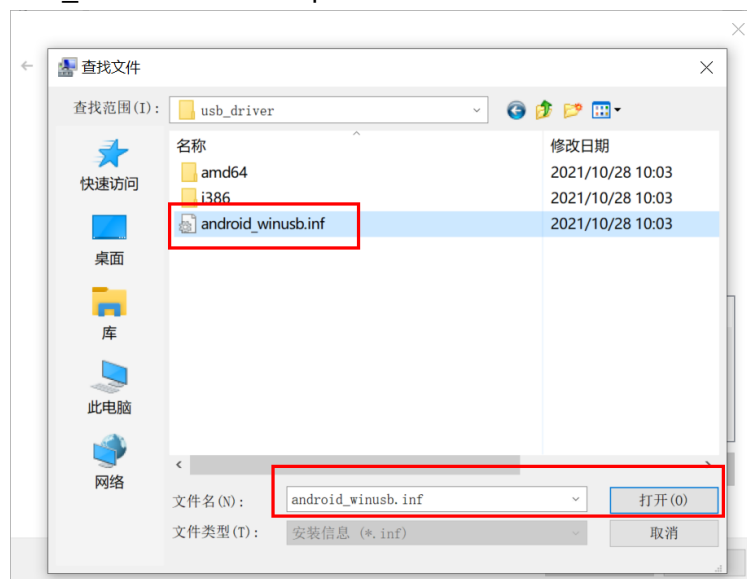
Figure2-12 Installing Drivers 7

8）Click "Ok".
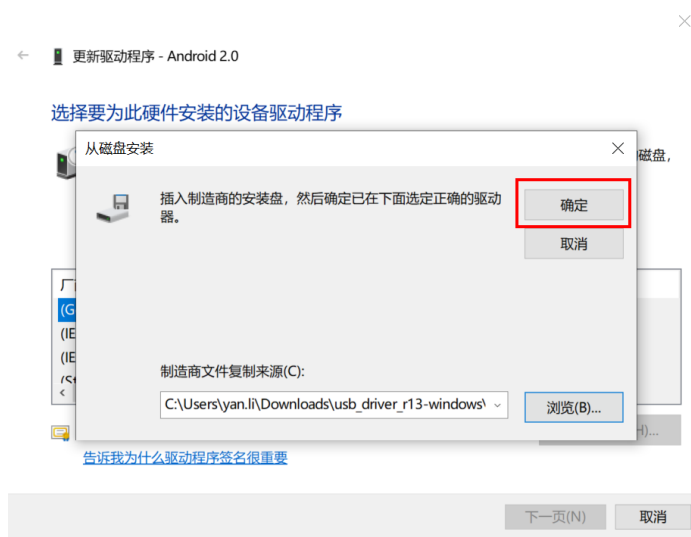
Figure2-13 Installing Drivers 8

9）Select "Android Bootloader Interface" and click on the next page.

Figure2-14 Installing Drivers 9

10）Pop up "Update driver Warning", click "Yes".
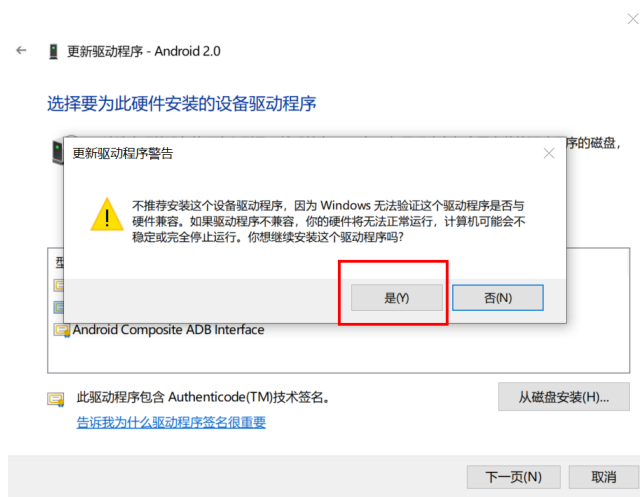
Figure2-15 Installing Drivers 10

11）Display "Updated your driver successfully", click close.
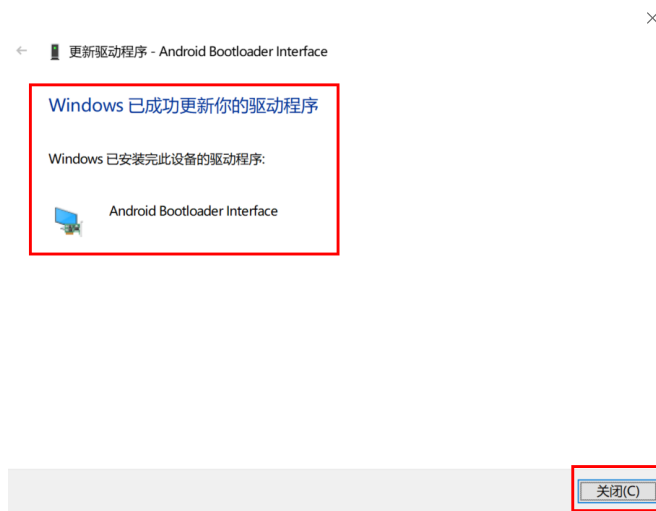
Figure2-16 Installing Drivers 11

12）Power on the Device again. You can find Android Device in Device Manager.

Figure2-17 Installing Drivers 12

2.3 UFS Configuration

If the current SE1000 chip is empty or the UFS partition size needs to be reconfigured, use the UFS configuration function to configure LUN partitions of the UFS.

1. Choose FLASH TYPE to "UFS".Click "fastboot flash" button to enter usb download state. You can choose the auto checkbox so you don't have to click the fastboot flash button every time
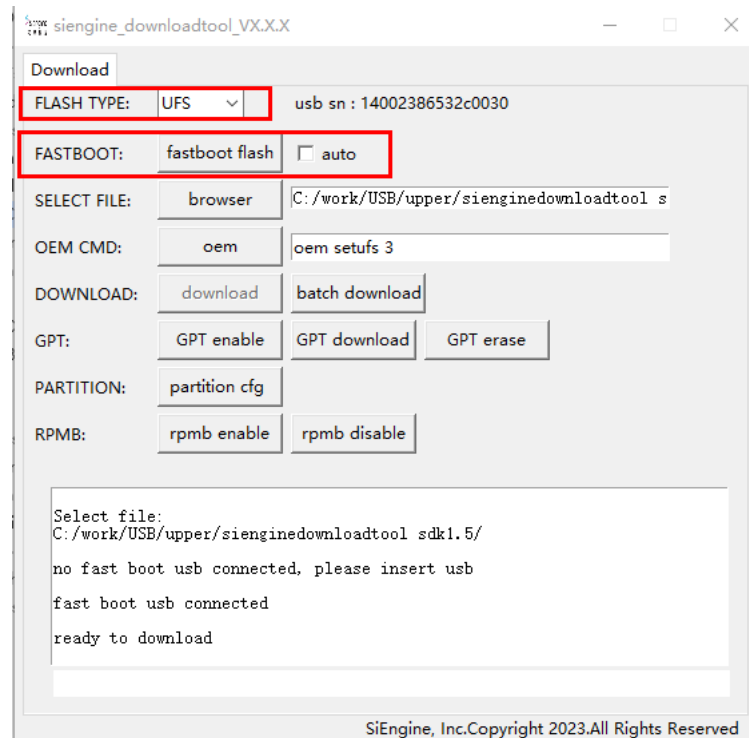
Figure2-18 UFS Configuration 1
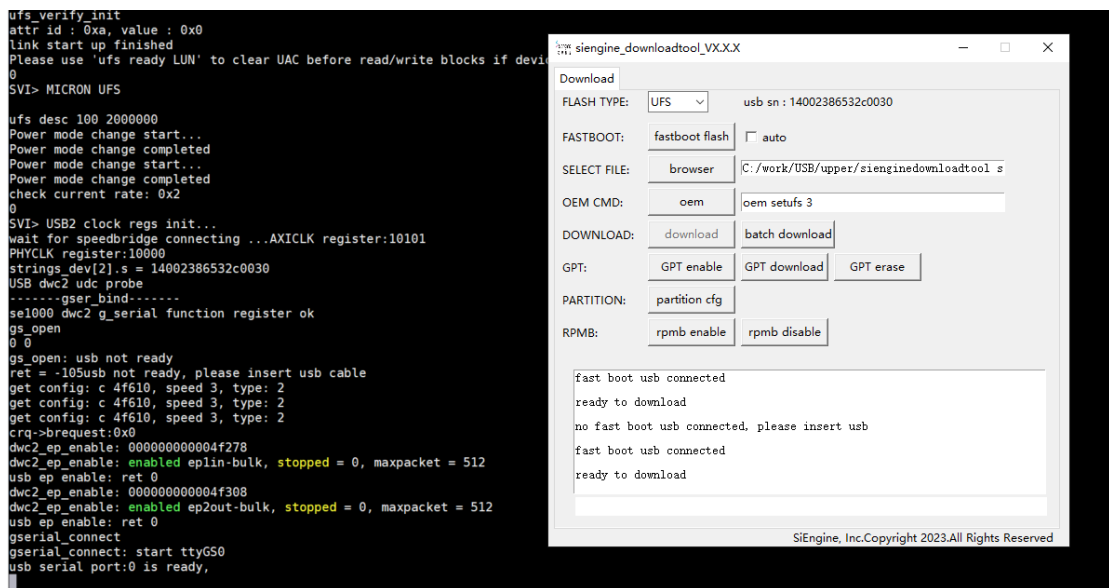
Figure2-19 UFS Configuration 2

2. Click "partition cfg" button to get the configuration in ufs-device-configuration.xml and

then configure it in UFS. After the UFS is configured, power on and restart the EVB.
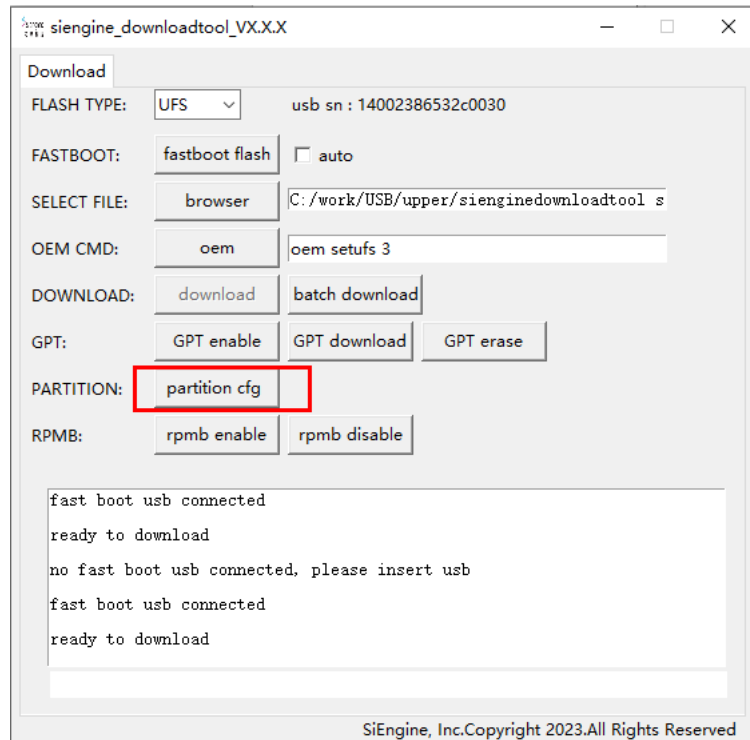
Figure2-20 UFS Configuration 3

