CONFIDENTIAL B

MT6765_62 ETT test & stress test reference for LP4X V1.6

Agenda

- ETT test step by step
- MTK Eye-Scan Function
- DRAM Stress Test step by step
- Nenamark2 + DVFS for Fast-K
- Suspend/Resume
- Reboot(DDR Reserve mode,Full-K,Fast-k)
- pass

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Chang list

Vison	changlist	date
1	Original version	2018 4 11
1.1	pass	2018 4 20
1.2	LP4X ETT	2018 7 9
1.3	Fix script device id	2018/09/12
1.4	Page 49 note Log	2018/12/10
1.5	Page42 note	2018/12/20
1.6	Page7 Page26 change VM(LV) from 1.09 to 1.06	2018/12/25

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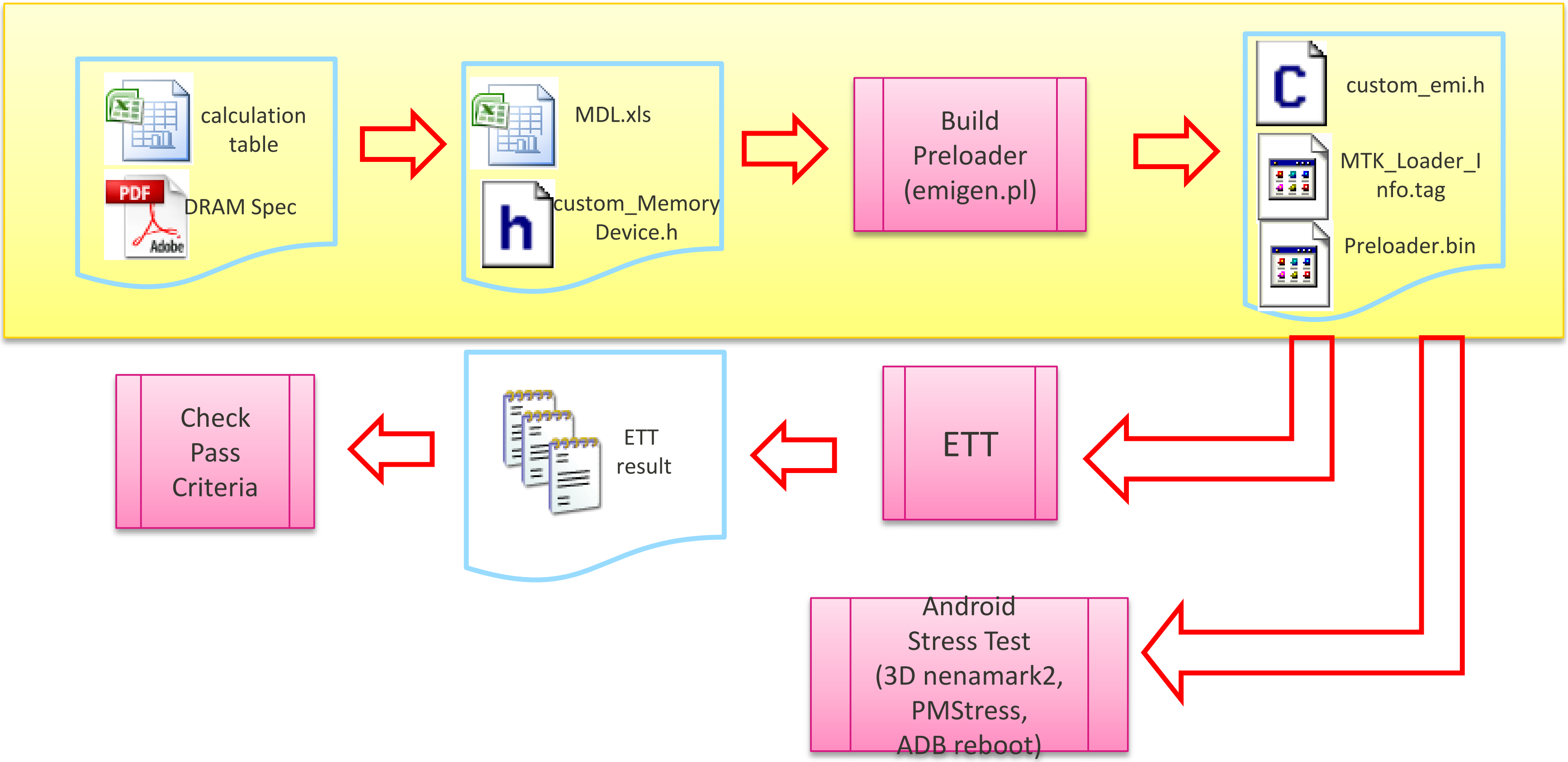
ETT TEST STEP BY STEP

MT6765_62 DRAM Validation Flow



calculation table

DRAM Spec

MDL.xls

custom_MemoryDevice.h

Build Preloader (emigen.pl)

custom_emi.h

MTK_Loader_Info.tag

Preloader.bin

ETT

ETT result

Check Pass Criteria

Android Stress Test (3D nenamark2, PMStress, ADB reboot)

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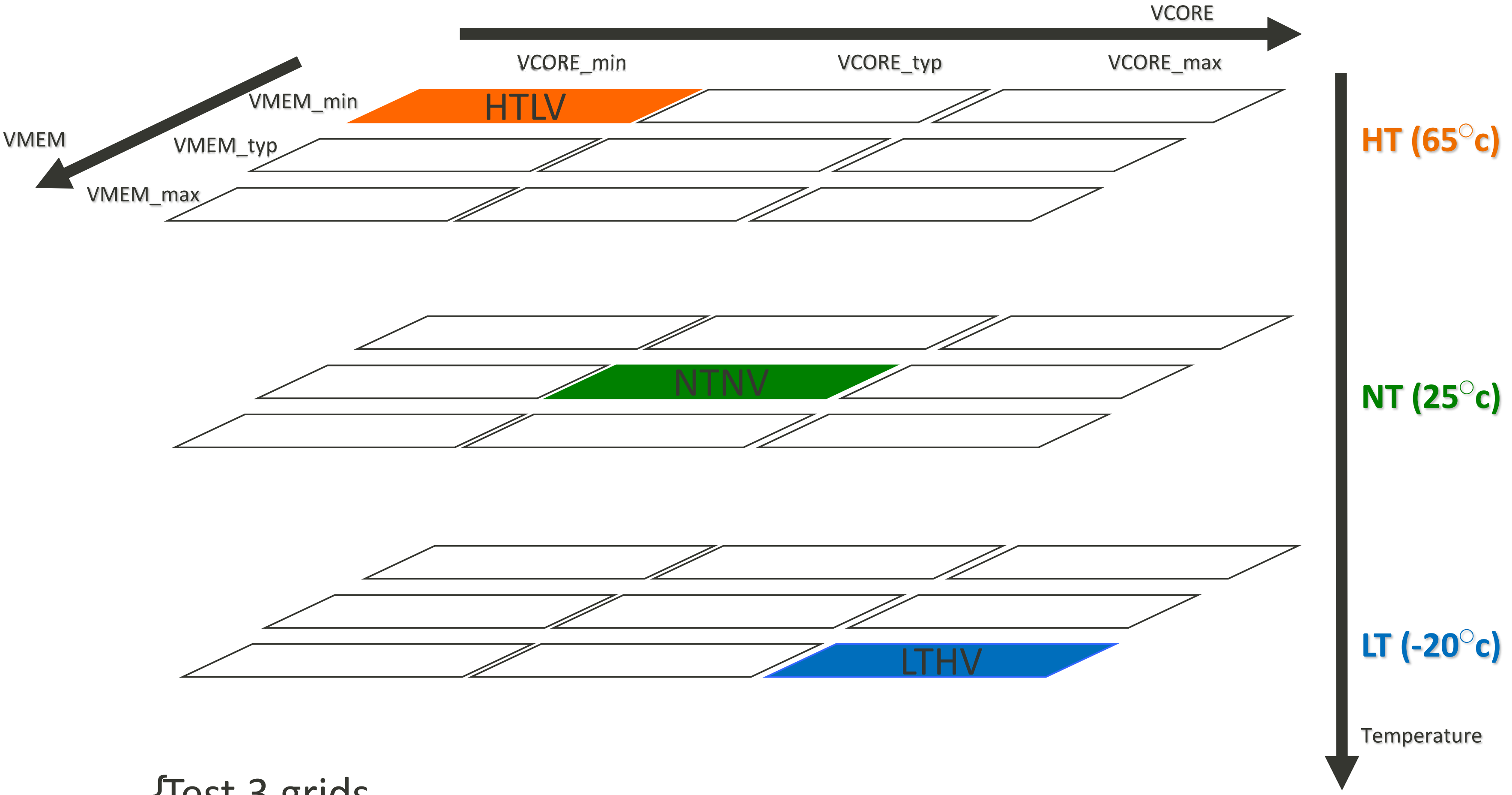
ETT Test Environment Setup (1/2)


VCORE
VCORE_min
VCORE_typ
VCORE_max
VMEM
VMEM_min
VMEM_typ
VMEM_max
HTLV
NTNV
LTHV
HT (65°c)
NT (25°c)
LT (-20°c)
Temperature

- Test 3 grids
  - HTLV, NTNV, LTHV

ETT Test Environment Setup (2/2)

For LPDDR4X 3200MHz

Condition	Temperature (°C)	Vcore (V)	Vm (V)	Vddq(V)
HTLV	65	0.75625	1.06	0.58
NTNV	25	0.80	1.12	0.6
LTHV	-20	0.84375	1.17	0.65

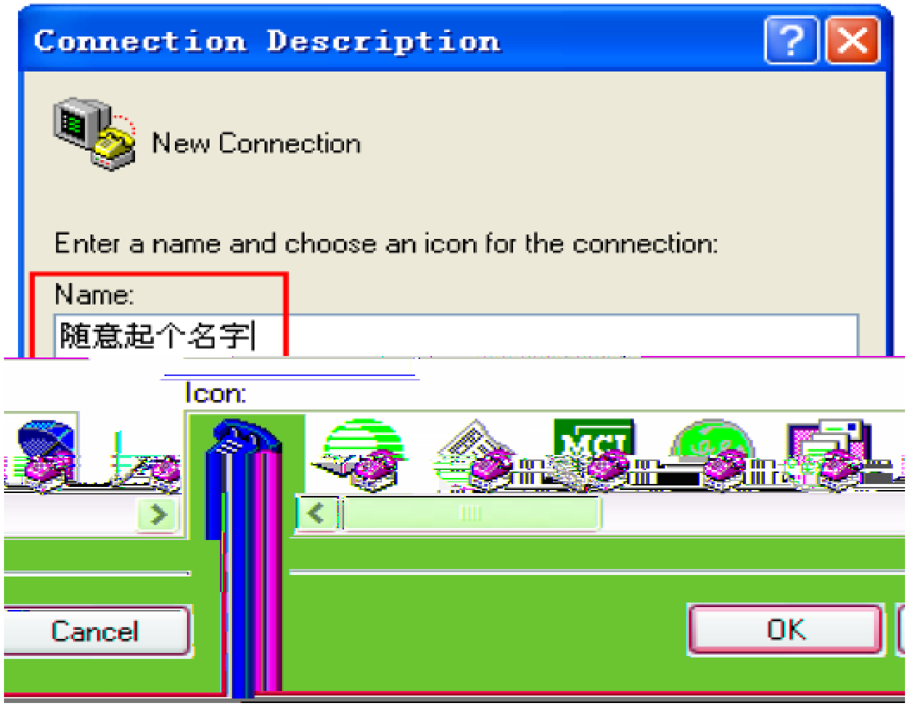
ETT (1/12)

- : MT6765_62 Flash tool(W1748).
- 不 **Format whole flash;**
- ETT BIN : https://online.mediatek.com/qvl/_layouts/15/mol/qvl/ext/QVLHomeExternal.aspx不 memory ETT bin

- Note1. VBAT 不
- Note2. NTC 不 10K GND， NTC!

ETT (2/12)

- **Step1.** UART Cable PC uart0
- **Step2.** _ _



Connection Description

New Connection

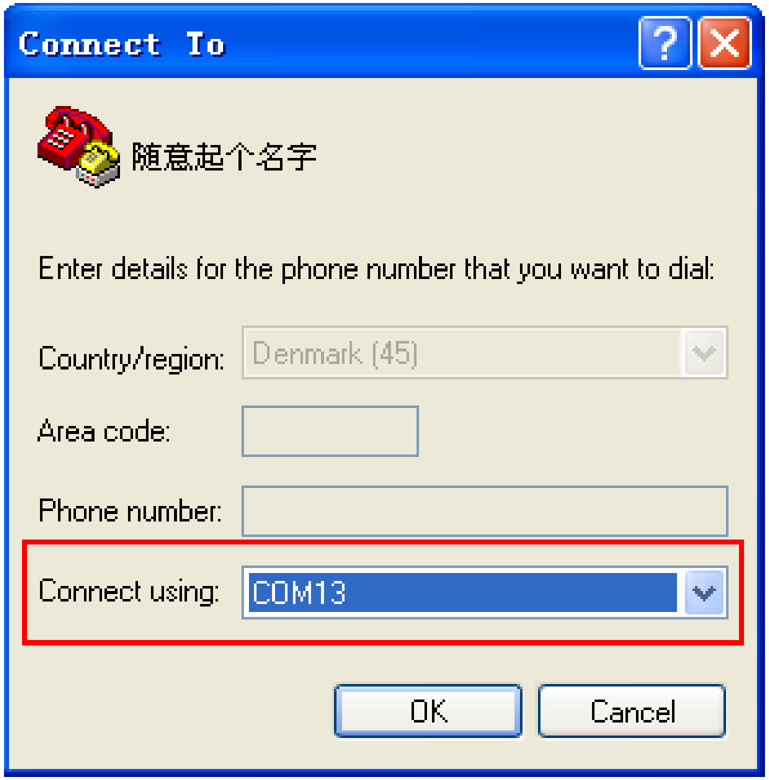
Enter a name and choose an icon for the connection:

Name:
随意起个名字

Icon:

ETT (3/12)

- **Step3:** UART0 COM port MT6765_62 ETT log uart0 ok



Connect To

随意起个名字

Enter details for the phone number that you want to dial:

Country/region: Denmark (45)

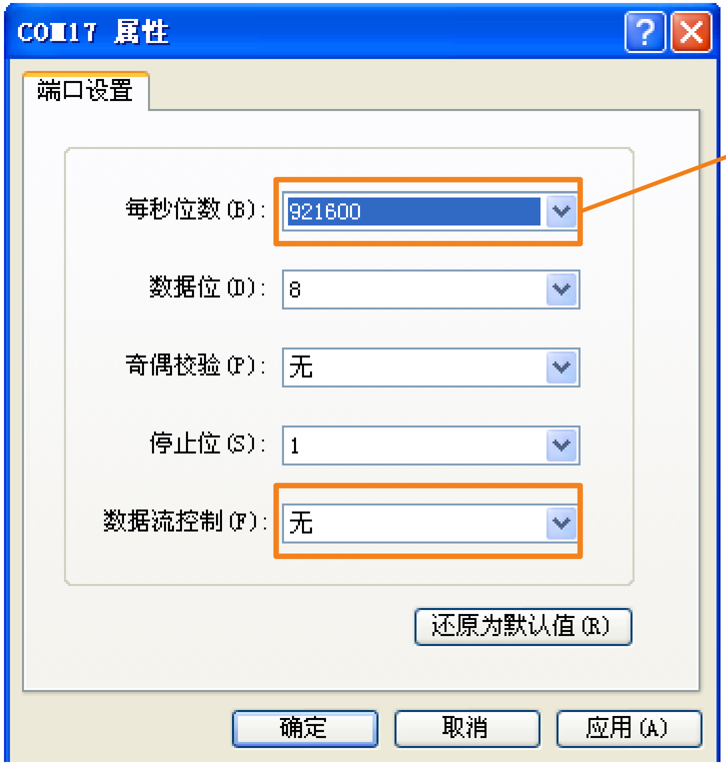
Area code:

Phone number:

Connect using: COM13

ETT (4/12)

- **Step4：** 921600 _U ➔


COM17 属性
端口设置
还原为默认值(R)
确定
取消
应用(A)

每秒位数(B)： 921600

数据位(D)： 8

奇偶校验(P)： 无

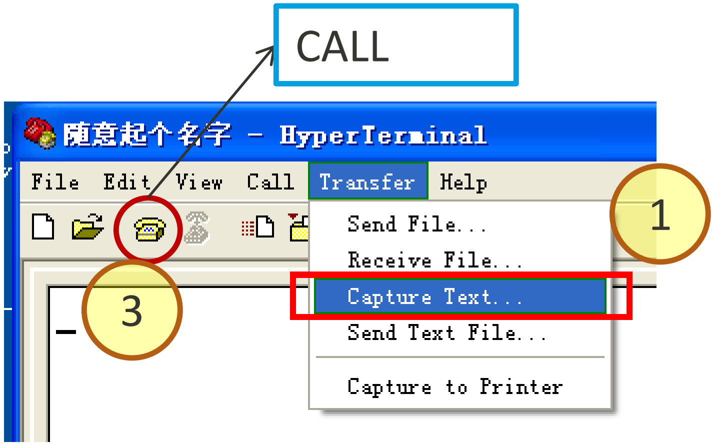
停止位(S)： 1

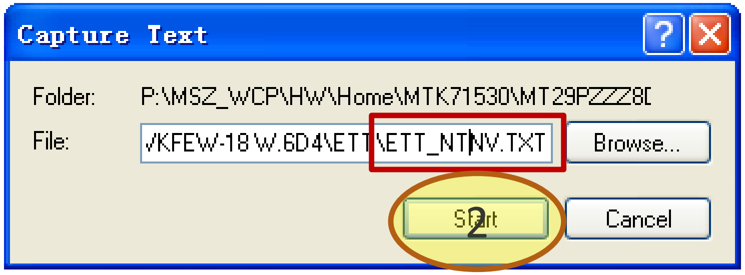
数据流控制(F)： 无

注意！

ETT (5/12)

- **Step5:** ETT raw data ➔ 不Start➔ 不CALL .


CALL
随意起个名字 - HyperTerminal
File
Edit
View
Call
Transfer
Help
Send File...
Receive File...
Capture Text...
Send Text File...
Capture to Printer
1
3


Capture Text
Browse...
Start
Cancel
2

Folder: P:\MSZ_WCP\HW\Home\MTK71530\MT29PZZZ8[

File: /KFEW-18W.6D4\ETT\ETT_NTNV.TXT

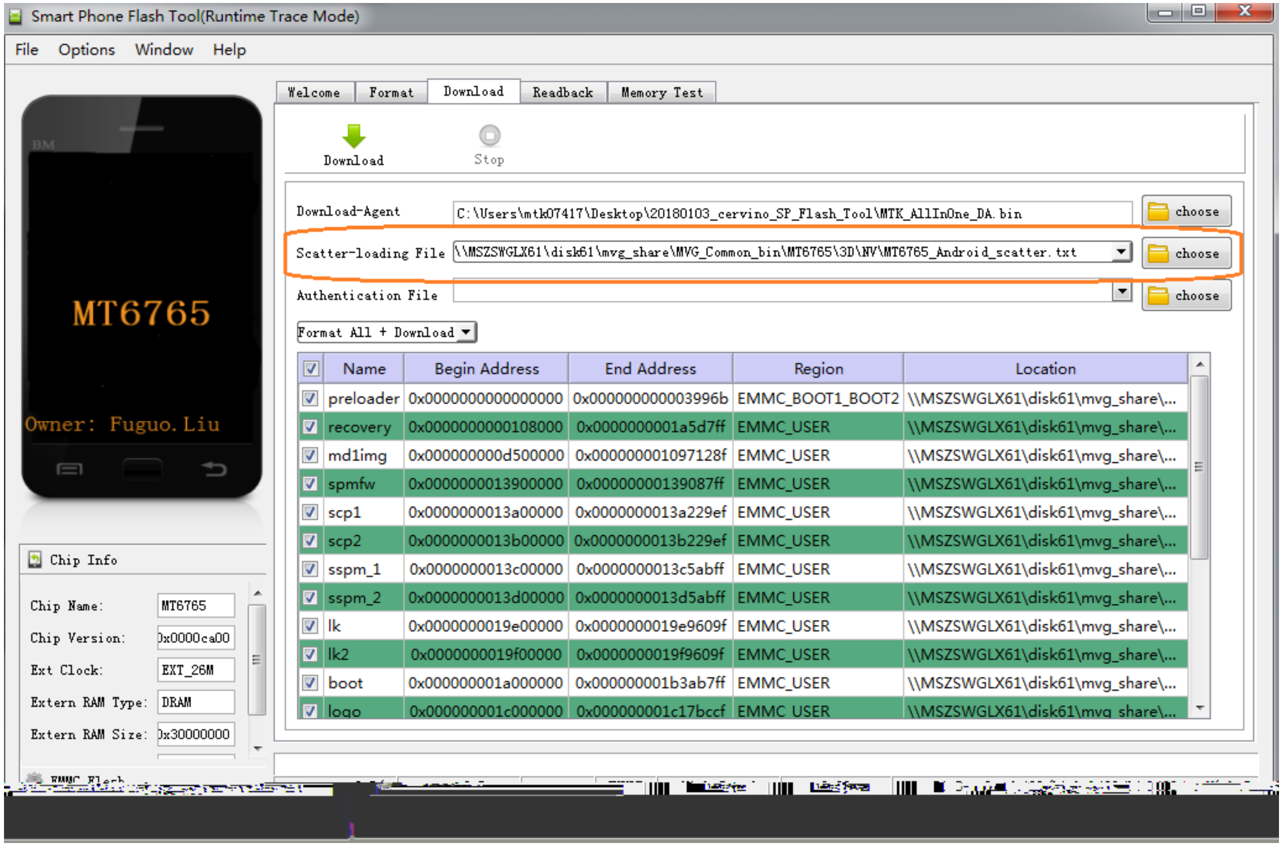
Note1:

Note2: , 停 , 停.