3. After you click partition cfg, a dialog box is displayed. You can select the ufs xml file anywhere or rename it.
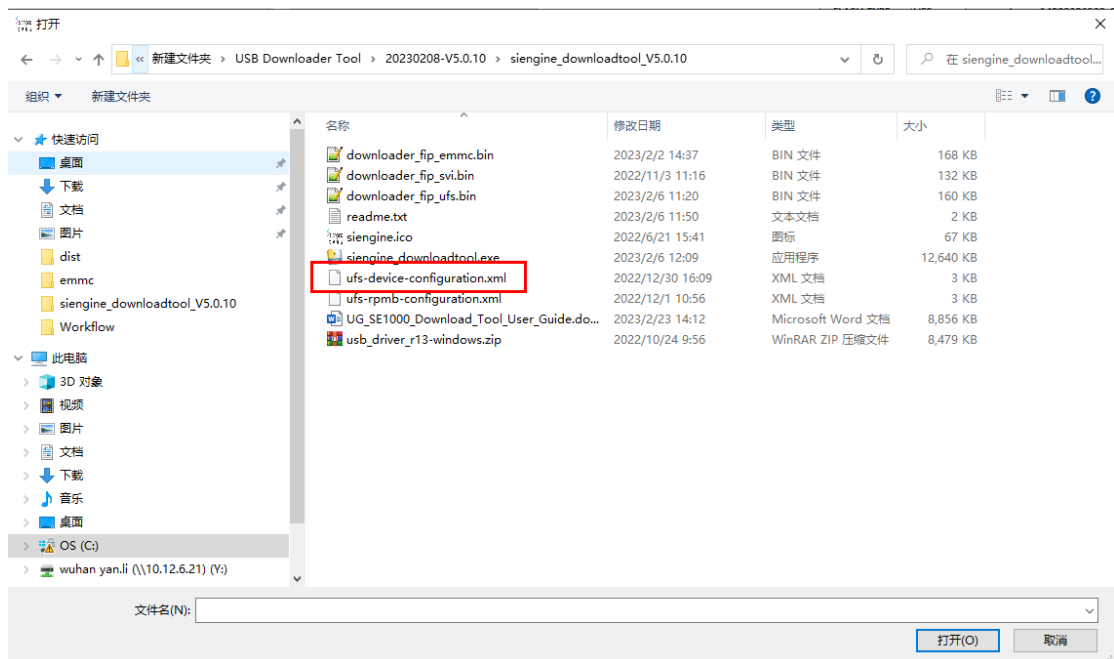
Figure2-21 UFS Configuration 4
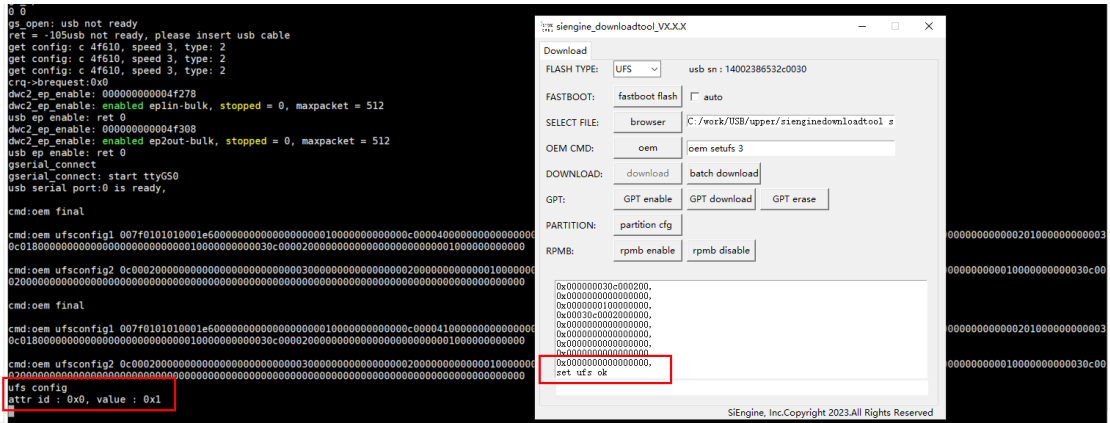
Figure2-22 UFS Configuration 5

Notes:

You do not need to repeat the configuration on the EVB where UFS is configured. Repeated configuration will delete all data in the UFS. After you modify the XML configuration file and partition cfg, all data in the UFS will be cleared and all mirrors need to be download again. After configuring the UFS, restart the EVB.

2.4 Starting Download

1. Before downloading, it's important to understand raw images and sparse images. Raw images are uncompressed original images, while sparse images are compressed images. Sparse images are smaller and have shorter download times compared to raw images. For a very large image, sparse compression can significantly reduce its size. This download tool supports both raw images and sparse images, and it will automatically recognize whether it is a raw image or a sparse image. There are three ways to download a sparse image:

   1. Perform a format operation first and then download all LUNs.

   2. Manually erase the target area before downloading the image for that region.

   3. If it's a LUN file, change the image name to "lunx_fip.bin," and the download tool will automatically erase the LUN before proceeding with the download. Raw images can be downloaded directly without erasing.

2. Open the siengine_downloadtool.exe. Click "fastboot flash" button, "ready to download " will be printed in the log area , and serial port printing as shown in the picture below.
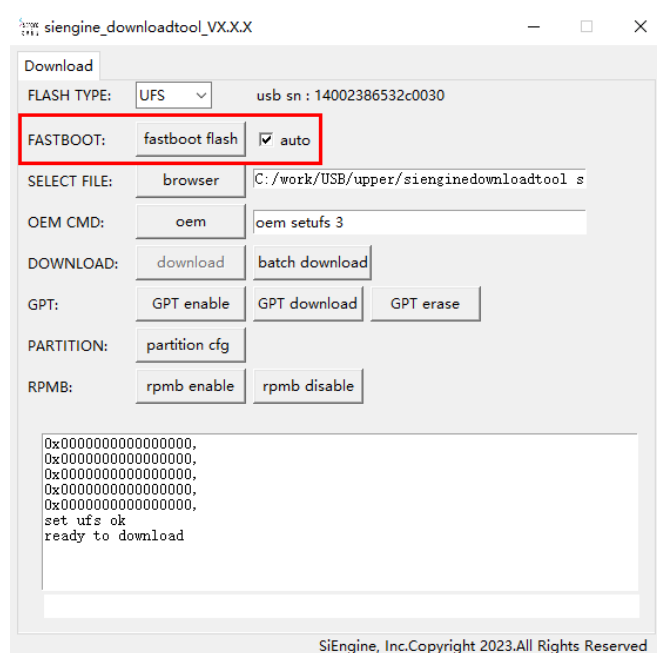
Figure2-23 Starting Download 1
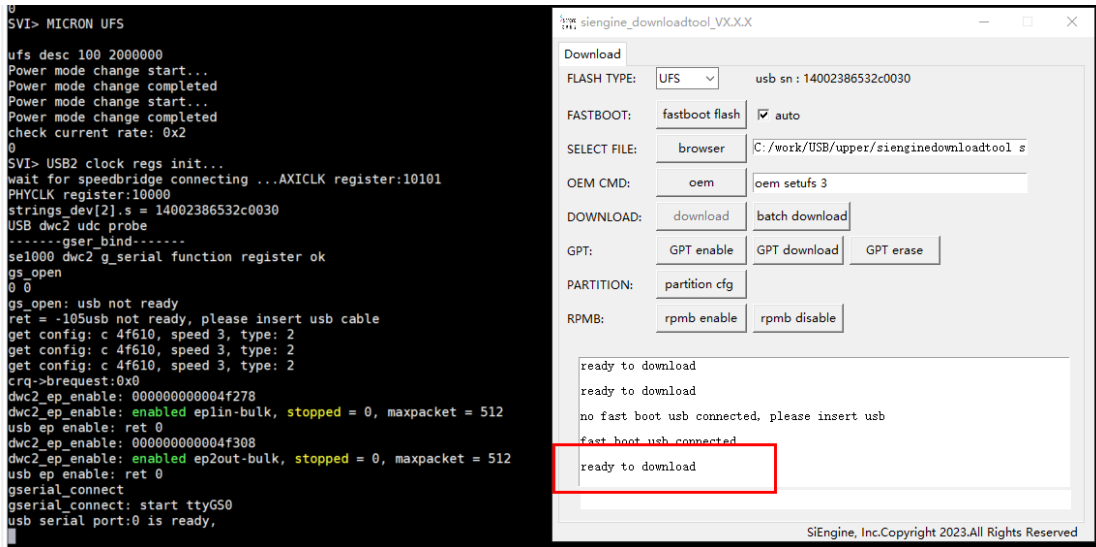
Figure2-24 Starting Download 2

3. Now enter the USB Download state. Download the files in UFS LUN0 first. Click "Browser" and select the file to be downloaded into LUN0. Here, the file lun0_fip.bin is selected. The fip file is downloaded into UFS LUN0. (the file is an example file, and the file name is different in actual download)
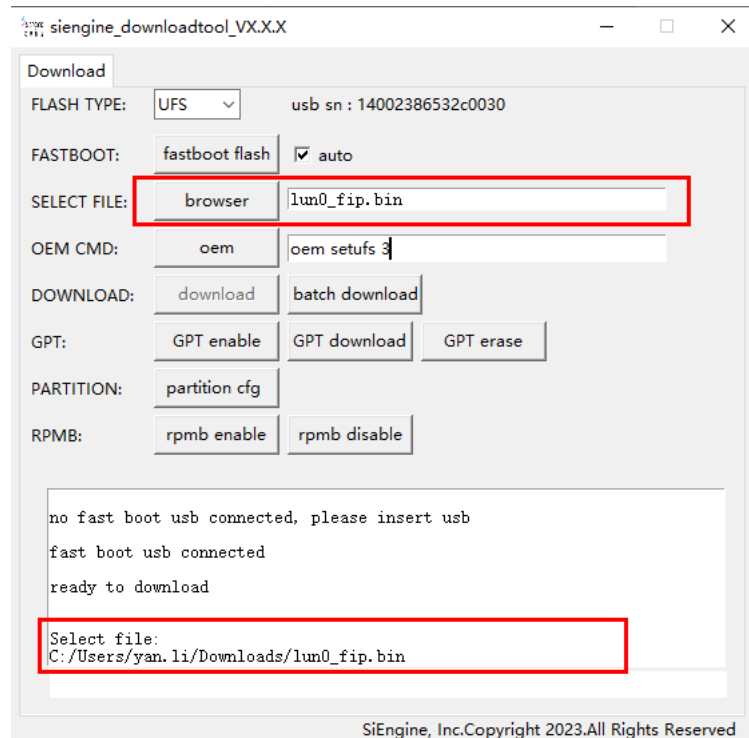
Figure2-25 Starting Download 3

4. Fill in "oem setufs 0" in the input box and click "oem" cmd button to send to the chip. The interface shows that the current download area is LUN0 LBA0.

Figure2-26 Starting Download 4

5. Click the "download" button to start the downloading until "Done" appears in the log area and the progress bar turn green. Now the downloading is complete, you can also click Finished Downloading Image on the serial port. During the downloading process, the progress bar is blue, and you can see the amount data length and the data length already downloaded.

Figure2-27 Starting Download 5

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6. Next step download files in UFS LUN1 is the same way as that in LUN0.Click "browser" and select the file to be downloaded to LUN1. In this case, the file lun1_fip.bin is selected (the file is example, and the file name in the actual download may be different).Fill in "oem setufs 1" in the input box and click "oem" cmd button to send to the chip. The interface shows that the current download area is LUN1 LBA0.Click the "download" button to start the downloading. Until "Done" is displayed in the Log area, the download is complete. You can also click Finished Downloading Image in the serial port.

Figure2-28 Starting Download 6

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7. Then download files in UFS LUN2 in the same way as that in LUN0.Click "browser" and select the file to be downloaded in LUN2. In this case, the file lun2_fip.bin is selected (the file is example, and the file name in the actual download may be different). Fill in "oem setufs 2" in the input box and click "OEM" CMD button to send to the chip. The interface shows that the curr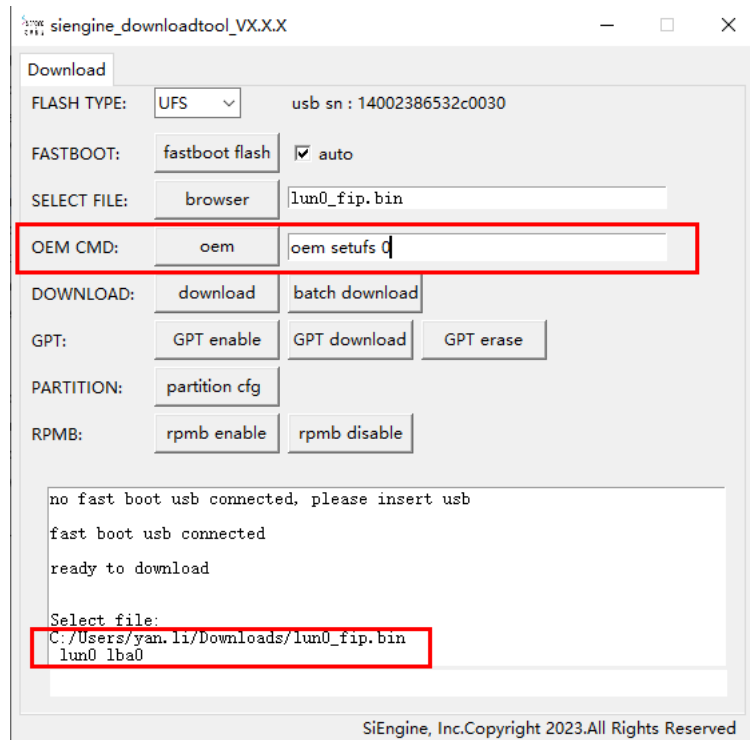ent download area is LUN2 LBA0.Click the "download" button to start the download. Until "Done" is displayed in the Log area, the download is complete. You can also click Finished Downloading Image in the serial port.
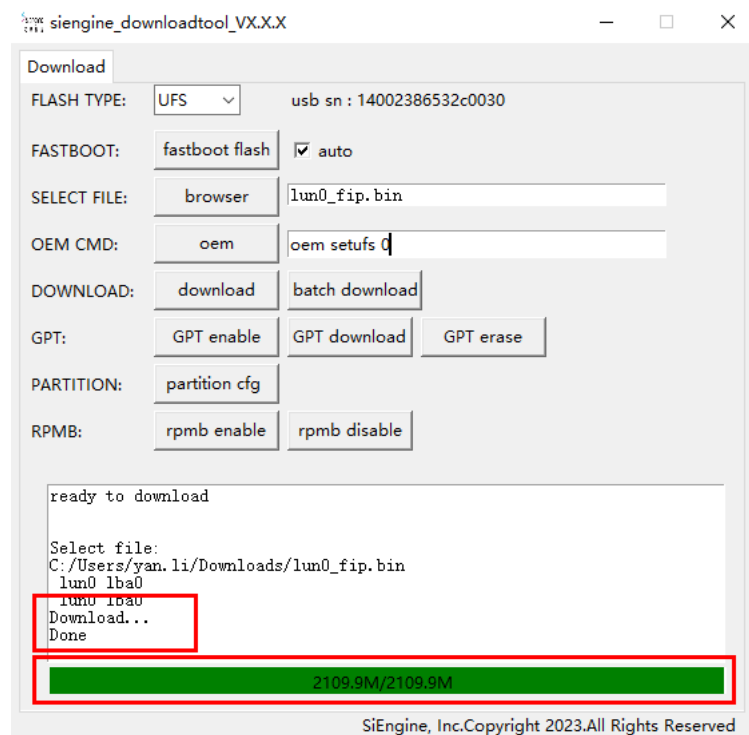