: ETT LOG

ETT (6/12)

- **Step6:** Flash tool download scatter file
- 不 **Format whole flash**


Smart Phone Flash Tool(Runtime Trace Mode)
File
Options
Window
Help
Welcome
Format
Download
Readback
Memory Test
Download
Stop
choose
choose
choose
MT6765
Owner: Fuguo.Liu
Chip Info
EMMC Flash

Download-Agent: C:\Users\mtk07417\Desktop\20180103_cervino_SP_Flash_Tool\MTK_AllInOne_DA.bin

Scatter-loading File: \\MSZSWGLX61\disk61\mvg_share\MVG_Common_bin\MT6765\3D\NV\MT6765_Android_scatter.txt

Authentication File:

Format All + Download

☑	Name	Begin Address	End Address	Region	Location
☑	preloader	0x0000000000000000	0x000000000003996b	EMMC_BOOT1_BOOT2	\\MSZSWGLX61\disk61\mvg_share\...
☑	recovery	0x0000000000108000	0x0000000001a5d7ff	EMMC_USER	\\MSZSWGLX61\disk61\mvg_share\...
☑	md1img	0x000000000d500000	0x000000001097128f	EMMC_USER	\\MSZSWGLX61\disk61\mvg_share\...
☑	spmfw	0x0000000013900000	0x00000000139087ff	EMMC_USER	\\MSZSWGLX61\disk61\mvg_share\...
☑	scp1	0x0000000013a00000	0x0000000013a229ef	EMMC_USER	\\MSZSWGLX61\disk61\mvg_share\...
☑	scp2	0x0000000013b00000	0x0000000013b229ef	EMMC_USER	\\MSZSWGLX61\disk61\mvg_share\...
☑	sspm_1	0x0000000013c00000	0x0000000013c5abff	EMMC_USER	\\MSZSWGLX61\disk61\mvg_share\...
☑	sspm_2	0x0000000013d00000	0x0000000013d5abff	EMMC_USER	\\MSZSWGLX61\disk61\mvg_share\...
☑	lk	0x0000000019e00000	0x0000000019e9609f	EMMC_USER	\\MSZSWGLX61\disk61\mvg_share\...
☑	lk2	0x0000000019f00000	0x0000000019f9609f	EMMC_USER	\\MSZSWGLX61\disk61\mvg_share\...
☑	boot	0x000000001a000000	0x000000001b3ab7ff	EMMC_USER	\\MSZSWGLX61\disk61\mvg_share\...
☑	logo	0x000000001c000000	0x000000001c17bccf	EMMC_USER	\\MSZSWGLX61\disk61\mvg_share\...

Chip Name: MT6765
Chip Version: 0x0000ca00
Ext Clock: EXT_26M
Extern RAM Type: DRAM
Extern RAM Size: 0x30000000

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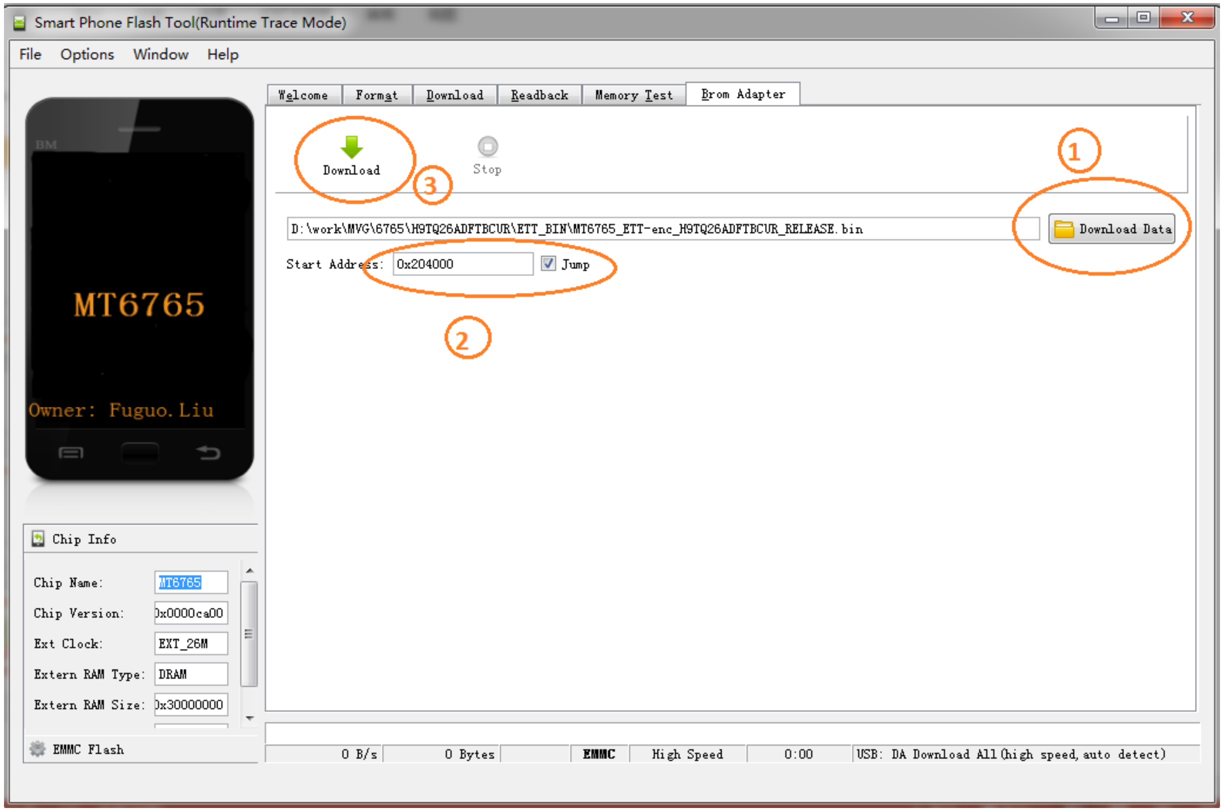
ETT (7/12)

- **Step7:** Ctrl+Alt+A flash tool brom Adapter→ ETT bin→ start address(**0x204000**)→ Jump→ download


Smart Phone Flash Tool(Runtime Trace Mode)
File
Options
Window
Help
Welcome
Format
Download
Readback
Memory Test
Brom Adapter
Download
Stop
Download Data
MT6765
Owner: Fuguo. Liu
Chip Info
EMMC Flash
①
②
③

D:\work\MVG\6765\H9TQ26ADFTBCUR\ETT_BIN\MT6765_ETT-enc_H9TQ26ADFTBCUR_RELEASE.bin

Start Address: 0x204000 ☑ Jump

Chip Name: MT6765
Chip Version: 0x0000ca00
Ext Clock: EXT_26M
Extern RAM Type: DRAM
Extern RAM Size: 0x30000000

0 B/s | 0 Bytes | EMMC | High Speed | 0:00 | USB: DA Download All(high speed, auto detect)

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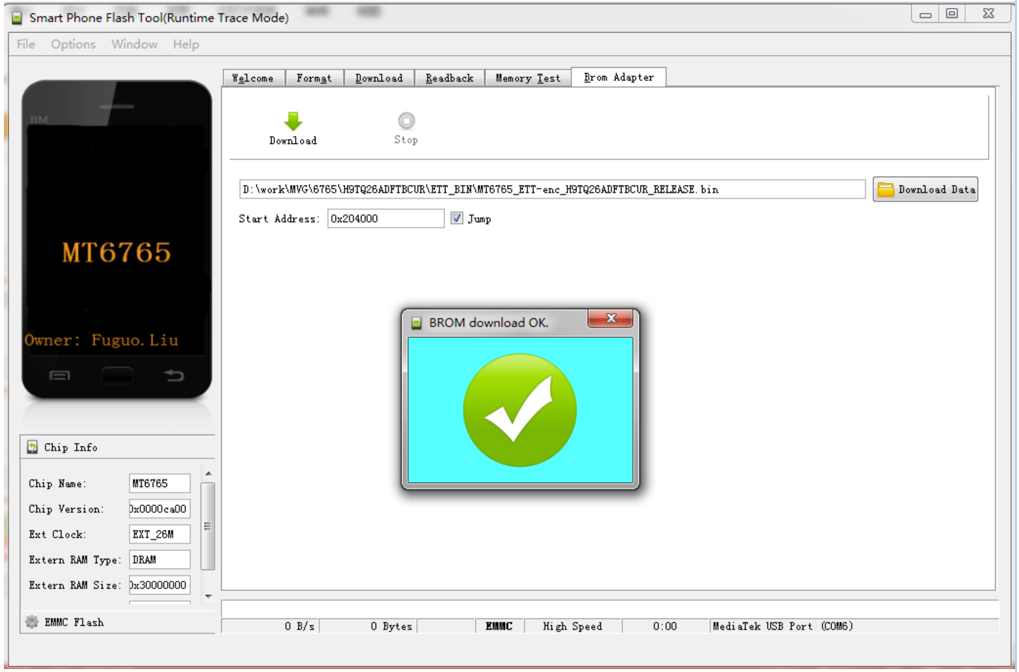
ETT (8/12)

- **Step8:** USB ETT bin不 →

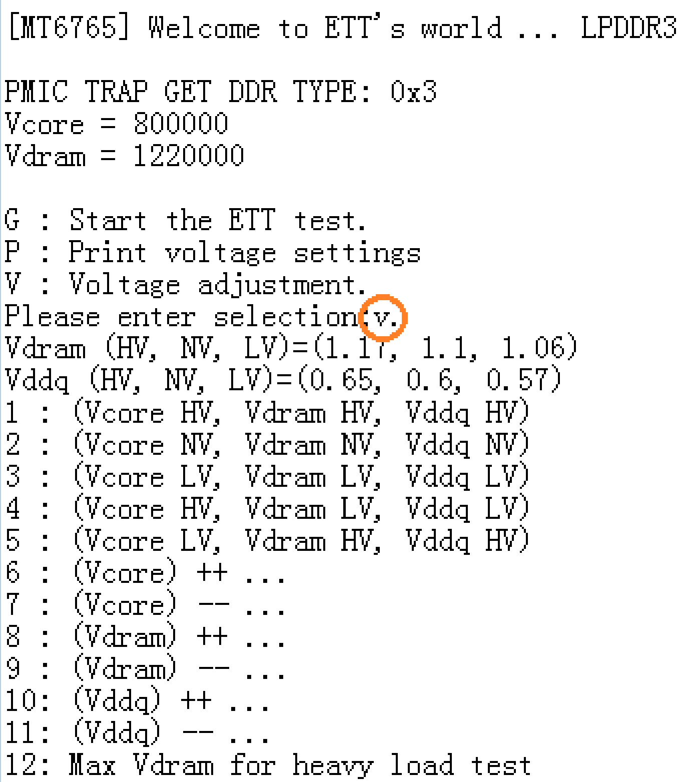

Smart Phone Flash Tool(Runtime Trace Mode)
File
Options
Window
Help
Welcome
Format
Download
Readback
Memory Test
Brom Adapter
Download
Stop
Download Data
MT6765
Owner: Fuguo. Liu
Chip Info
EMMC Flash
BROM download OK.

D:\work\MVG\6765\H9TQ26ADFTBCUR\ETT_BIN\MT6765_ETT-enc_H9TQ26ADFTBCUR_RELEASE.bin

Start Address: 0x204000 ☑ Jump

Chip Name: MT6765
Chip Version: 0x0000ca00
Ext Clock: EXT_26M
Extern RAM Type: DRAM
Extern RAM Size: 0x30000000

0 B/s | 0 Bytes | EMMC | High Speed | 0:00 | MediaTek USB Port (COM6)



```
[MT6765] Welcome to ETT's world ... LPDDR3

PMIC TRAP GET DDR TYPE: 0x3
Vcore = 800000
Vdram = 1220000

G : Start the ETT test.
P : Print voltage settings
V : Voltage adjustment.
Please enter selection:v.
Vdram (HV, NV, LV)=(1.17, 1.1, 1.06)
Vddq (HV, NV, LV)=(0.65, 0.6, 0.57)
1 : (Vcore HV, Vdram HV, Vddq HV)
2 : (Vcore NV, Vdram NV, Vddq NV)
3 : (Vcore LV, Vdram LV, Vddq LV)
4 : (Vcore HV, Vdram LV, Vddq LV)
5 : (Vcore LV, Vdram HV, Vddq HV)
6 : (Vcore) ++ ...
7 : (Vcore) -- ...
8 : (Vdram) ++ ...
9 : (Vdram) -- ...
10: (Vddq) ++ ...
11: (Vddq) -- ...
12: Max Vdram for heavy load test
```

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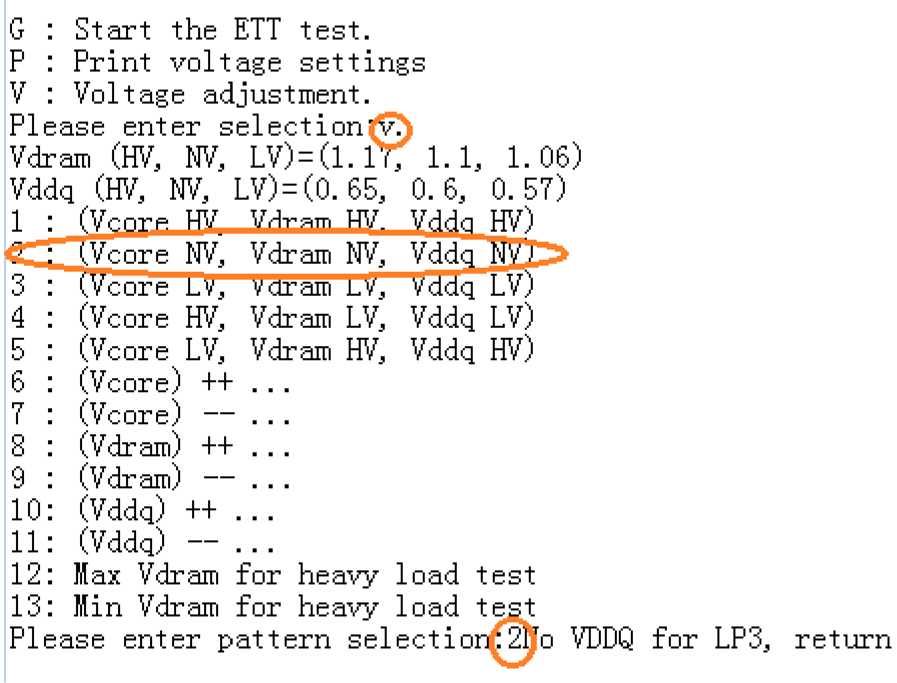
ETT (9/12)

- Step9. (HV, NV, LV) **Step11**

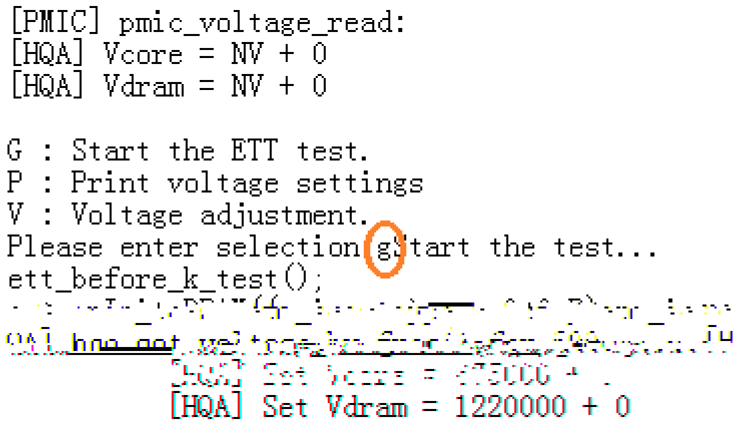
三



```
G : Start the ETT test.
P : Print voltage settings
V : Voltage adjustment.
Please enter selection:v.
Vdram (HV, NV, LV)=(1.17, 1.1, 1.06)
Vddq (HV, NV, LV)=(0.65, 0.6, 0.57)
1 : (Vcore HV, Vdram HV, Vddq HV)
2 : (Vcore NV, Vdram NV, Vddq NV)
3 : (Vcore LV, Vdram LV, Vddq LV)
4 : (Vcore HV, Vdram LV, Vddq LV)
5 : (Vcore LV, Vdram HV, Vddq HV)
6 : (Vcore) ++ ...
7 : (Vcore) -- ...
8 : (Vdram) ++ ...
9 : (Vdram) -- ...
10: (Vddq) ++ ...
11: (Vddq) -- ...
12: Max Vdram for heavy load test
13: Min Vdram for heavy load test
Please enter pattern selection:2No VDDQ for LP3, return
```

ETT (10/12)

- **Step10:** G ETT



```
[PMIC] pmic_voltage_read:
[HQA] Vcore = NV + 0
[HQA] Vdram = NV + 0

G : Start the ETT test.
P : Print voltage settings
V : Voltage adjustment.
Please enter selection g Start the test...
ett_before_k_test();
[illegible]
[illegible]
                    [HQA] Set Vcore = [illegible]
                    [HQA] Set Vdram = 1220000 + 0
```

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ETT (11/12)

- **Step11:**ETT ETT log log
  不 三 Vcore,Vmem, Vddq
  20mV

For LPDDR4X 3200MHz

Condition	Temperature (°C)	Vcore (V)	Vm (V)	Vddq(V)
HTLV	65	0.75625	1.09	0.58
NTNV	25	0.80	1.12	0.6
LTHV	-20	0.84375	1.17	0.65

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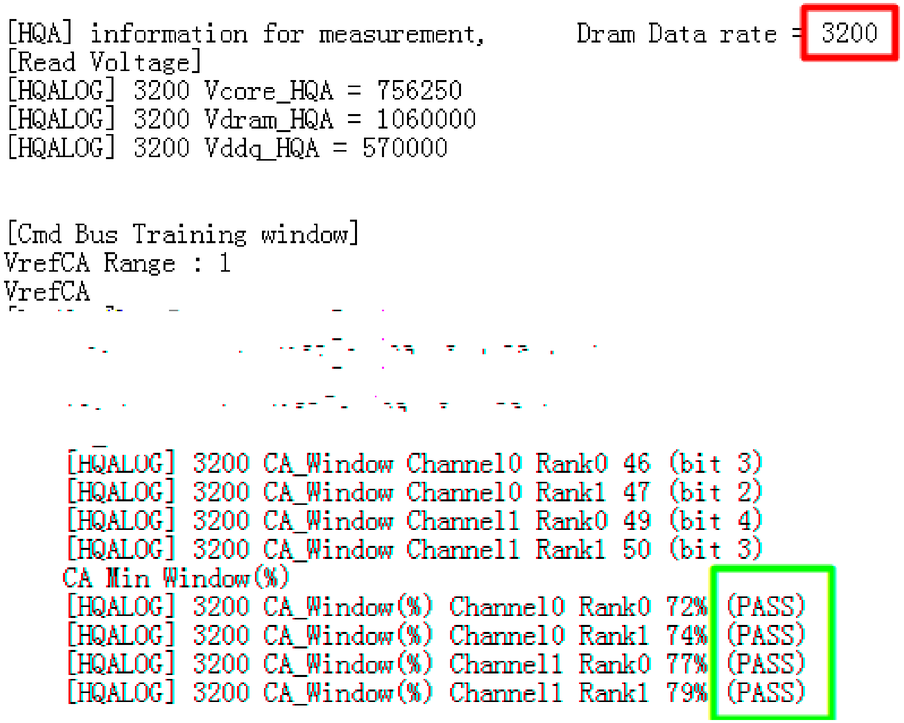
ETT (12/12)

Step12 ETT pass 3200 fail pass ETT



```
[HQA] information for measurement,      Dram Data rate = 3200
[Read Voltage]
[HQALOG] 3200 Vcore_HQA = 756250
[HQALOG] 3200 Vdram_HQA = 1060000
[HQALOG] 3200 Vddq_HQA = 570000


[Cmd Bus Training window]
VrefCA Range : 1
VrefCA
[illegible]

    [HQALOG] 3200 CA_Window Channel0 Rank0 46 (bit 3)
    [HQALOG] 3200 CA_Window Channel0 Rank1 47 (bit 2)
    [HQALOG] 3200 CA_Window Channel1 Rank0 49 (bit 4)
    [HQALOG] 3200 CA_Window Channel1 Rank1 50 (bit 3)
    CA Min Window(%)
    [HQALOG] 3200 CA_Window(%) Channel0 Rank0 72% (PASS)
    [HQALOG] 3200 CA_Window(%) Channel0 Rank1 74% (PASS)
    [HQALOG] 3200 CA_Window(%) Channel1 Rank0 77% (PASS)
    [HQALOG] 3200 CA_Window(%) Channel1 Rank1 79% (PASS)
```

ETT log ETT pass
停NTNV HTLV LTHV下 ETT log
parsetool ETT out

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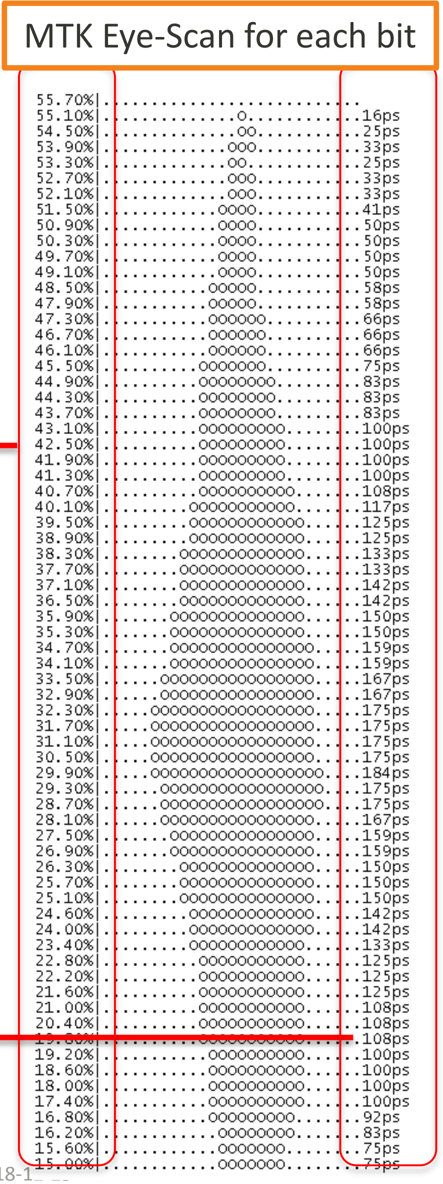
MTK EYE-SCAN FUNCTION

ETT 务 (1/2)