Figure2-29 Starting Download 7

25

8. Then download files in UFS LUN3 in the same way as that in LUN0.Click "browser" and select the file to be downloaded in LUN3. In this case, the file lun3_fip.bin is selected (the file is example, and the file name in the actual download may be different). Fill in "oem setufs 3" in the input box and click "OEM" CMD button to send to the chip. The interface shows that the current download area is LUN3 LBA0.Click the "download" button to start the download. Until "Done" is displayed in the Log area, the download is complete. You can also click Finished Downloading Image in the serial port.
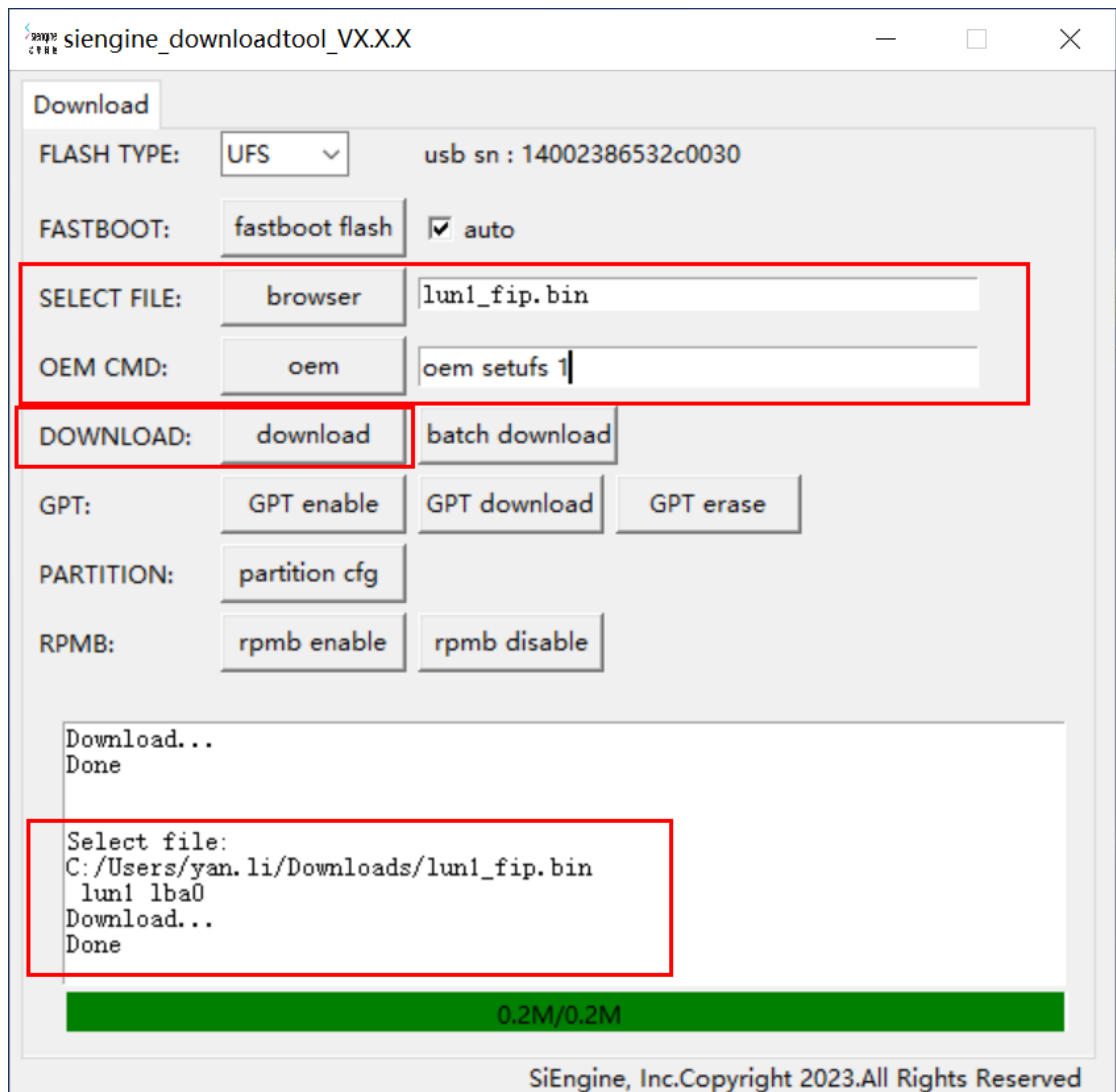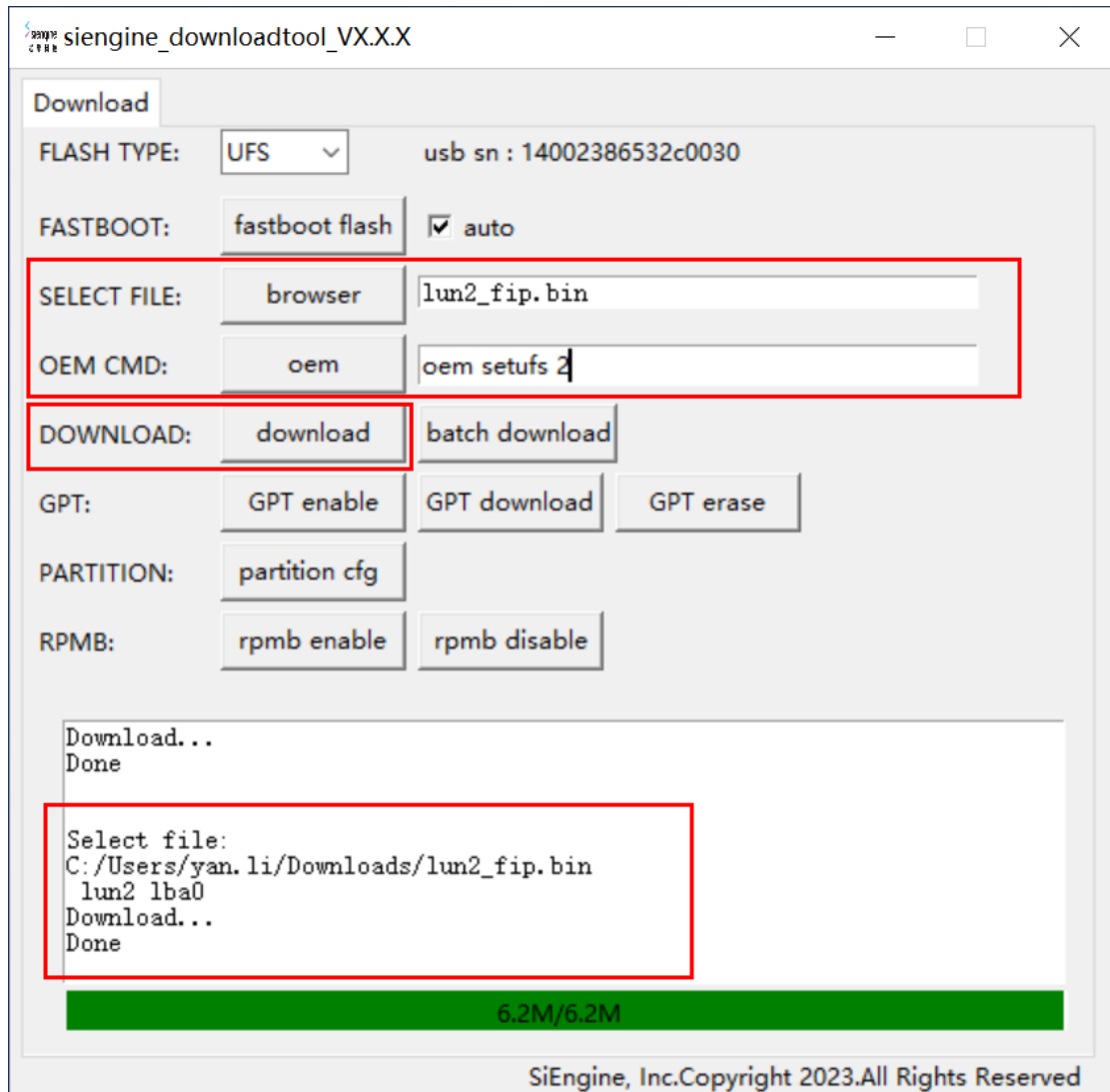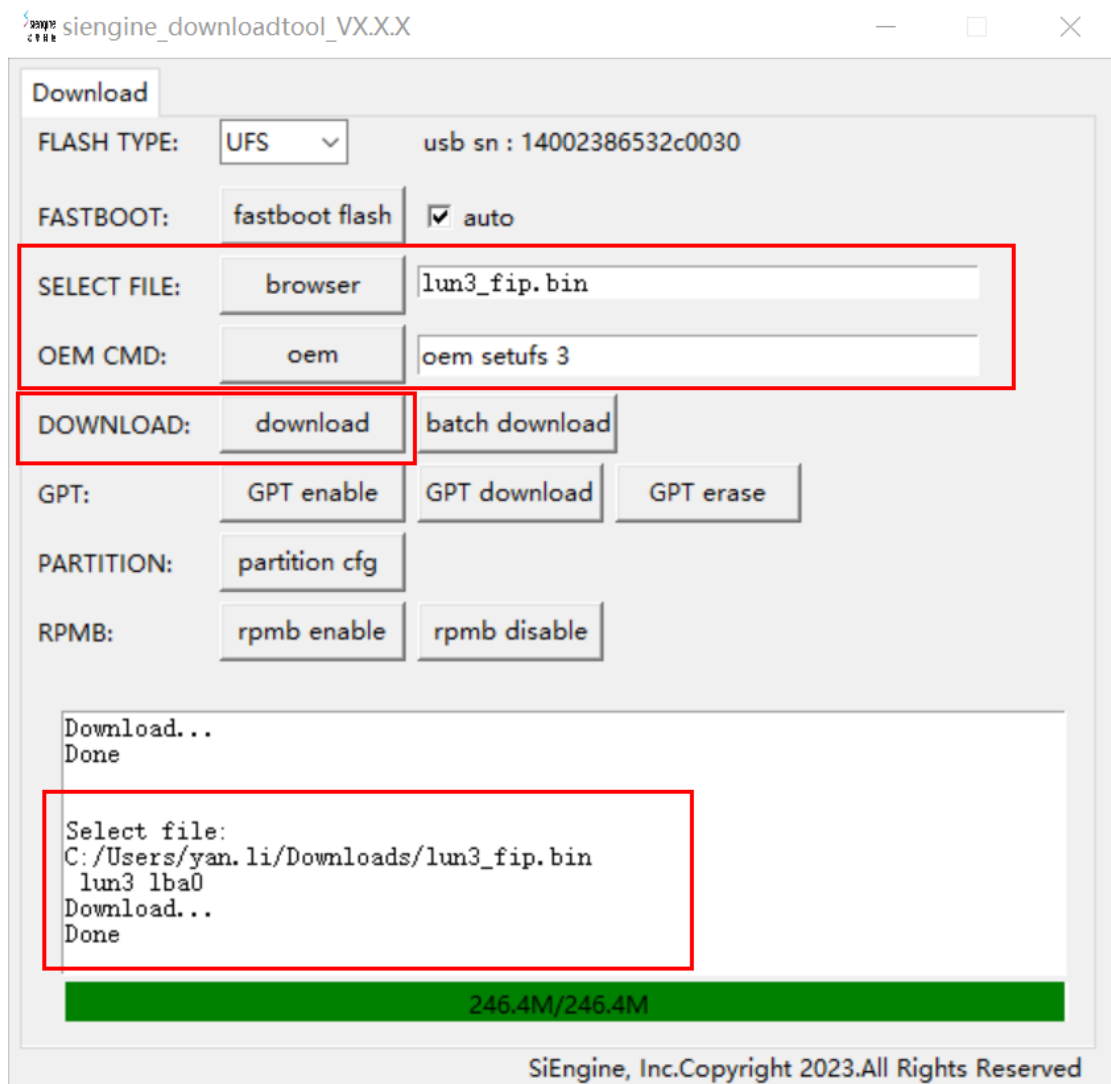

Figure2-30 Starting Download 8

9. If other LUN have download requirements, the download methods is similar to the download methods of LUN0, LUN1, LUN2 and LUN3.

2.5 Download Complete

1. Power off the EVB, switch the BOOT CFG dip switch (sw1-1) back to the original position, that is, all the dip switches are in the lower part. If the dip switches are in the power-on state, you need to reset the board to restart the switch.
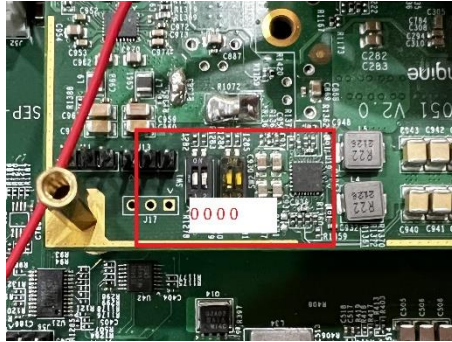
Figure2-31 Download Complete 1

2. Power on, check the serial port printing, then the program is finished, exit the download mode, and enter the normal process.

```
INFO:     BL1: 0x60000 - 0x75000 [size = 86016]
NOTICE:   Booting SiEngine Trusted Firmware
NOTICE:   BL1: v2.1(debug):se1000_rom_v1.2
NOTICE:   BL1: Built : 00:46:58, Apr 25 2021
INFO:     BL1: RAM 0x60000 - 0x75000
INFO:     BL1: cortex_a76: CPU workaround for cve_2018_3639 was applied
INFO:     Using crypto library 'mbed TLS'
NOTICE:   Reset reason:1.
NOTICE:   Booting from UFS
INFO:     BL1: Loading BL2
INFO:     Loading image id=1 at address 0x30000
INFO:     Image id=1 loaded: 0x30000 - 0x4da48
NOTICE:   BL1: Booting BL2
INFO:     Entry point address = 0x30000
INFO:     SPSR = 0x3c5
early_bl2_config
baseaddr: 0x6000, offset : 1, freq: 0 M
realtime_pll_freq_check[401]
realtime_pll_freq_check[409]
26214416baseaddr: 0x6000, ffset : 1, freq: 2000 M
realtime_pll_freq_check[419]
realtime_pll_freq_check[422]
===========================================
LPDDR4X_6GB_3200M Training successfully!
=======ddr init end=========
```

Figure2-32 Download Complete 2

2.6 Batch Download

To save user operation time and reduce user operation steps, batch download function.
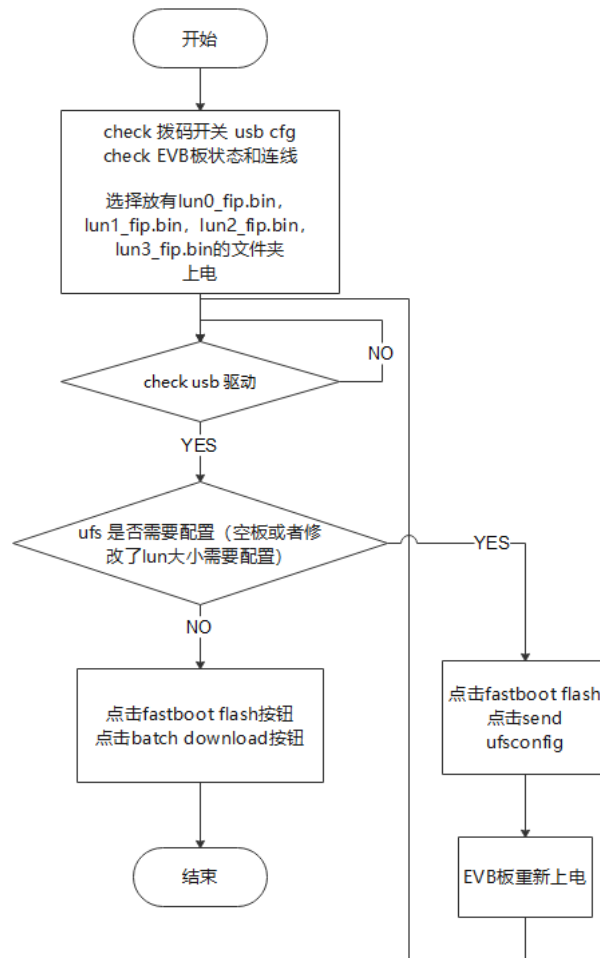
Figure2-33 Batch Download 1

1. In Section 2.1 and 2.2, prepare the test environment and configure UFS (partition cfg to configure UFS if the chip is empty).Click the "fastboot flash" button. Then click the "batch download" button to choose the folder include the file you want to download(lun0_fip.bin lun1_fip.bin lun2_fip.bin lun3_fip.bin ect). Then start batch download.
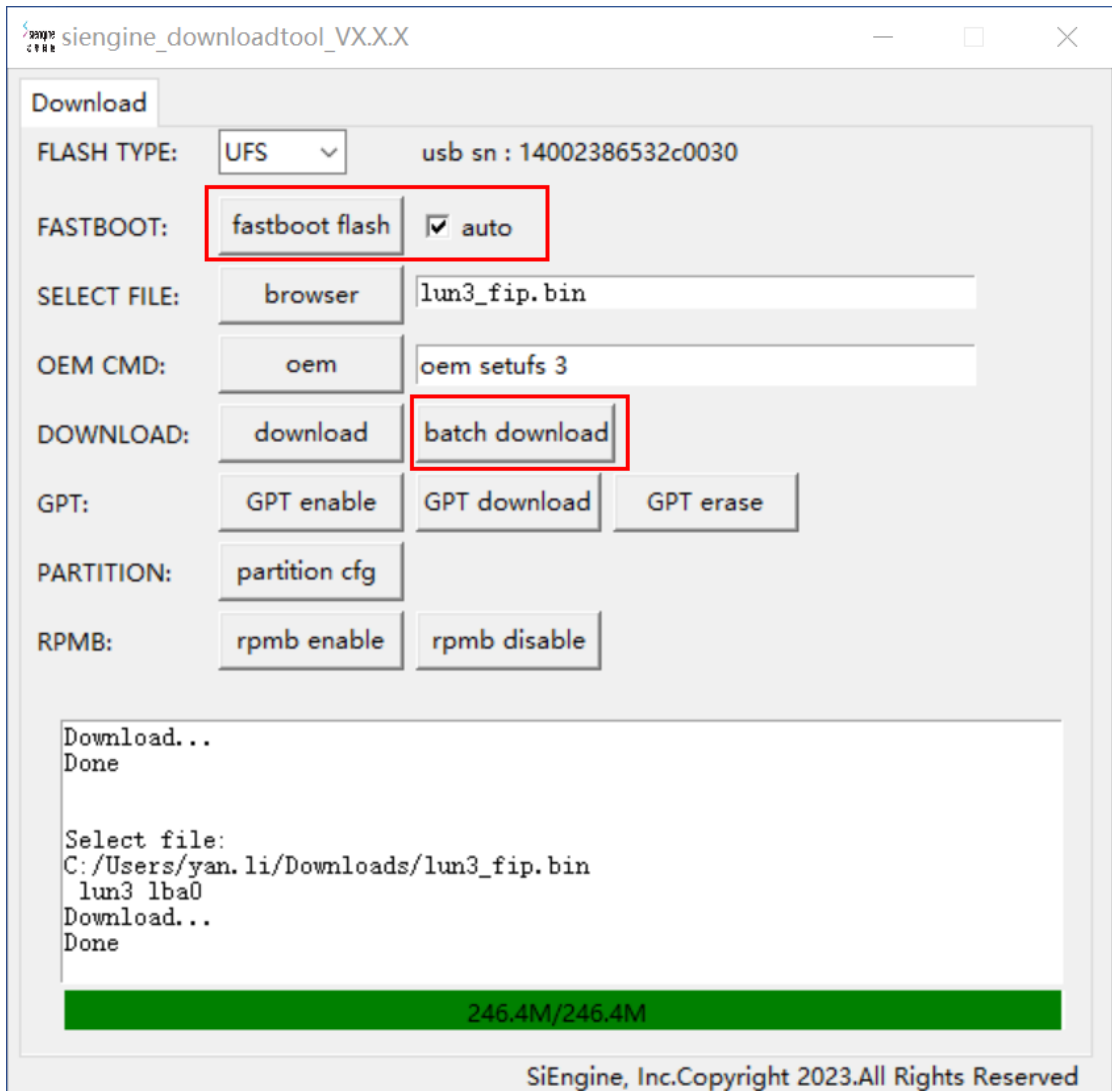
Figure2-34 Batch Download 2
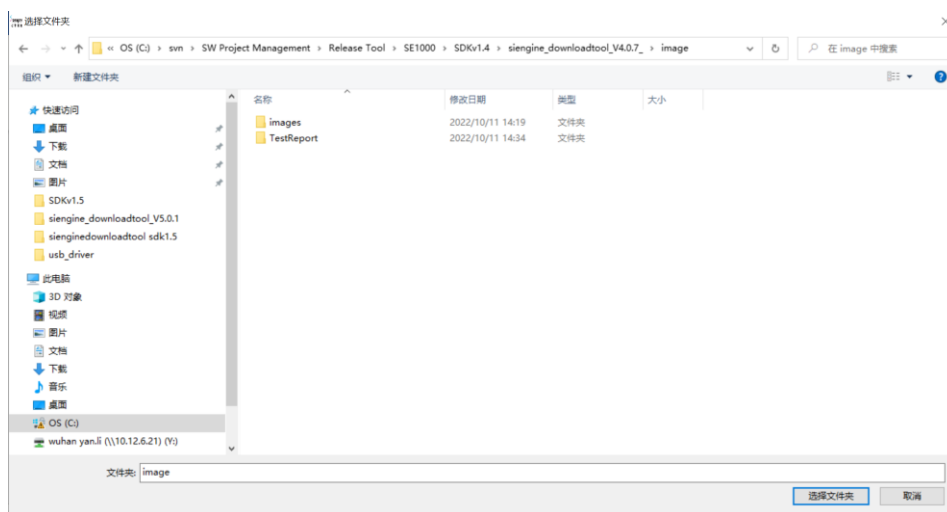
Figure2-35 Batch Download 3
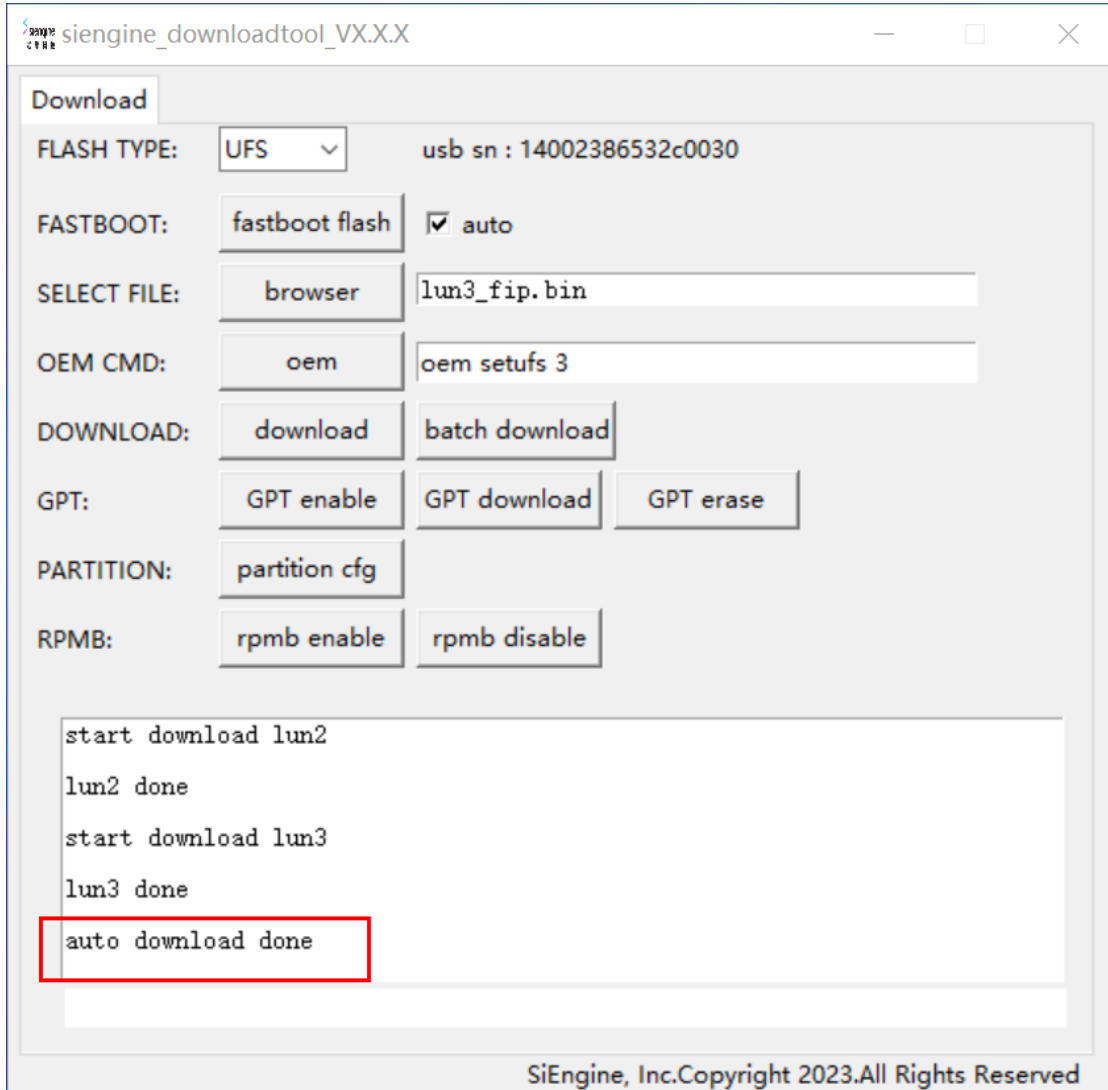
Figure2-36 Batch Download 4