MT6765_62 ETT LP4X 务

- 务 LPDDR4X memory
  LPDDR3
- 务 Vref
  DQ 住 别pass
  0
  务 不



MTK Eye-Scan for each bit

```
55.70%|...........................
55.10%|..............o............16ps
54.50%|..............oo...........25ps
53.90%|.............ooo...........33ps
53.30%|.............oo............25ps
52.70%|.............ooo...........33ps
52.10%|.............ooo...........33ps
51.50%|............oooo...........41ps
50.90%|............oooo...........50ps
50.30%|............oooo...........50ps
49.70%|............oooo...........50ps
49.10%|............oooo...........50ps
48.50%|...........ooooo...........58ps
47.90%|...........ooooo...........58ps
47.30%|...........oooooo..........66ps
46.70%|...........oooooo..........66ps
46.10%|...........oooooo..........66ps
45.50%|..........ooooooo..........75ps
44.90%|..........oooooooo.........83ps
44.30%|..........oooooooo.........83ps
43.70%|..........oooooooo.........83ps
43.10%|..........ooooooooo........100ps
42.50%|..........ooooooooo........100ps
41.90%|..........ooooooooo........100ps
41.30%|..........ooooooooo........100ps
40.70%|..........oooooooooo.......108ps
40.10%|.........ooooooooooo.......117ps
39.50%|.........oooooooooooo......125ps
38.90%|.........oooooooooooo......125ps
38.30%|........ooooooooooooo......133ps
37.70%|........ooooooooooooo......133ps
37.10%|........ooooooooooooo......142ps
36.50%|........ooooooooooooo......142ps
35.90%|.......oooooooooooooo......150ps
35.30%|.......oooooooooooooo......150ps
34.70%|.......ooooooooooooooo.....159ps
34.10%|.......ooooooooooooooo.....159ps
33.50%|......oooooooooooooooo.....167ps
32.90%|......oooooooooooooooo.....167ps
32.30%|.....ooooooooooooooooo.....175ps
31.70%|.....ooooooooooooooooo.....175ps
31.10%|.....ooooooooooooooooo.....175ps
30.50%|.....ooooooooooooooooo.....175ps
29.90%|.....oooooooooooooooooo....184ps
29.30%|......ooooooooooooooooo....175ps
28.70%|......ooooooooooooooooo....175ps
28.10%|......oooooooooooooooo.....167ps
27.50%|.......ooooooooooooooo.....159ps
26.90%|.......ooooooooooooooo.....159ps
26.30%|........oooooooooooooo.....150ps
25.70%|........oooooooooooooo.....150ps
25.10%|........oooooooooooooo.....150ps
24.60%|.........ooooooooooooo.....142ps
24.00%|.........ooooooooooooo.....142ps
23.40%|.........oooooooooooo......133ps
22.80%|..........ooooooooooo......125ps
22.20%|..........ooooooooooo......125ps
21.60%|..........ooooooooooo......125ps
21.00%|..........ooooooooooo......108ps
20.40%|..........ooooooooooo......108ps
19.80%|..........ooooooooooo......108ps
19.20%|...........oooooooooo......100ps
18.60%|...........oooooooooo......100ps
18.00%|...........oooooooooo......100ps
17.40%|...........oooooooooo......100ps
16.80%|...........ooooooooo.......92ps
16.20%|............oooooooo.......83ps
15.60%|............ooooooo........75ps
15.00%|............ooooooo........75ps
```

VREF Setting

PASS timing window

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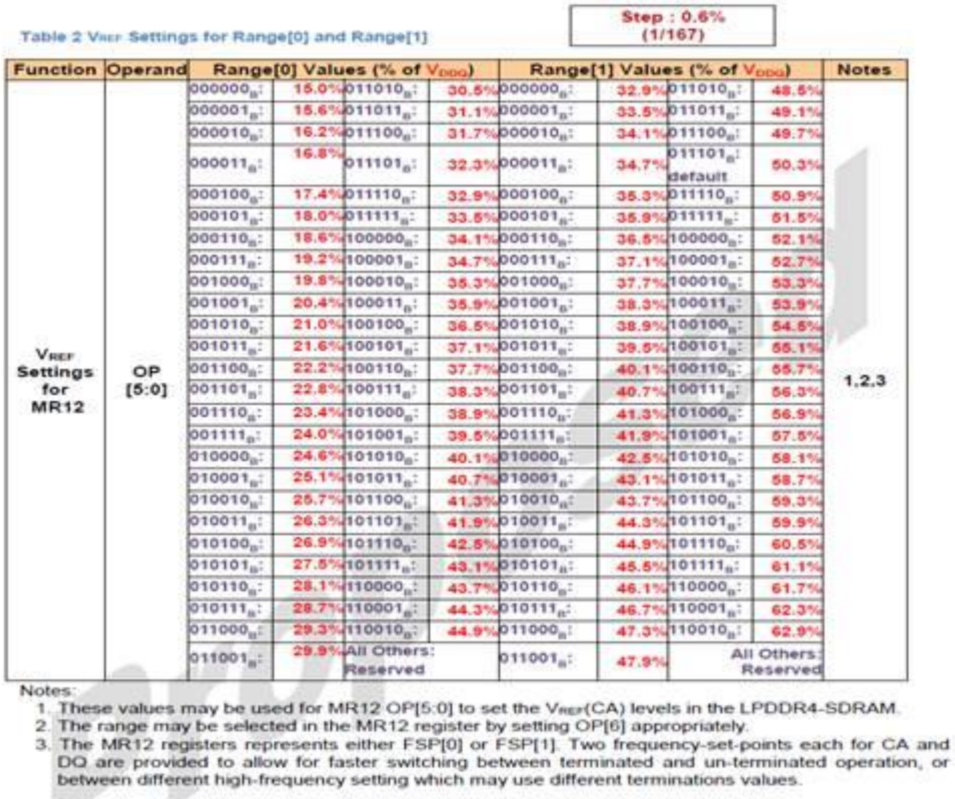
ETT 务 (2/2) FAQ

-
  → debug
  dram SI 不 Eye Scan (5)
  Debug 1. Eye 2. 后 停
  bit/byte 后
- 10.
  → Vref 住 Vref
  不 DQ pass window Vref JEDEC 之
  JEDEC Vref Setting table for LP4X



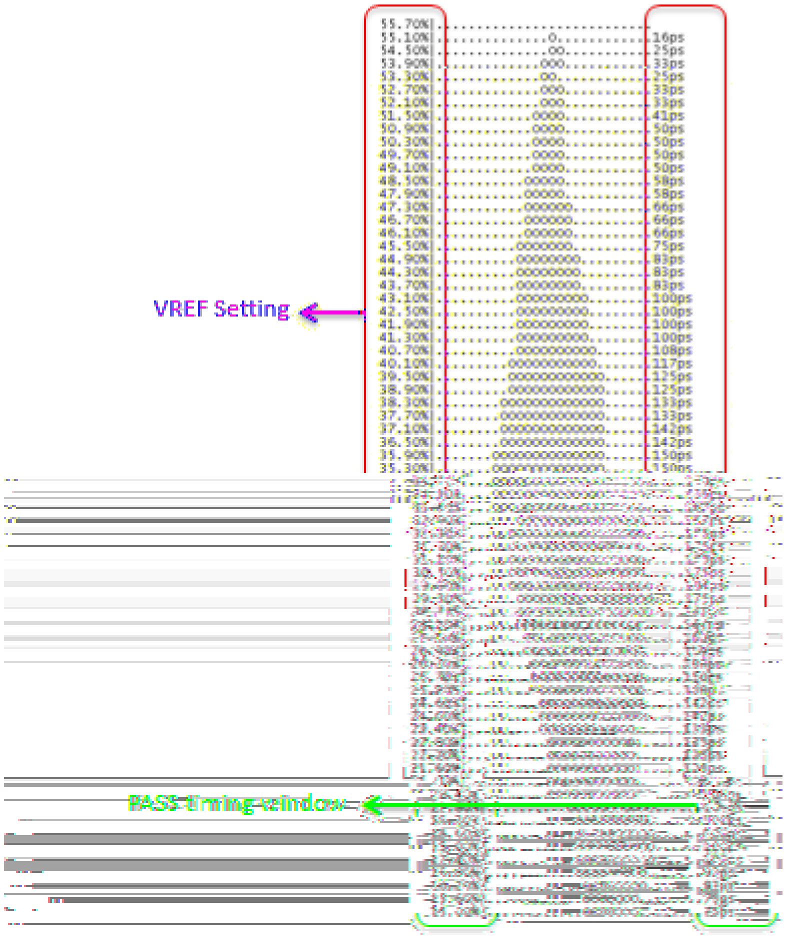
Step : 0.6%
(1/167)

Table 2 V_{REF} Settings for Range[0] and Range[1]

Function	Operand	Range[0] Values (% of V_{DDQ})				Range[1] Values (% of V_{DDQ})				Notes
V_{REF} Settings for MR12	OP [5:0]	000000_B:	15.0%	011010_B:	30.5%	000000_B:	32.9%	011010_B:	48.5%	1,2,3
		000001_B:	15.6%	011011_B:	31.1%	000001_B:	33.5%	011011_B:	49.1%	
		000010_B:	16.2%	011100_B:	31.7%	000010_B:	34.1%	011100_B:	49.7%	
		000011_B:	16.8%	011101_B:	32.3%	000011_B:	34.7%	011101_B: default	50.3%	
		000100_B:	17.4%	011110_B:	32.9%	000100_B:	35.3%	011110_B:	50.9%	
		000101_B:	18.0%	011111_B:	33.5%	000101_B:	35.9%	011111_B:	51.5%	
		000110_B:	18.6%	100000_B:	34.1%	000110_B:	36.5%	100000_B:	52.1%	
		000111_B:	19.2%	100001_B:	34.7%	000111_B:	37.1%	100001_B:	52.7%	
		001000_B:	19.8%	100010_B:	35.3%	001000_B:	37.7%	100010_B:	53.3%	
		001001_B:	20.4%	100011_B:	35.9%	001001_B:	38.3%	100011_B:	53.9%	
		001010_B:	21.0%	100100_B:	36.5%	001010_B:	38.9%	100100_B:	54.5%	
		001011_B:	21.6%	100101_B:	37.1%	001011_B:	39.5%	100101_B:	55.1%	
		001100_B:	22.2%	100110_B:	37.7%	001100_B:	40.1%	100110_B:	55.7%	
		001101_B:	22.8%	100111_B:	38.3%	001101_B:	40.7%	100111_B:	56.3%	
		001110_B:	23.4%	101000_B:	38.9%	001110_B:	41.3%	101000_B:	56.9%	
		001111_B:	24.0%	101001_B:	39.5%	001111_B:	41.9%	101001_B:	57.5%	
		010000_B:	24.6%	101010_B:	40.1%	010000_B:	42.5%	101010_B:	58.1%	
		010001_B:	25.1%	101011_B:	40.7%	010001_B:	43.1%	101011_B:	58.7%	
		010010_B:	25.7%	101100_B:	41.3%	010010_B:	43.7%	101100_B:	59.3%	
		010011_B:	26.3%	101101_B:	41.9%	010011_B:	44.3%	101101_B:	59.9%	
		010100_B:	26.9%	101110_B:	42.5%	010100_B:	44.9%	101110_B:	60.5%	
		010101_B:	27.5%	101111_B:	43.1%	010101_B:	45.5%	101111_B:	61.1%	
		010110_B:	28.1%	110000_B:	43.7%	010110_B:	46.1%	110000_B:	61.7%	
		010111_B:	28.7%	110001_B:	44.3%	010111_B:	46.7%	110001_B:	62.3%	
		011000_B:	29.3%	110010_B:	44.9%	011000_B:	47.3%	110010_B:	62.9%	
		011001_B:	29.9%	All Others: Reserved		011001_B:	47.9%	All Others: Reserved		

Notes:
1. These values may be used for MR12 OP[5:0] to set the V_{REF}(CA) levels in the LPDDR4-SDRAM.
2. The range may be selected in the MR12 register by setting OP[6] appropriately.
3. The MR12 registers represents either FSP[0] or FSP[1]. Two frequency-set-points each for CA and DQ are provided to allow for faster switching between terminated and un-terminated operation, or between different high-frequency setting which may use different terminations values.