2.7 GPT Download

1. Click the "fastboot flash" button and click the "GPT enable" button to start the GPT download.
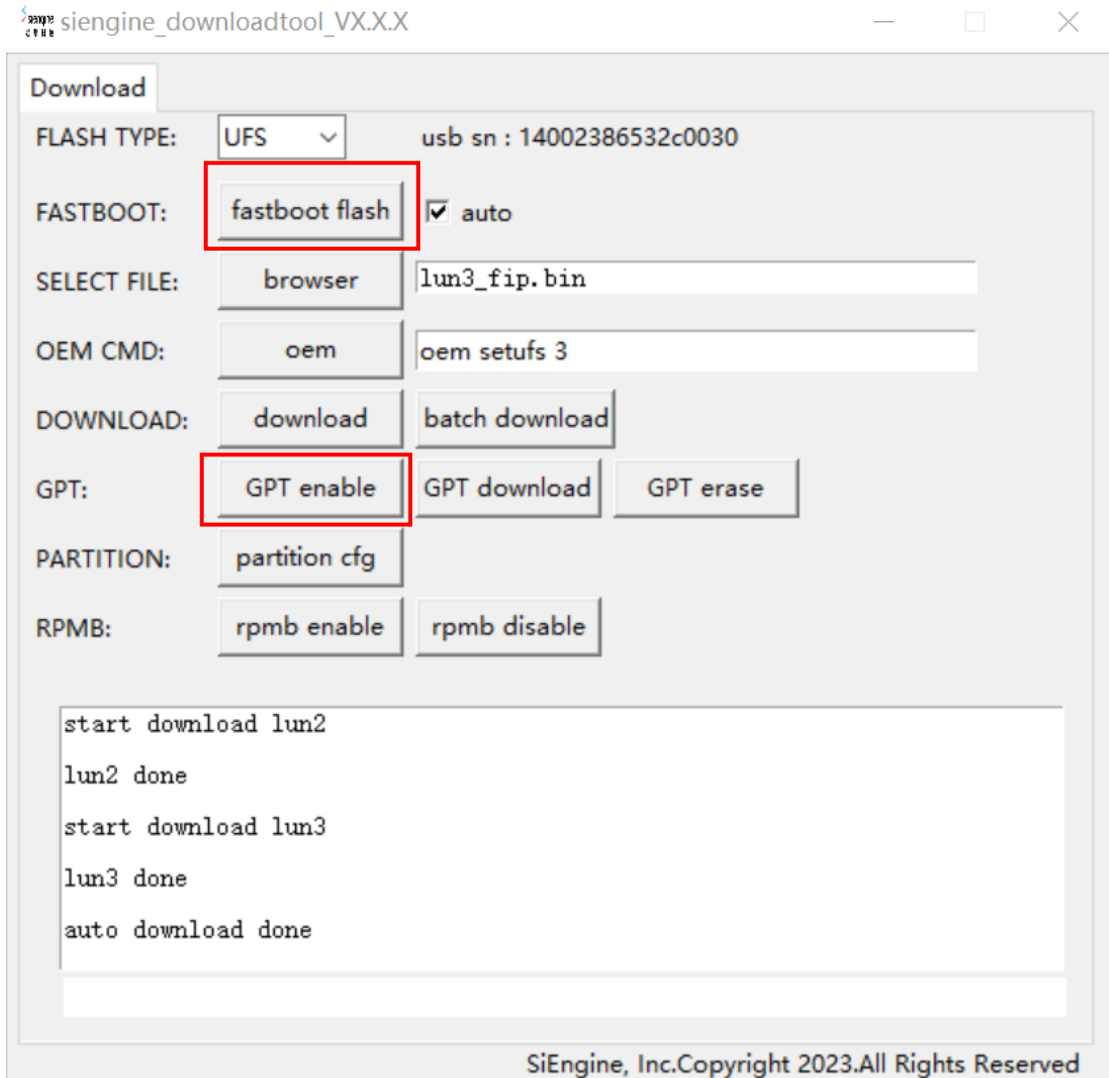
Figure2-37 GPT download 1

2. Choose partition file "SiPartitionFile_lun0".
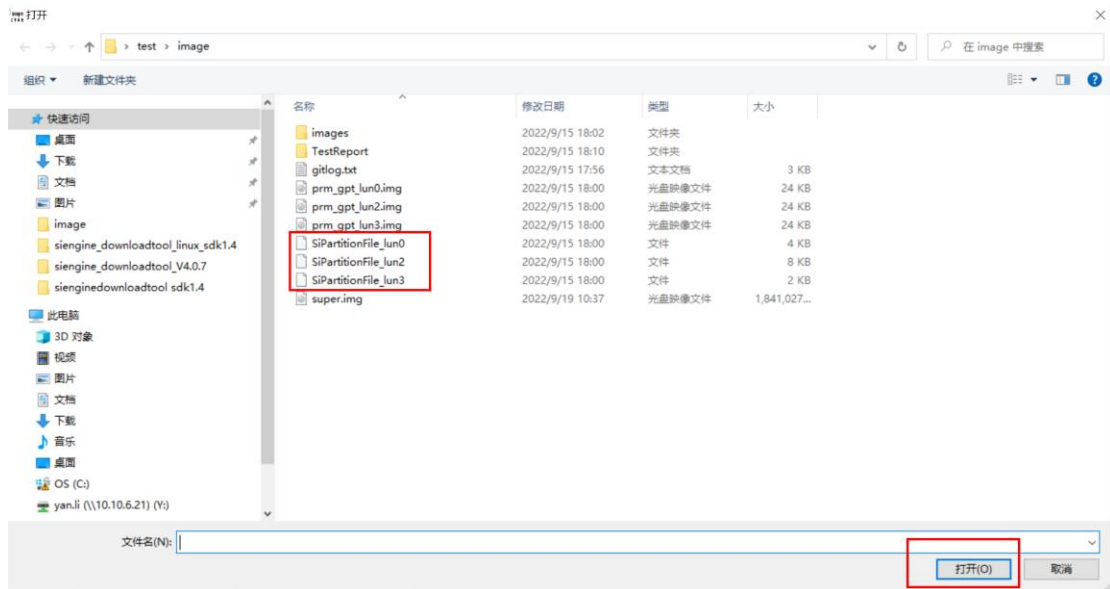
Figure2-38 GPT download 2

3. Check the GPT partition, select the file you want to download. Click the number button left to the check button to choose file, for example, if you want to download dtb and bl22_a image, click the dtb and bl22_a check button, and click the number button to choose file.

4. Then click the "GPT download" button starting to download. Wait until the last partition download over.
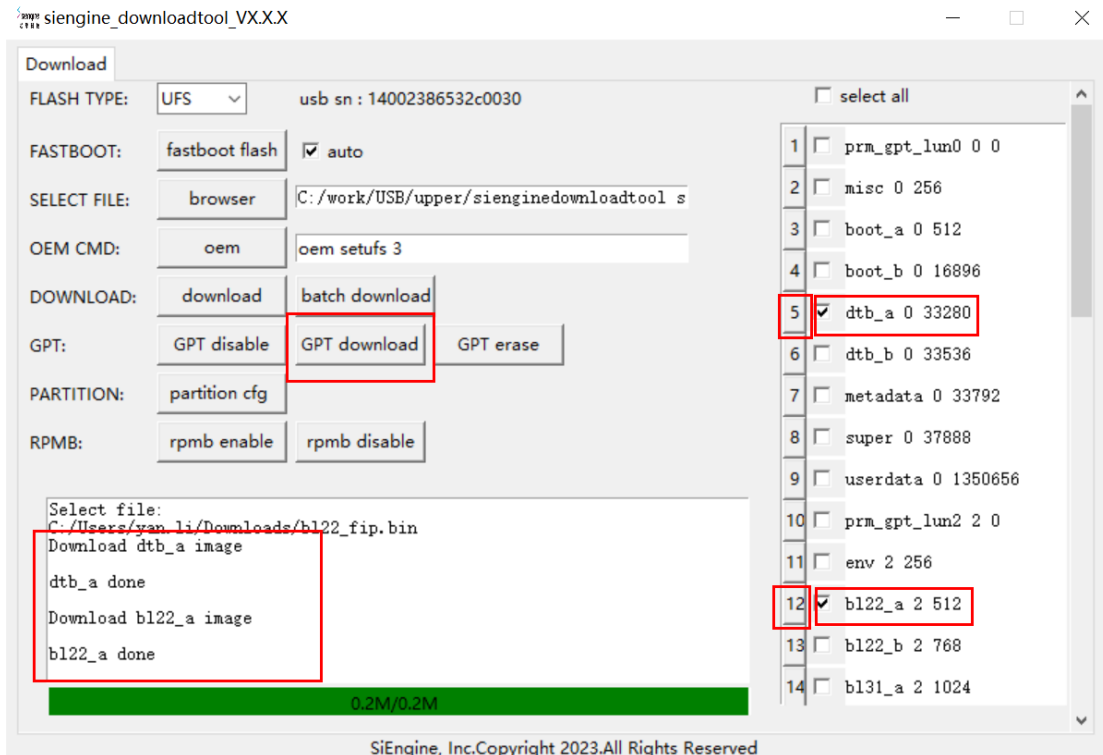
Figure2-39 GPT download 3

2.8 RPMB Enable

1. Download tool support enable ufs rpmb.
2. Click the "fastboot flash" button and click the "rpmb enable" button to choose "ufs-rpmb-configuration.xml" file to enable ufs RPMB region. After click "rpmb enable", all lun must be downloaded again.
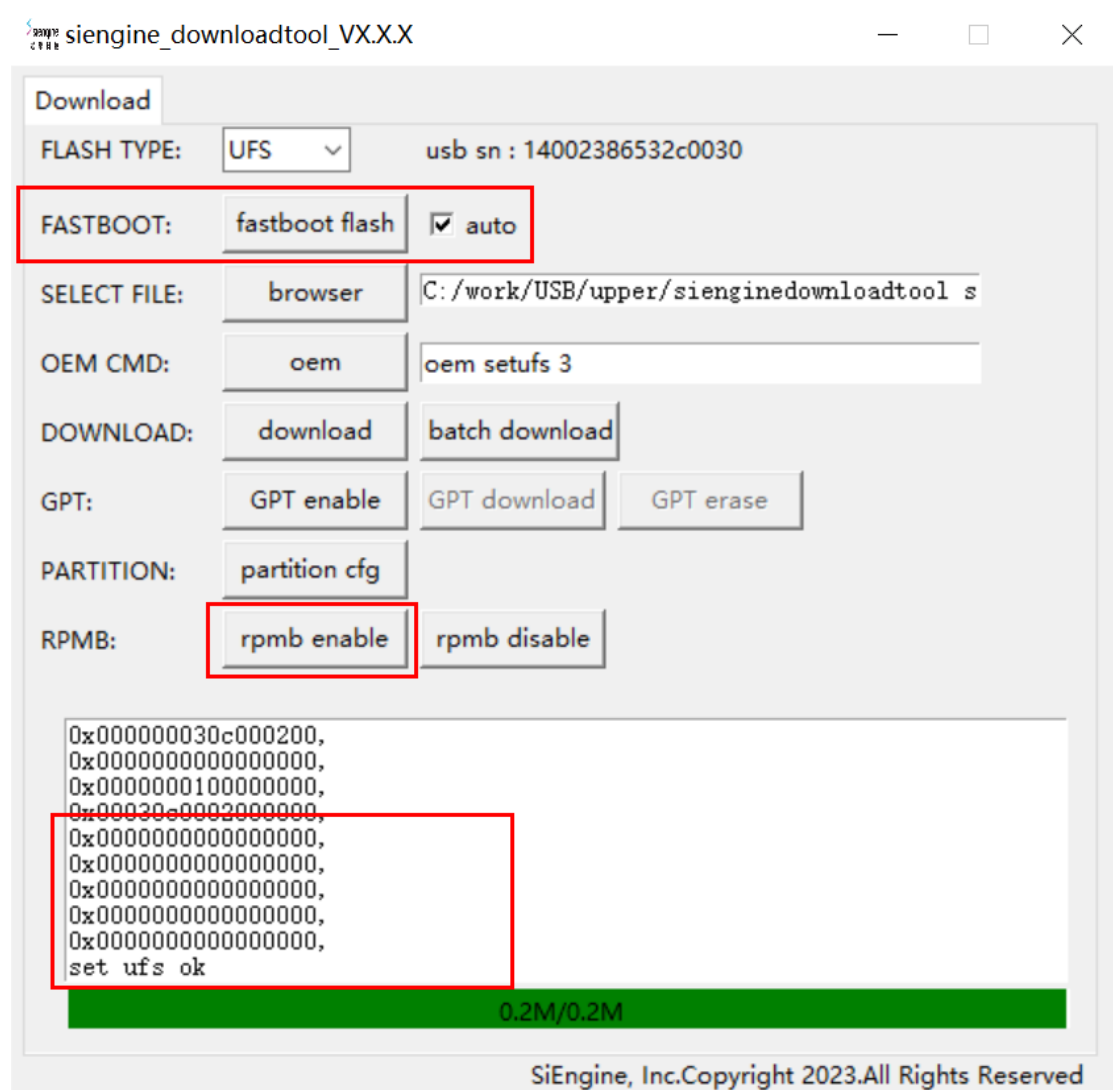
Figure2-40 RPMB Enable 1
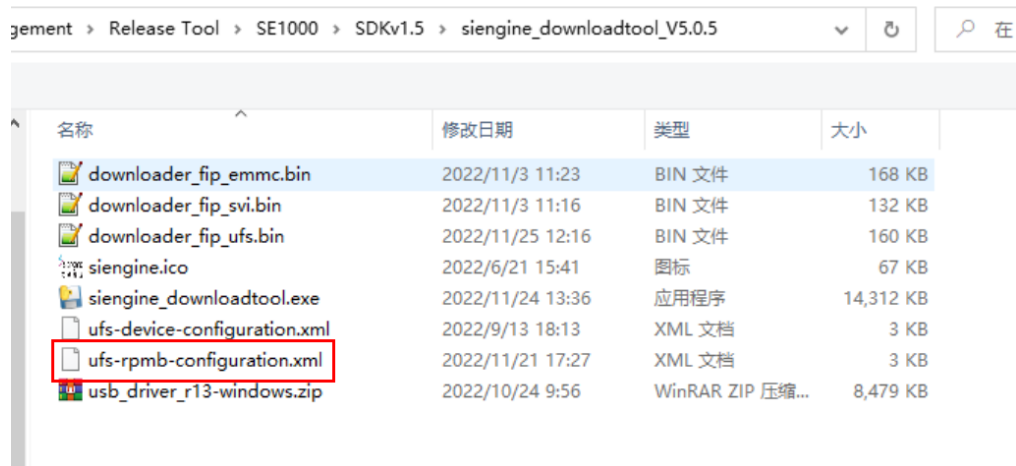
Figure2-41 RPMB Enable 2