MTK Eye-Scan for each bit


55.70%
55.10% 16ps
54.50% 25ps
53.90% 33ps
53.30% 25ps
52.70% 33ps
52.10% 33ps
51.50% 41ps
50.90% 50ps
50.30% 50ps
49.70% 50ps
49.10% 50ps
48.50% 58ps
47.90% 58ps
47.30% 66ps
46.70% 66ps
46.10% 66ps
45.50% 75ps
44.90% 83ps
44.30% 83ps
43.70% 83ps
43.10% 100ps
42.50% 100ps
41.90% 100ps
41.30% 100ps
40.70% 108ps
40.10% 117ps
39.50% 125ps
38.90% 125ps
38.30% 133ps
37.70% 133ps
37.10% 142ps
36.50% 142ps
35.90% 150ps
35.30% 150ps
VREF Setting
PASS timing window

DRAM STRESS TEST STEP BY STEP

MT6765_62 DRAM Stress Test

- Stress Test PMIC
- 不 NTNV HTLV LTHV 下
  preloader bin preloader bin
- preloder code
- 份 Linux kernel code
- VDD2 VDDQ preloader linux kernel
- Vcore Linux kernel (Vcore DVFS)
- 1.停Memory
  2. root
  build MTK_BUILD_ROOT=yes

Note ENG userdebug user

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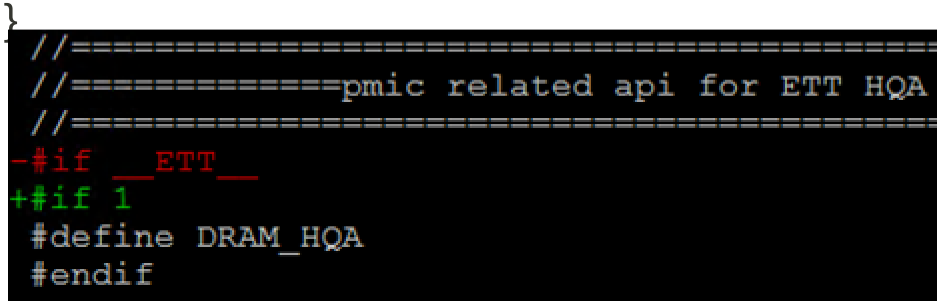
MT6765_62 DRAM Stress Test SW Configuration Android preloader

- D }] (Ç^ vendor/mediatek/proprietary/bootable/bootloader/preloader/platform/MT6765/src/drivers/inc/emi.h _

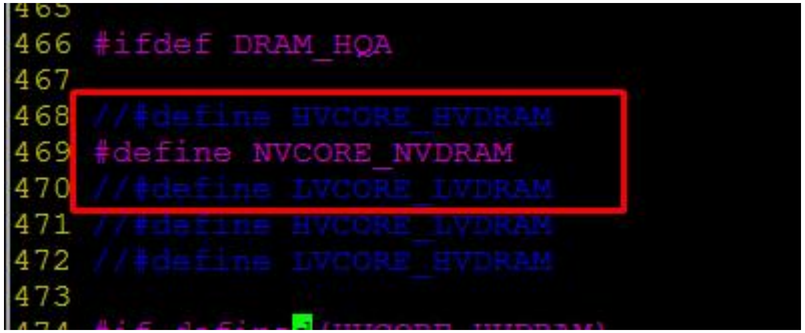
í X v o DRAM ^_HQA _ u Œ }



```
//==========================================
//=============pmic related api for ETT HQA
//==========================================
-#if __ETT__
+#if 1
 #define DRAM_HQA
 #endif
```

2. Select voltage condition

  - HVCORE_HVDRAM / NVCORE_NVDRAM / LVCORE_LVDRAM
  - The 3 macros are exclusive for each other, please enable just one macro for each voltage condition.



```
#ifdef DRAM_HQA

//#define HVCORE_HVDRAM
#define NVCORE_NVDRAM
//#define LVCORE_LVDRAM
//#define HVCORE_LVDRAM
//#define LVCORE_HVDRAM

```

MT6765_62 Stress Test 1/3

- DRAM 不 停Stress test.
- MT6765_62 3D TEST ETT stress test Vcore 不 Vcore 住

For LPDDR4X :

LP4X	DRAM Data Rate	HV	NV	LV
Vcore	3200(opp1)	0.84375	0.8	0.75625
	2400(opp3)	0.84375	0.8	0.75625
	2400(opp8)	0.7375	0.7	0.6625
	1534(opp10)	0.7375	0.7	0.6625
	1534(opp15)	0.6875	0.65	0.6125
VDRAM(VDD2)		1.17	1.12	1.06
VDDQ		0.65	0.6	0.58

MT6765_62 Stress Test 2/3

后 PMIC run ETT

Stress test 后

Note1: Vcore DVFS Vcore script

Note2: 不 Vcore Vcore

Note3: VDD2 preloader Vcore 住

Note4: download HV / NV / LV preloader bin

Note5: 份 1ms Vcore

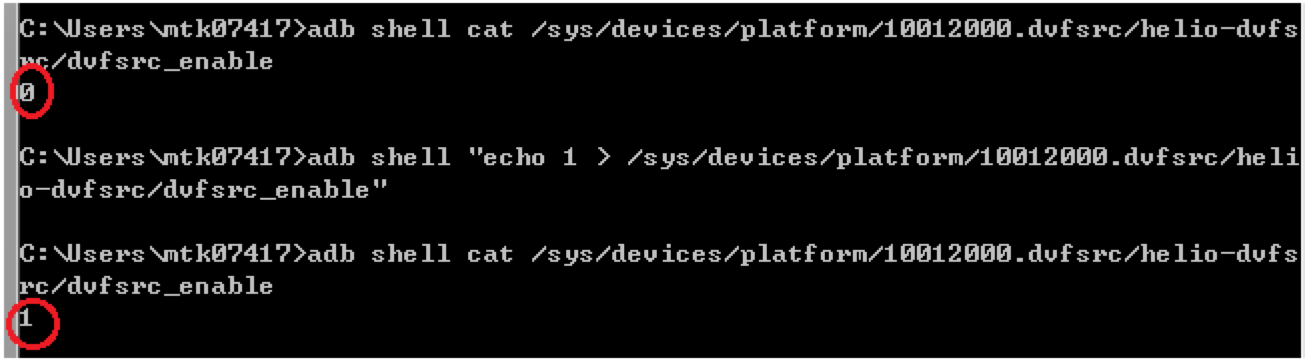
Vcore

1. dvfs 0 1

adb shell cat /sys/devices/platform/10012000.dvfsrc/helio-dvfsrc/dvfsrc_enable--- dvfs

adb shell "echo 1 > /sys/devices/platform/10012000.dvfsrc/helio-dvfsrc/dvfsrc_enable"

------- dvfs

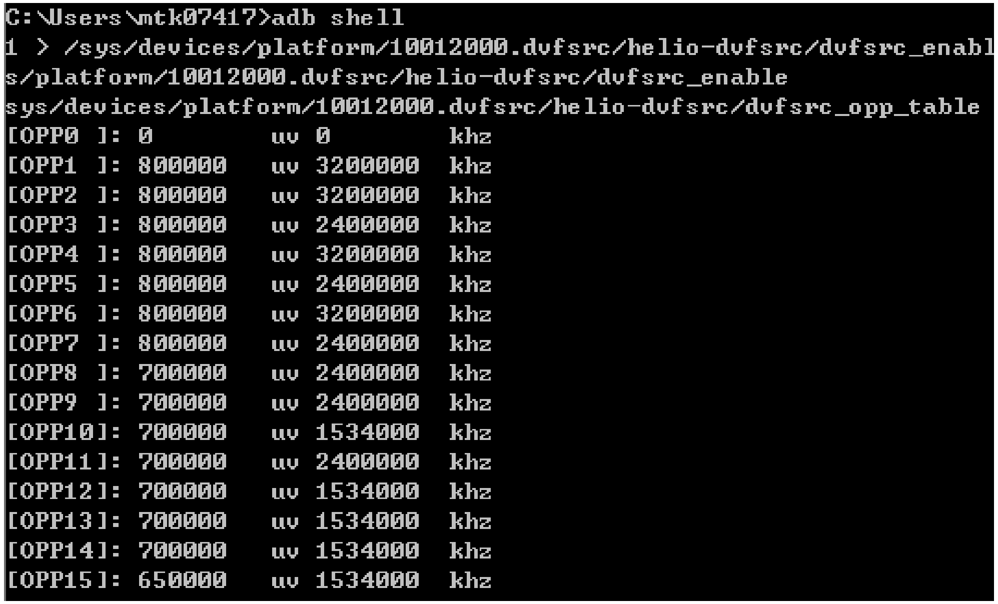


```
C:\Users\mtk07417>adb shell cat /sys/devices/platform/10012000.dvfsrc/helio-dvfs
rc/dvfsrc_enable
0

C:\Users\mtk07417>adb shell "echo 1 > /sys/devices/platform/10012000.dvfsrc/heli
o-dvfsrc/dvfsrc_enable"

C:\Users\mtk07417>adb shell cat /sys/devices/platform/10012000.dvfsrc/helio-dvfs
rc/dvfsrc_enable
1
```

MT6765_62 Stress Test 3/3

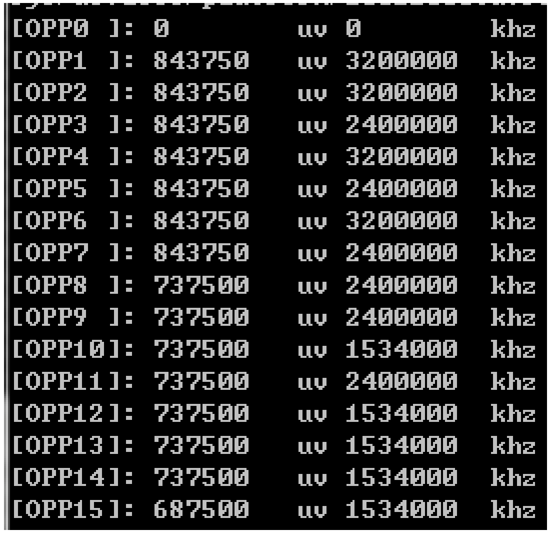
2. vcore DVFS OPP table 不 NV cat OPP13 OPP14 0.675V 0.65V
cat cat

cat /sys/devices/platform/10012000.dvfsrc/helio-dvfsrc/dvfsrc_opp_table



```
C:\Users\mtk07417>adb shell
1 > /sys/devices/platform/10012000.dvfsrc/helio-dvfsrc/dvfsrc_enabl
s/platform/10012000.dvfsrc/helio-dvfsrc/dvfsrc_enable
sys/devices/platform/10012000.dvfsrc/helio-dvfsrc/dvfsrc_opp_table
[OPP0 ]: 0        uv 0        khz
[OPP1 ]: 800000   uv 3200000  khz
[OPP2 ]: 800000   uv 3200000  khz
[OPP3 ]: 800000   uv 2400000  khz
[OPP4 ]: 800000   uv 3200000  khz
[OPP5 ]: 800000   uv 2400000  khz
[OPP6 ]: 800000   uv 3200000  khz
[OPP7 ]: 800000   uv 2400000  khz
[OPP8 ]: 700000   uv 2400000  khz
[OPP9 ]: 700000   uv 2400000  khz
[OPP10]: 700000   uv 1534000  khz
[OPP11]: 700000   uv 2400000  khz
[OPP12]: 700000   uv 1534000  khz
[OPP13]: 700000   uv 1534000  khz
[OPP14]: 700000   uv 1534000  khz
[OPP15]: 650000   uv 1534000  khz
```

3. HV DVFS_Nenamark_Memtester_Script
set_opp_table_HV.bat device id
LV
set_opp_table_LV.bat opp table



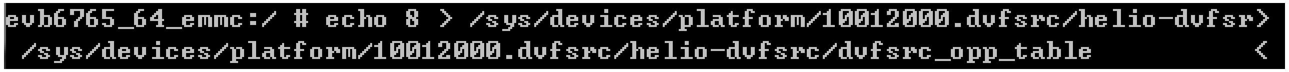
```
[OPP0 ]: 0        uv 0        khz
[OPP1 ]: 843750   uv 3200000  khz
[OPP2 ]: 843750   uv 3200000  khz
[OPP3 ]: 843750   uv 2400000  khz
[OPP4 ]: 843750   uv 3200000  khz
[OPP5 ]: 843750   uv 2400000  khz
[OPP6 ]: 843750   uv 3200000  khz
[OPP7 ]: 843750   uv 2400000  khz
[OPP8 ]: 737500   uv 2400000  khz
[OPP9 ]: 737500   uv 2400000  khz
[OPP10]: 737500   uv 1534000  khz
[OPP11]: 737500   uv 2400000  khz
[OPP12]: 737500   uv 1534000  khz
[OPP13]: 737500   uv 1534000  khz
[OPP14]: 737500   uv 1534000  khz
[OPP15]: 687500   uv 1534000  khz
```

MT6765_62 Stress Test 3/3

4. adb 5 住 住 Vcore 关
5 5 Opp0 Vcore
下 3200,2400,1534 下 0.84375 0.7375,0.6875
1866 0.84375 OPP1 OPP2

echo OPP_ID > /sys/devices/platform/10012000.dvfsrc/helio-dvfsrc/dvfsrc_force_vcore_dvfs_opp

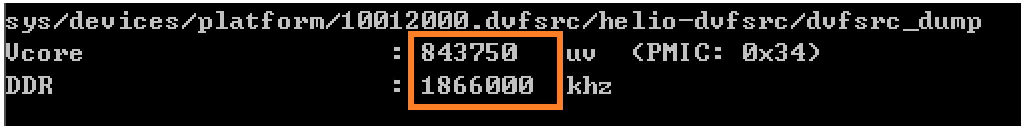
不 HV preload OPP8 0.7375V 不 三 Vcore
0.7375V VDD2 1.12V



```
evb6765_64_emmc:/ # echo 8 > /sys/devices/platform/10012000.dvfsrc/helio-dvfsr>
 /sys/devices/platform/10012000.dvfsrc/helio-dvfsrc/dvfsrc_opp_table          <
```

5. 住 _cat /sys/devices/platform/10012000.dvfsrc/helio-dvfsrc/dvfsrc_dump _

不 catch



```
sys/devices/platform/10012000.dvfsrc/helio-dvfsrc/dvfsrc_dump
Vcore                         : 843750   uv  (PMIC: 0x34)
DDR                           : 1866000  khz
```

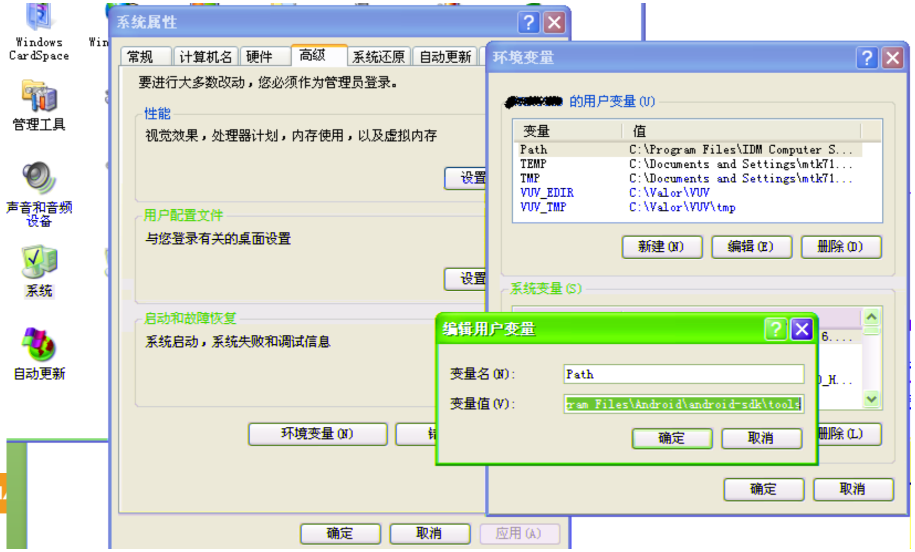
DRAM Stress test 1/8

- **Step1： 1** Only need to do this for once on your PC

Download and install JAVA
- http://www.java.com

Install Android SDK to have ADB.
- http://developer.android.com/sdk/index.html
- Remember to add ADB in your PATH.
  - EX: C:\ path = %path%; YOU_ADB_PATH
  - 变ADB ADB 住 tool 不 monkeyrunner.bat PATH EX ADB D:\Program Files monkeyrunner.bat住 D:\Program Files\Android\android-sdk\tools D:\Program Files\Android\android-sdk\tools PC PATH

Install a python environment to be able to run python programs.
- For example, download Python 2.7.3 Windows Installer (Windows binary -- does not include source) from http://www.python.org/getit/


Windows CardSpace
管理工具
声音和音频设备
系统
自动更新
系统属性
常规
计算机名
硬件
高级
系统还原
自动更新
性能
设置
用户配置文件
设置
启动和故障恢复
环境变量 (N)
确定
取消
应用 (A)
环境变量
新建 (N)
编辑 (E)
删除 (D)
系统变量 (S)
删除 (L)
确定
取消
编辑用户变量
确定
取消

要进行大多数改动，您必须作为管理员登录。

视觉效果，处理器计划，内存使用，以及虚拟内存

与您登录有关的桌面设置

系统启动，系统失败和调试信息

[redacted] 的用户变量 (U)

变量	值
Path	C:\Program Files\IDM Computer S...
TEMP	C:\Documents and Settings\mtk71...
TMP	C:\Documents and Settings\mtk71...
VUV_EDIR	C:\Valor\VUV
VUV_TMP	C:\Valor\VUV\tmp

变量名 (N): Path

变量值 (V): ram Files\Android\android-sdk\tools

控制版面→系统→高级
→环境变量→Path
在原有的路径后面添加
monkeyrunner.bat的路径，用
[illegible]

DRAM Stress test 2/8

- **Step2. 2**
  - **Test_Tools.rar**
  - Test_Tools
  - adb, SP_Driver_V2.0

Note1. MOL不 MTK_MVG_TOOLs.rar,

Note2. Test_Tools reboot_script DVFS_Nenamark_Memtester_Script suspend_and_DVFS script OA

Stess Test **UART log**

DRAM Stress test 3/8

- **Step3. load (HTLV/LTHV/NTNV),不**
  不
- **→ → →30**
- **→Developer options→stay awake**
- **Step4. MTK mobile log**

: Nenamark , ,
, MD wifi

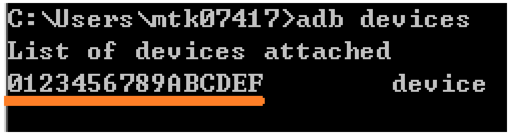
DRAM Stress test (4/8)

- **Step5. device id**

eo eo 不

c d gxkeg

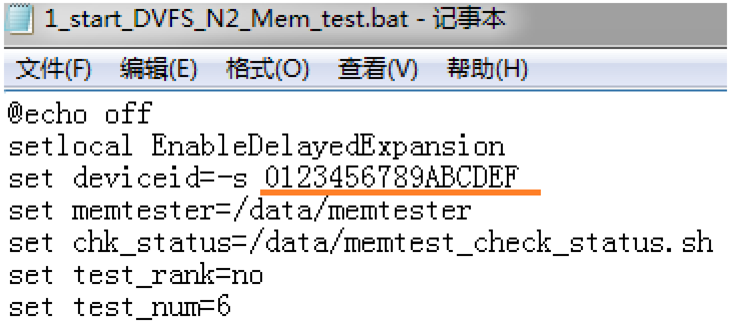
gxkeg k 不 23456789 CDEF 2



```
C:\Users\mtk07417>adb devices
List of devices attached
0123456789ABCDEF        device
```

F UaPgpcoctmaogovg va etkrvaNRFFT6 vctvaF UaP4a goavg v dcv

gv gxkegk 2 gxkeg k . 不 .

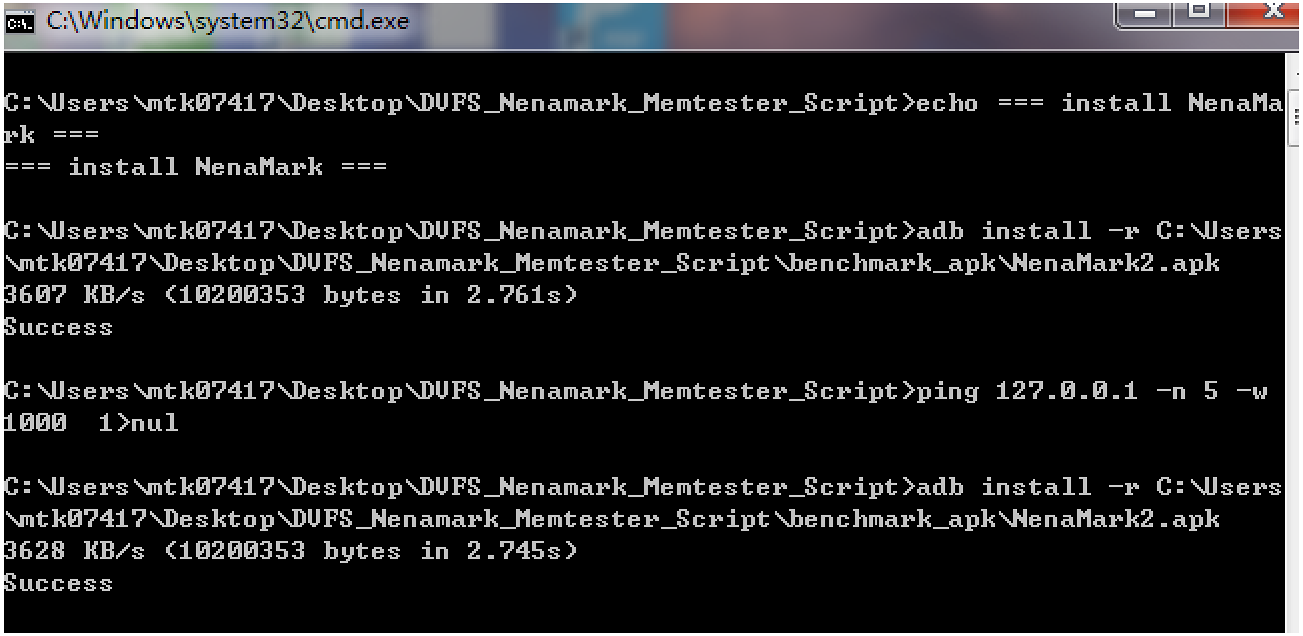


1_start_DVFS_N2_Mem_test.bat - 记事本
文件(F) 编辑(E) 格式(O) 查看(V) 帮助(H)

```
@echo off
setlocal EnableDelayedExpansion
set deviceid=-s 0123456789ABCDEF
set memtester=/data/memtester
set chk_status=/data/memtest_check_status.sh
set test_rank=no
set test_num=6
```

DRAM Stress test (5/8)