3. If you want to disable rpmb, you can Click the "fastboot flash" button and click the "rpmb disable" button to disable ufs RPMB region. After click "rpmb disable", all lun must be downloaded again.
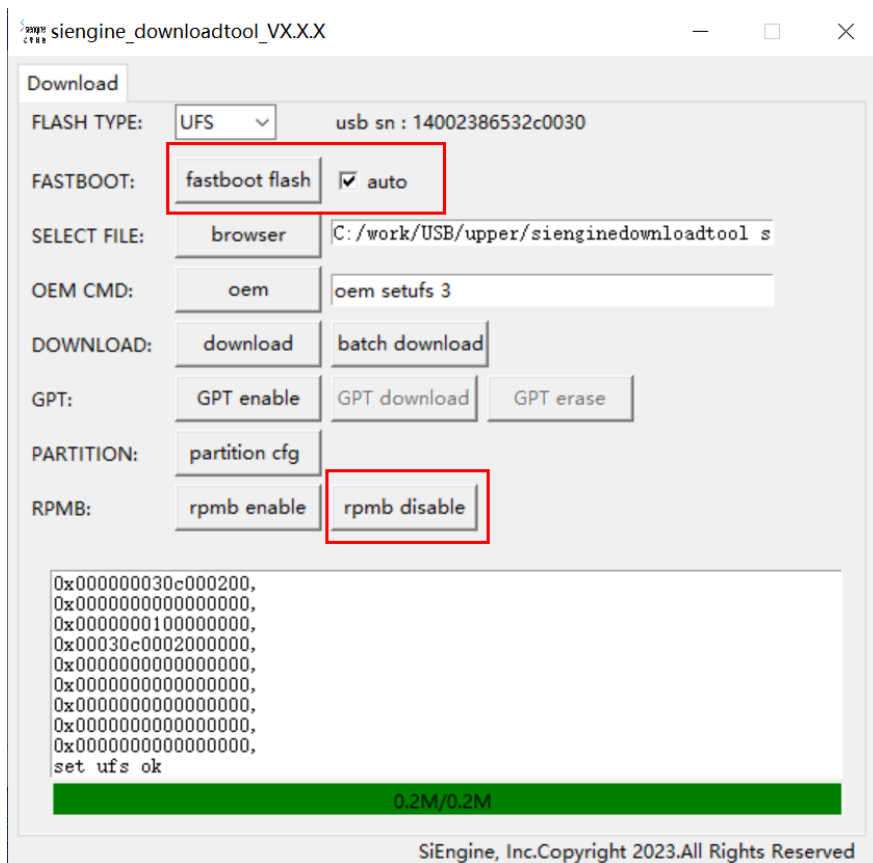
Figure2-42 RPMB Enable 3

2.9 Erase UFS

1. Download tool support erase ufs blocks.
2. Click the "fastboot flash" button and input "oem format", All of the ufs content will be cleared.
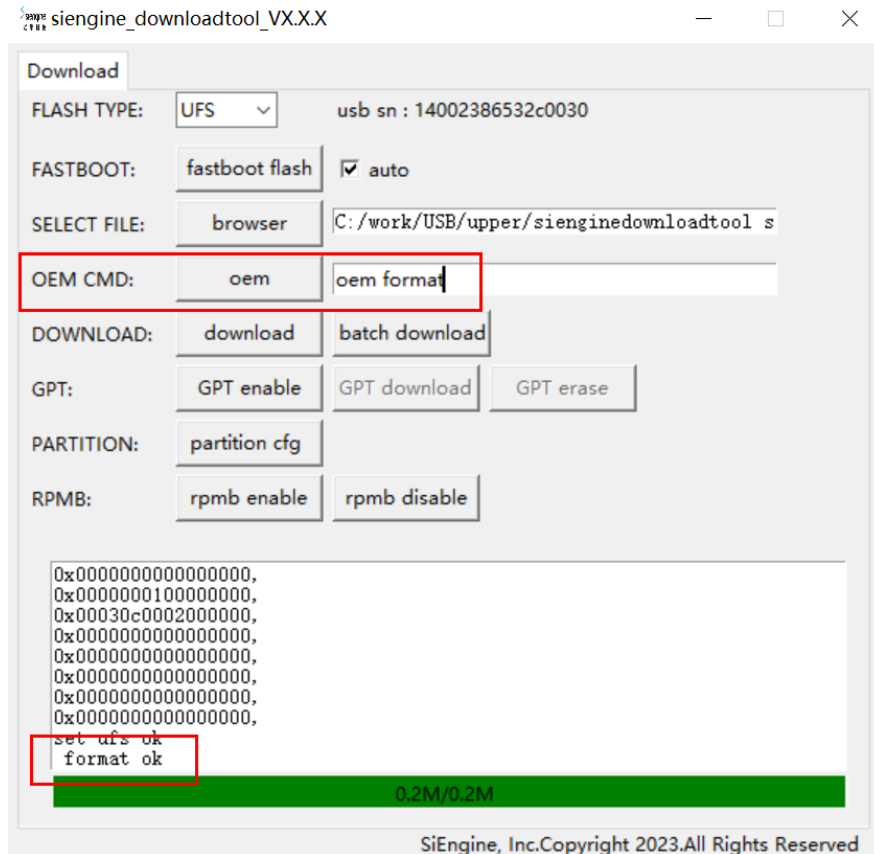
Figure2-43 Erase UFS 1

3. Input "oem erase ", you can erase certain blocks of ufs. For example, in the picture below "oem erase 0 16896 256", "0" is lun number, "16896" is the start block number, "256" is the total number of the erase block. You can find the relevant partition information from the Sipartitionfile.
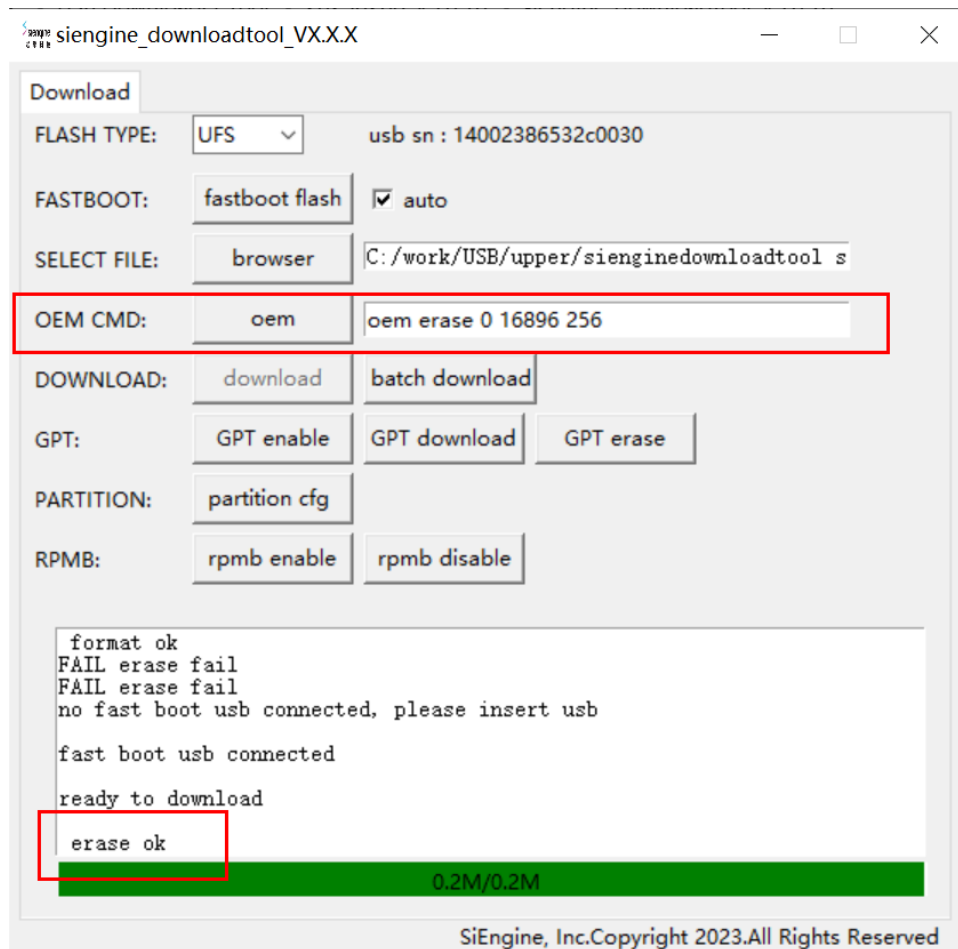
Figure2-44 Erase UFS 2

2.10 GPT Erase

1. Click the "fastboot flash" button and click the "GPT enable" button to start the GPT erase.
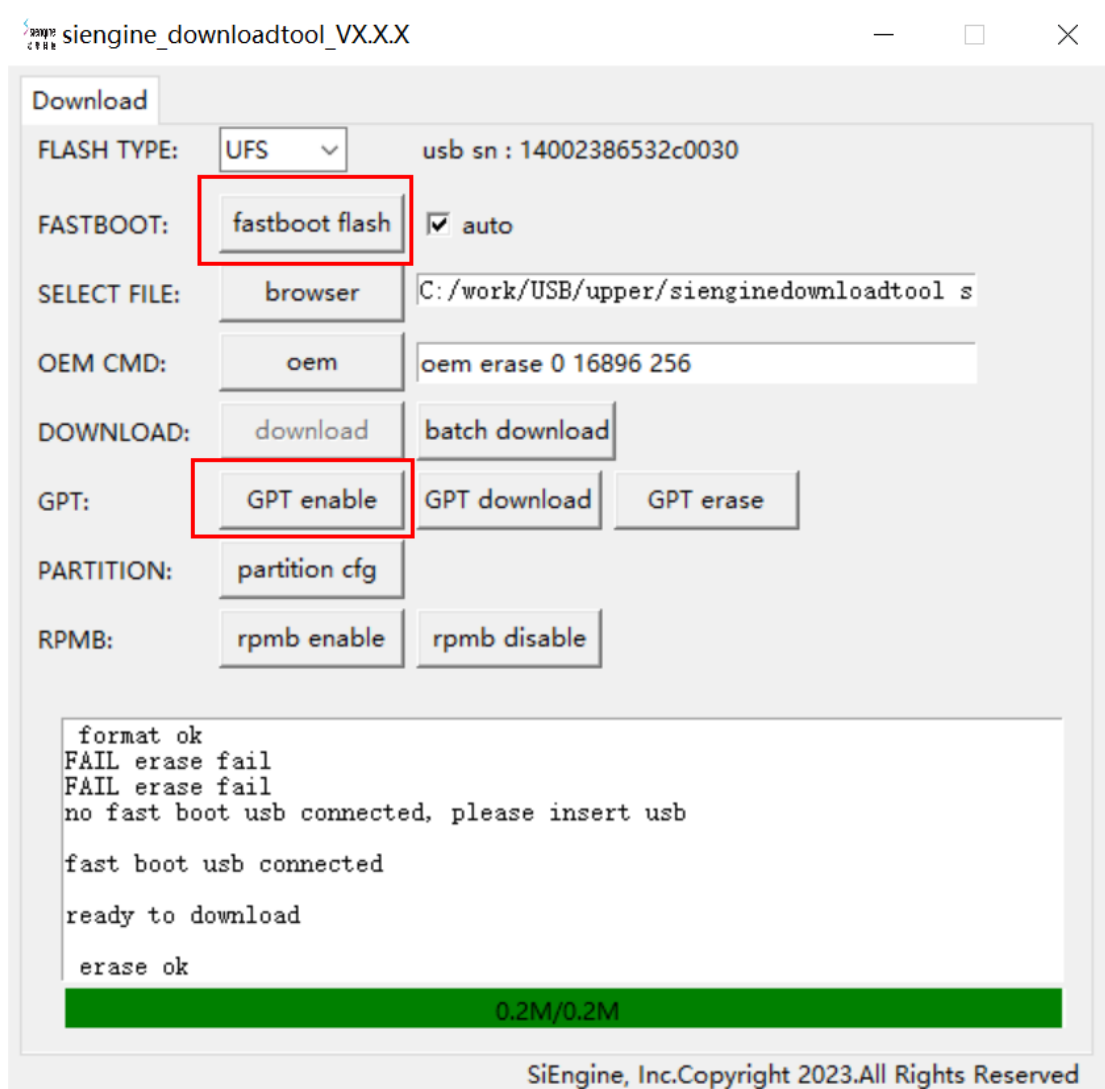
Figure2-45 GPT Erase 1

2. Choose partition file "SiPartitionFile_lun0".

3. Check the GPT partition, select the file you want to erase. For example, if you want to erase dtb_a image, click the dtb_a check button.
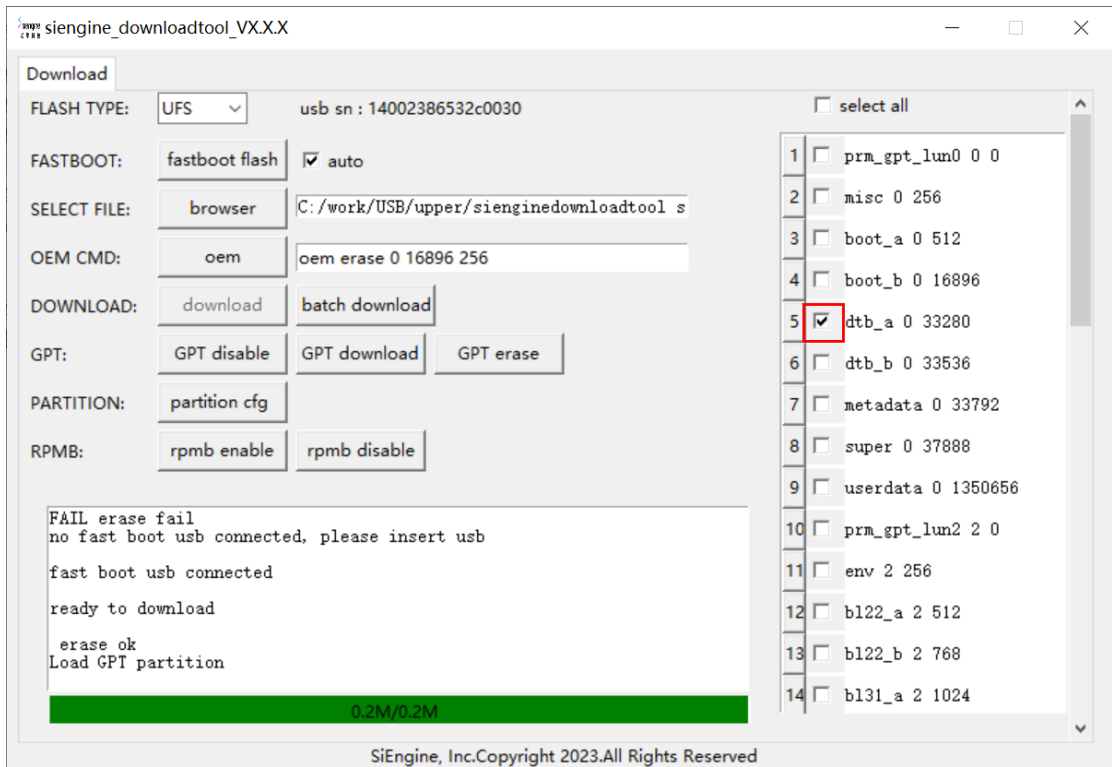
Figure2-46 GPT Erase 2

4. Then click the "GPT erase" button starting to download. Wait until the last partition erase over.
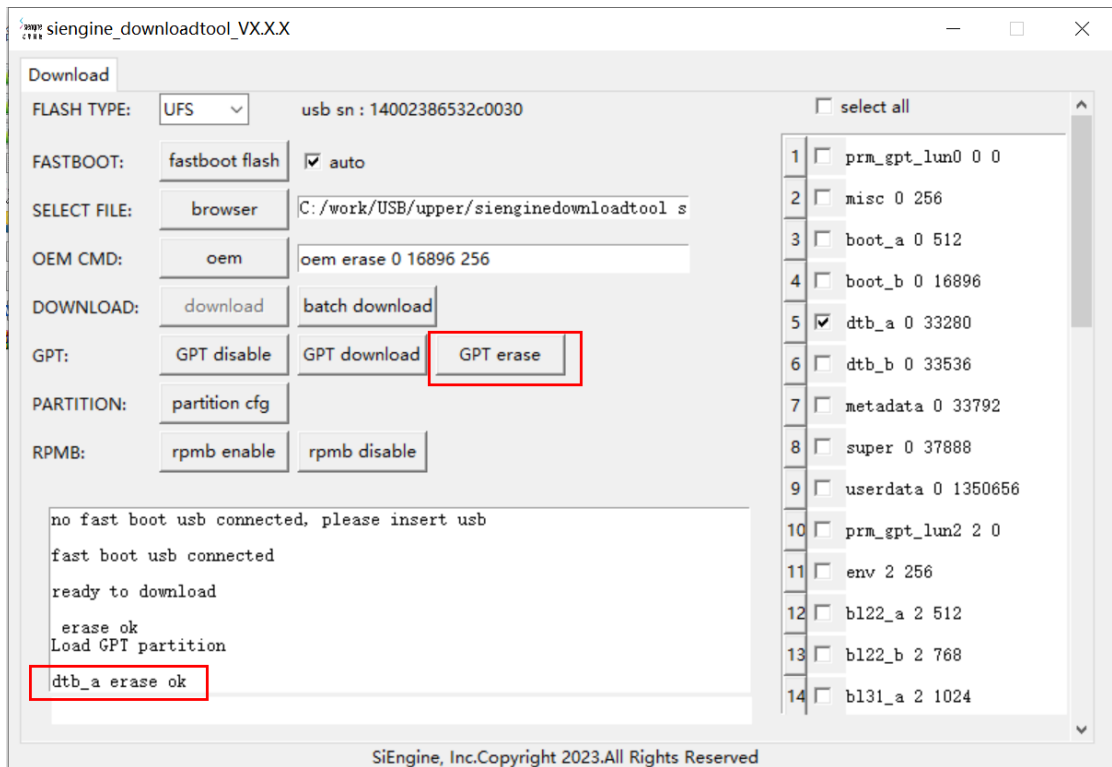
Figure2-47 GPT Erase 3

3. Download steps for EMMC

The basic operation flow of download for EMMC :
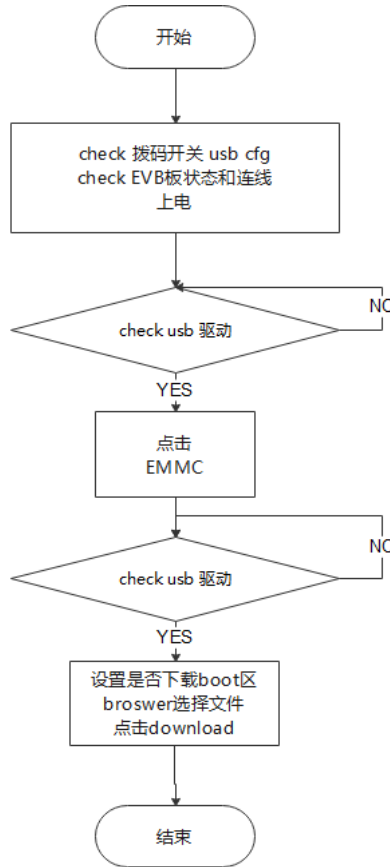
Figure3-1 Basic Operation Flow

Notes:

The hardware operations like power, DIP switch and other operations are the same as those of the download ufs, which will not be described here.

3.1 Starting Download

1. Choose FLASH TYPE to "EMMC".Click "fastboot flash" button, "flash downloader_fip_emmc.bin done" will be printed in the log area .
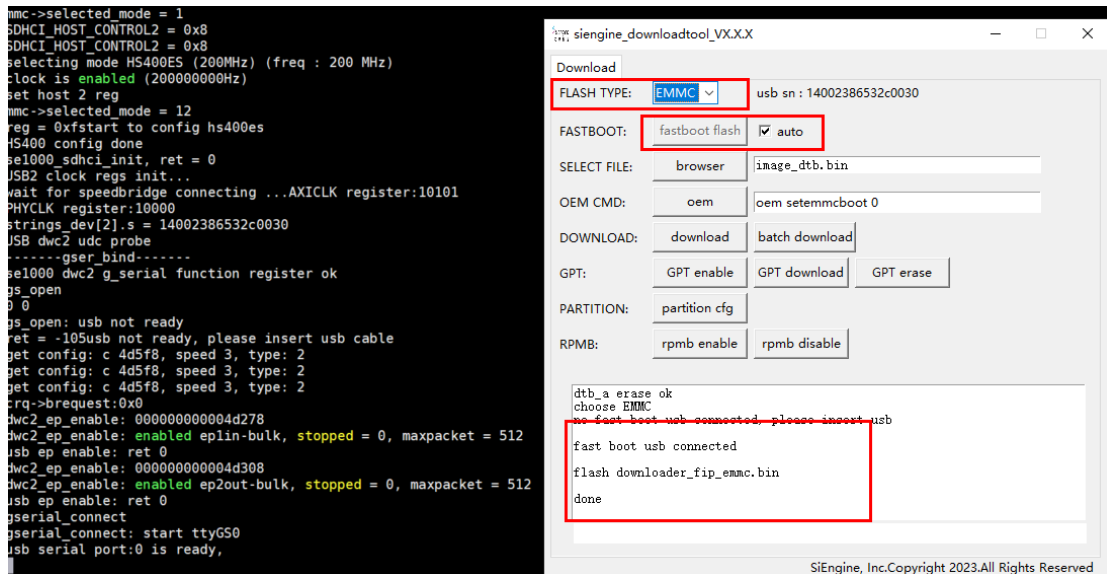
Figure3-2 EMMC Download 1

2. If you need to download data to boot partition. Fill in "oem setemmcboot 1" in the input box and click "oem" cmd button to send to the chip. The interface shows that the current download area is boot1.Now enter the USB Download state.

3. If you need to download data to none boot partition. Fill in "oem setemmcboot 0" in the input box and click "oem" cmd button to send to the chip. The interface shows that the current download area is none boot.Now enter the USB Download state.
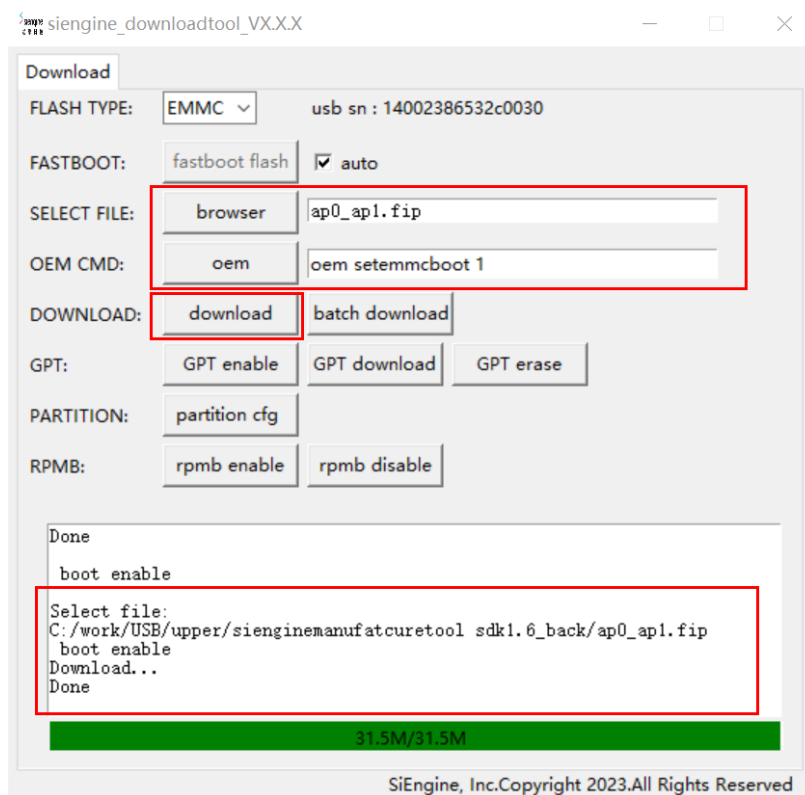
Figure3-3 EMMC Download 2
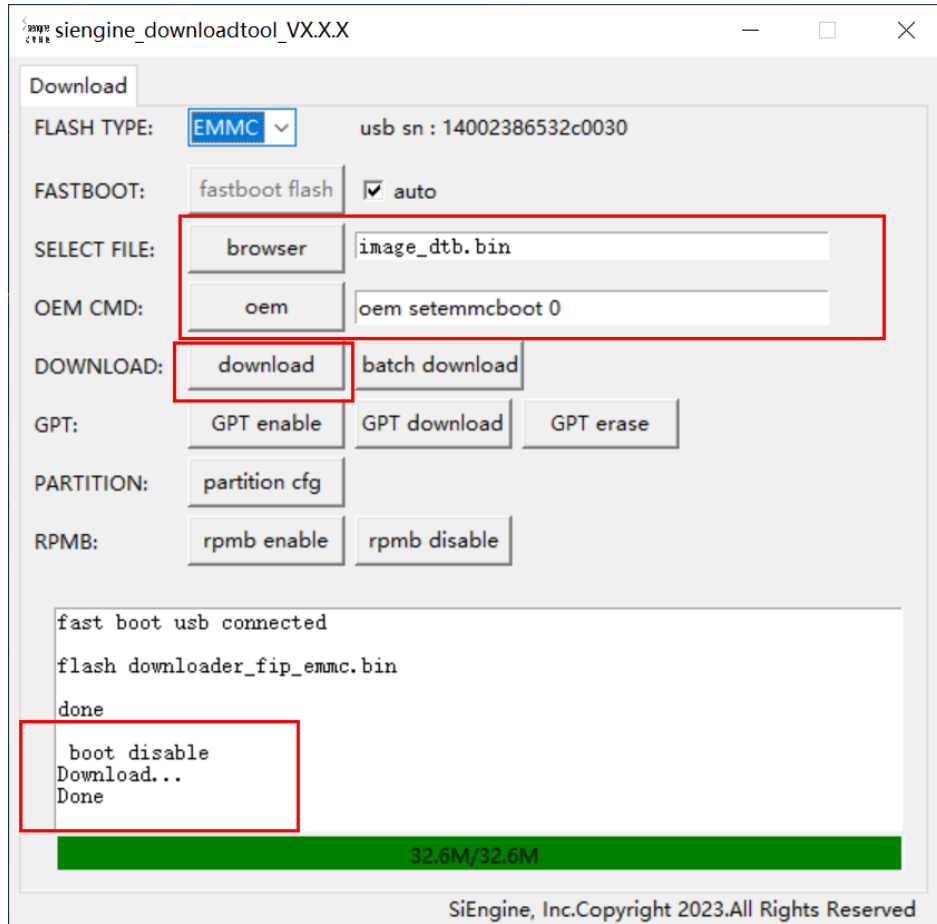
Figure3-4 EMMC Download 3

3.2 Download Complete

1. Power off the EVB, switch the BOOT CFG dip switch (sw1-2) back to the original position, that is, all the dip switches are in the lower part. If the dip switches are in the power-on state, you need to reset the board to restart the switch.

Figure3-5 Download Complete

SE1000 Linux Download Tool User Guide

1.Introduction

siengine_downloadtool_linux is a tool for downloading in Linux environments. Compared to the Windows version, the Linux version of the download tool does not have a GUI interface, using instructions to download SE1000.

Notes:

The hardware operations like power, DIP switch and other operations are the same as those of the Windows version download tool, which will not be described here.

2.What's in the download tool

Use the tar command to decompress siengine_downloadtool_linux.tar.gz.

- downloader_fip_emmc.bin: fip file used to download the code to be downloaded to the EMMC
- downloader_fip_ufs.bin: fip file used to download the code to be downloaded to the UFS
- downloader_fip_svi.bin: fip file used to download the bare metal image
- fastbootflashscript: user run this script can run fastboot flash command
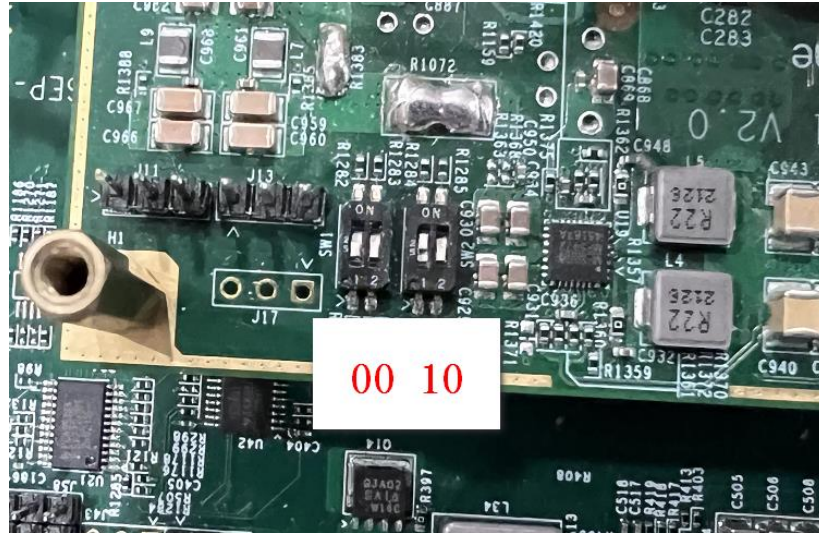- siengine_downloadtool: Linux executable file. It is used to download tools. If you do not have the execution permission, grant the execution permission to the file
- ufs-device-configuration.xml: ufs configuration file
- ufs-rpmb-configuration.xml: UFS RPMB configuration file

```
yan.li@gerrit-android-wh:~/siengine_downloadtool_linux$ ll
总用量 21592
drwxr-xr-x  2 yan.li swdesign      4096 3月   2 10:24 ./
drwxr-xr-x 16 yan.li swdesign      4096 3月   2 09:42 ../
-rwxr-xr-x  1 yan.li swdesign    172032 3月   1 20:37 downloader_fip_emmc.bin*
-rwxr-xr-x  1 yan.li swdesign    139264 3月   1 20:37 downloader_fip_svi.bin*
-rwxr-xr-x  1 yan.li swdesign    167936 3月   1 20:37 downloader_fip_ufs.bin*
-rwxr-xr-x  1 yan.li swdesign       124 11月 25 12:32 fastbootflashscript*
-rwxr-xr-x  1 yan.li swdesign      1769 3月   1 20:40 readme.txt*
-rwxr-xr-x  1 yan.li swdesign  12405936 3月   1 20:38 siengine_downloadtool*
-rwxr-xr-x  1 yan.li swdesign      2492 3月   1 20:42 ufs-device-configuration.xml*
-rwxr-xr-x  1 yan.li swdesign      2525 3月   1 20:42 ufs-rpmb-configuration.xml*
-rwxr-xr-x  1 yan.li swdesign   9197793 2月   8 11:21 UG_SE1000_Download_Tool_User_Guide.docx*
```

Figure Linux2-1 What's in the download tool

3.Download steps

1. The BOOT CFG dip switch (sw1-1) is used to switch to the USB BOOT CFG mode and download downloader_fip.bin to enter the USB Download state. If you have several EVB connected to one linux machine, you can send "fastboot devices" to query the usb

serial number. And choose the EVB you want to download by adding "-s xxxx" in each instruction. if you only have one EVB, you don't have to add "-s xxxx" in instructions. For example, my EVB usb serial number is 0A00114A53323231. So I will add "-s 0A00114A53323231" in every instruction.

```
yan.li@gerrit-android-wh:~/siengine_downloadtool_linux$ fastboot devices
0A00114A53323231          fastboot
```

Figure Linux3-1 Download steps 1

2. This step corresponds to Step 2 in Section 2.4 of the Windows version.
   The instructions are as follows:

   EMMC:
   ./siengine_downloadtool download -s 0A00114A53323231 downloader_fip_emmc.bin
   ./siengine_downloadtool flash -s 0A00114A53323231 downloader_fip_emmc.bin

```
yan.li@gerrit-android-wh:~/siengine_downloadtool_linux$ ./siengine_downloadtool download -s 0A00114A53323231 downloader_fip_emmc.bin
Downloading...
progress: 100%: ████████████████████████████████████done
yan.li@gerrit-android-wh:~/siengine_downloadtool_linux$ ./siengine_downloadtool flash -s 0A00114A53323231 downloader_fip_emmc.bin
done
```

Figure Linux3-2 Download steps 2

   UFS:
   ./siengine_downloadtool download -s 0A00114A53323231 downloader_fip_ufs.bin
   ./siengine_downloadtool flash -s 0A00114A53323231 downloader_fip_ufs.bin

```
yan.li@gerrit-android-wh:~/siengine_downloadtool_linux$ ./siengine_downloadtool download -s 0A00114A53323231 downloader_fip_ufs.bin
Downloading...
progress: 100%: ████████████████████████████████████done
yan.li@gerrit-android-wh:~/siengine_downloadtool_linux$ ./siengine_downloadtool flash -s 0A00114A53323231 downloader_fip_ufs.bin
done
```

Figure Linux3-3 Download steps 3

3. If the SE1000 chip is empty or the UFS partition size needs to be reconfigured, you need to configure the UFS LUN partition by using the UFS configuration function. If you do not need to change the UFS partition size, skip this step. This step corresponds to Step 2 in Section 2.3 of the Windows version.
   The instructions are as follows:
   ./siengine_downloadtool download -s 0A00114A53323231 downloader_fip_ufs.bin
   ./siengine_downloadtool flash -s 0A00114A53323231 downloader_fip_ufs.bin
   ./siengine_downloadtool oem -s 0A00114A53323231 "ufsconfig"

Figure Linux3-4 Download steps 4

Notes:

After modifying the XML configuration file and then "partition cfg", all data in the UFS will be emptied.

4. Start downloading.

EMMC:

./siengine_downloadtool oem -s 0A00114A53323231 "setemmcboot 0"

./siengine_downloadtool download -s 0A00114A53323231 image_dtb.bin

./siengine_downloadtool oem -s 0A00114A53323231 "setemmcboot 1"

./siengine_downloadtool download -s 0A00114A53323231 ap0_ap1.fip

Figure Linux3-5 Download steps 5

UFS:

Set UFS LUN0 and download LUN0 files.

Set UFS LUN1 and download LUN1 files.

Set UFS LUN2 and download LUN2 files.

Set UFS LUN3 and download LUN3 files.

./siengine_downloadtool download -s 0A00114A53323231 downloader_fip_ufs.bin

./siengine_downloadtool flash -s 0A00114A53323231 downloader_fip_ufs.bin

./siengine_downloadtool oem -s 0A00114A53323231 "startdownload"

./siengine_downloadtool oem -s 0A00114A53323231 "eraselun 0"

./siengine_downloadtool oem -s 0A00114A53323231 "setufs 0"

./siengine_downloadtool download -s 0A00114A53323231 lun0_fip.bin

./siengine_downloadtool oem -s 0A00114A53323231 "startdownload"

./siengine_downloadtool oem -s 0A00114A53323231 "eraselun 1"

./siengine_downloadtool oem -s 0A00114A53323231 "setufs 1"

./siengine_downloadtool download -s 0A00114A53323231 lun1_fip.bin

./siengine_downloadtool oem -s 0A00114A53323231 "startdownload"

./siengine_downloadtool oem -s 0A00114A53323231 "eraselun 2"

./siengine_downloadtool oem -s 0A00114A53323231 "setufs 2"

./siengine_downloadtool download -s 0A00114A53323231 lun2_fip.bin

./siengine_downloadtool oem -s 0A00114A53323231 "startdownload"

./siengine_downloadtool oem -s 0A00114A53323231 "eraselun 3"

./siengine_downloadtool oem -s 0A00114A53323231 "setufs 3"

./siengine_downloadtool download -s 0A00114A53323231 lun3_fip.bin

Figure Linux3-6 Download steps 6

5. After downloading, flip the DIP switch and enter the normal flow. This step corresponds to Section 2.5 of the Windows version.

Figure Linux3-7 Normal Flow

6. GPT download

    First put your SiPartitionFile_lun0, SiPartitionFile_lun2, SiPartitionFile_lun3 in the same path of siengine_downloadtool. Select which partition you need to download, then download.

Figure Linux3-8 GPT Download 1

For example, if you want to download bl22_a :

./siengine_downloadtool download -s 0A00114A53323231 downloader_fip_ufs.bin

./siengine_downloadtool flash -s 0A00114A53323231 downloader_fip_ufs.bin

./siengine_downloadtool oem -s 0A00114A53323231 " startdownload "

./siengine_downloadtool erasegpt -s 0A00114A53323231 bl22_a

./siengine_downloadtool parsegpt -s 0A00114A53323231 bl22_a

./siengine_downloadtool download -s 0A00114A53323231 bl22_fip.bin

Figure Linux3-9 GPT Download 2

For another example, if you want to download m4_a :

./siengine_downloadtool oem -s 0A00114A53323231 " startdownload "

./siengine_downloadtool erasegpt -s 0A00114A53323231 m4_a

./siengine_downloadtool parsegpt -s 0A00114A53323231 m4_a

./siengine_downloadtool download -s 0A00114A53323231 m4_fip.bin

Figure Linux3-10 GPT Download 3

7. RPMB enable/disable

   If you want to enable RPMB:

   ./siengine_downloadtool download -s 0A00114A53323231 downloader_fip_ufs.bin

   ./siengine_downloadtool flash -s 0A00114A53323231 downloader_fip_ufs.bin

   ./siengine_downloadtool oem -s 0A00114A53323231 "enablerpmb"

Figure Linux3-11 RPMB Enable

After you send enable rpmb instruction, you need to download all lun_fip.bin again.

If you want to disable RPMB:

./siengine_downloadtool oem -s 0A00114A53323231 "disablerpmb"

Figure Linux3-12 RPMB Disable

After you send disable rpmb instruction, you need to download all lun_fip.bin again.

8. Erase ufs

If you want to format ufs:

./siengine_downloadtool download -s 0A00114A53323231 downloader_fip_ufs.bin

./siengine_downloadtool flash -s 0A00114A53323231 downloader_fip_ufs.bin

./siengine_downloadtool oem -s 0A00114A53323231 "format"

Figure Linux3-13 Erase ufs1

If you want to erase some particular part of the ufs:

./siengine_downloadtool oem -s 0A00114A53323231 "erase 0 16896 256"

Figure Linux3-14 Erase ufs2

If you want to erase some gpt partition(SipartitionFile should be placed in the same directory):

./siengine_downloadtool erasegpt -s 0A00114A53323231 m4_a

Figure Linux3-15 Erase ufs3

If you want to erase one of the lun in ufs:

./siengine_downloadtool oem -s 0A00114A53323231 "eraselun 0"

Figure Linux3-16 Erase ufs4