- **Step6. Install_Nenamark2.bat**


C:\Windows\system32\cmd.exe

```
C:\Users\mtk07417\Desktop\DVFS_Nenamark_Memtester_Script>echo === install NenaMa
rk ===
=== install NenaMark ===

C:\Users\mtk07417\Desktop\DVFS_Nenamark_Memtester_Script>adb install -r C:\Users
\mtk07417\Desktop\DVFS_Nenamark_Memtester_Script\benchmark_apk\NenaMark2.apk
3607 KB/s (10200353 bytes in 2.761s)
Success

C:\Users\mtk07417\Desktop\DVFS_Nenamark_Memtester_Script>ping 127.0.0.1 -n 5 -w
1000  1>nul

C:\Users\mtk07417\Desktop\DVFS_Nenamark_Memtester_Script>adb install -r C:\Users
\mtk07417\Desktop\DVFS_Nenamark_Memtester_Script\benchmark_apk\NenaMark2.apk
3628 KB/s (10200353 bytes in 2.745s)
Success
```

NenaMark2 , choose what to
allow NenaMark2 to access 的 , continue Nenamark2
run 3D

[redacted]

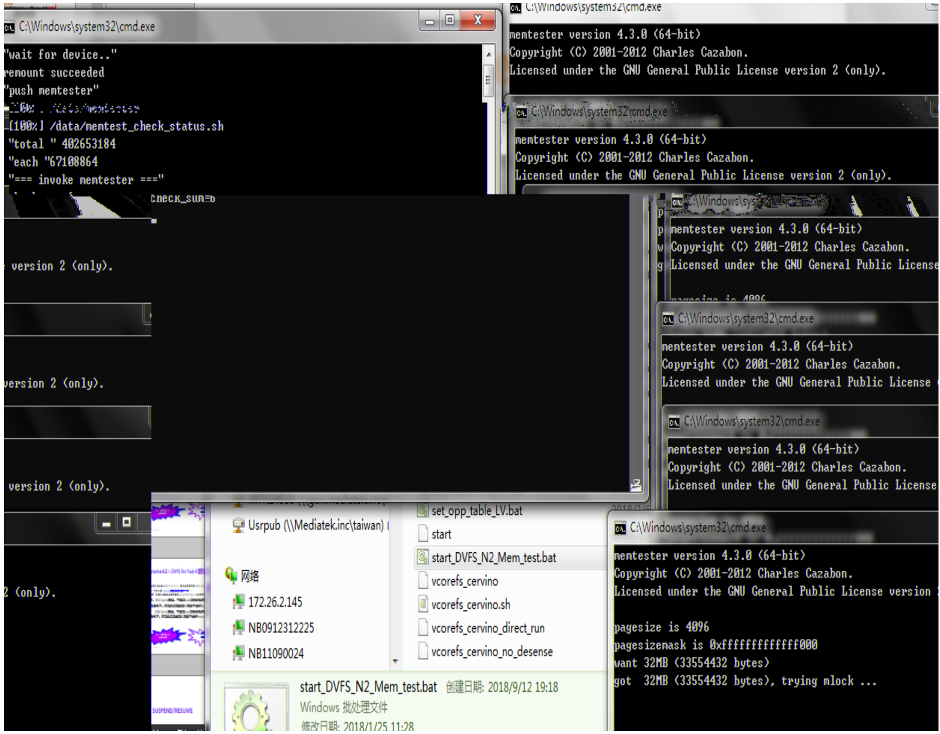
DRAM Stress test (7/8)

- Step9. 停HV set_opp_table_HV.bat HV OPP table
- 停LV set_opp_table_LV.bat LV OPP table
- 停NV OPP table

device id

- Step10: adb shell
- sh /data/run.sh &
- Step11: adb shell
- sh /data/vcorefs_cervino.sh &
- Step12:

DVFS_Nenamark_memtest_script_LPDDR4
start_DVFS_N2_Mem_test.bat
n ,后 3D
, 3D run
display the x and y point.pdf



C:\Windows\system32\cmd.exe
Usrpub (\\Mediatek.inc\taiwan)
网络
172.26.2.145
NB0912312225
NB11090024
set_opp_table_LV.bat
start
start_DVFS_N2_Mem_test.bat
vcorefs_cervino
vcorefs_cervino.sh
vcorefs_cervino_direct_run
vcorefs_cervino_no_desense
start_DVFS_N2_Mem_test.bat 创建日期: 2018/9/12 19:18
Windows 批处理文件
修改日期: 2018/1/25 11:28

```
"wait for device.."
remount succeeded
"push memtester"
[100%] /data/memtest_check_status.sh
"total " 402653184
"each "67108864
"=== invoke memtester ==="
check_sum=b
```

```
memtester version 4.3.0 (64-bit)
Copyright (C) 2001-2012 Charles Cazabon.
Licensed under the GNU General Public License version 2 (only).
```

```
memtester version 4.3.0 (64-bit)
Copyright (C) 2001-2012 Charles Cazabon.
Licensed under the GNU General Public License version 2 (only).

pagesize is 4096
pagesizemask is 0xfffffffffffff000
want 32MB (33554432 bytes)
got  32MB (33554432 bytes), trying mlock ...
```

DRAM Stress test (8/8)

- Step13. 三 USB 8 Stress test
- Step14. “ rc ”
- Step15. >3 HTLV\LTHV\NTNV 不 Stress test
- preloader bin, preloader bin, preloader bin.
- download.

New log UART

USB 三

Nenamark2 + DVFS for Fast-K

DRAM Stress test DRAM Stress

Test 后 **Step3** .

Step 3 load (HTLV/LTHV) 关

HTLV fast-k 不 load

不 HT 不 Stress Test

LTHV fast-k 不 load

不 LT 不 Stress Test

New UART

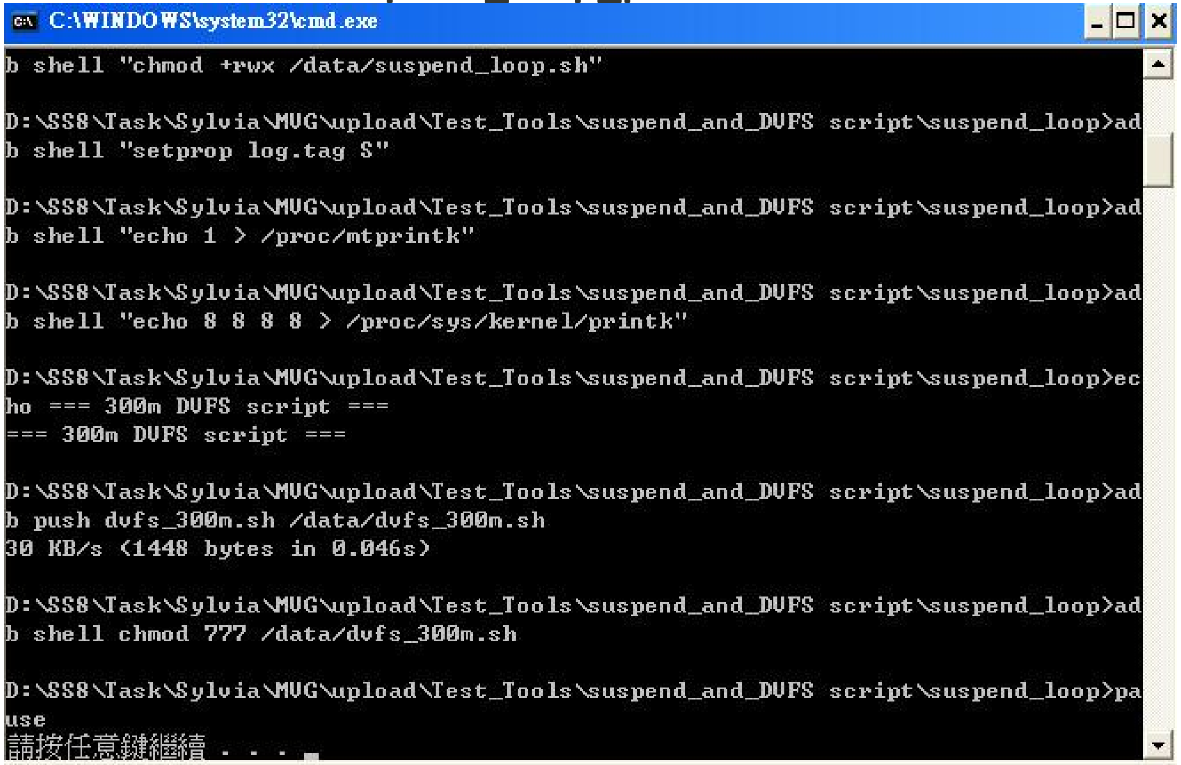
log

USB 三

SUSPEND/RESUME

Suspend/Resume (1/3)

- **Preloader bin** .
- always on MTK mobile log
- **Step1. suspend_loop debug务**
- **Step2. suspend_loop_push.bat** 份



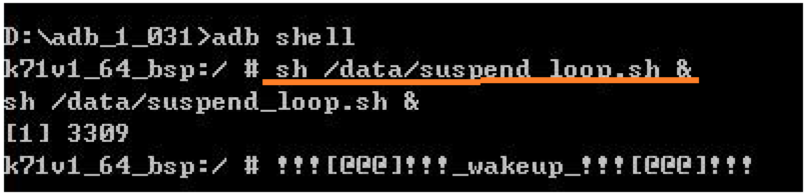
```
b shell "chmod +rwx /data/suspend_loop.sh"

D:\SS8\Task\Sylvia\MVG\upload\Test_Tools\suspend_and_DVFS script\suspend_loop>ad
b shell "setprop log.tag S"

D:\SS8\Task\Sylvia\MVG\upload\Test_Tools\suspend_and_DVFS script\suspend_loop>ad
b shell "echo 1 > /proc/mtprintk"

D:\SS8\Task\Sylvia\MVG\upload\Test_Tools\suspend_and_DVFS script\suspend_loop>ad
b shell "echo 8 8 8 8 > /proc/sys/kernel/printk"

D:\SS8\Task\Sylvia\MVG\upload\Test_Tools\suspend_and_DVFS script\suspend_loop>ec
ho === 300m DVFS script ===
=== 300m DVFS script ===

D:\SS8\Task\Sylvia\MVG\upload\Test_Tools\suspend_and_DVFS script\suspend_loop>ad
b push dvfs_300m.sh /data/dvfs_300m.sh
30 KB/s (1448 bytes in 0.046s)

D:\SS8\Task\Sylvia\MVG\upload\Test_Tools\suspend_and_DVFS script\suspend_loop>ad
b shell chmod 777 /data/dvfs_300m.sh

D:\SS8\Task\Sylvia\MVG\upload\Test_Tools\suspend_and_DVFS script\suspend_loop>pa
use
請按任意鍵繼續 . . .
```

Suspend/Resume (2/3)

- **Step3.** **cmd** 不

  adb shell

  sh /data/suspend_loop.sh &



```
D:\adb_1_031>adb shell
k71v1_64_bsp:/ # sh /data/suspend_loop.sh &
sh /data/suspend_loop.sh &
[1] 3309
k71v1_64_bsp:/ # !!![@@@]!!!_wakeup_!!![@@@]!!!
```

- **Step4.** **usb,** **usb,** **usb,** 下

  power monitor **usb adapter**

  12

New log UART

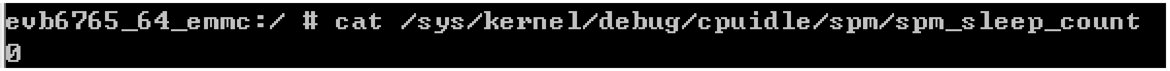
USB

Suspend/Resume (3/3)

- **Step5.** 停 不

  adb shell cat /sys/kernel/debug/cpuidle/spm/spm_sleep_count

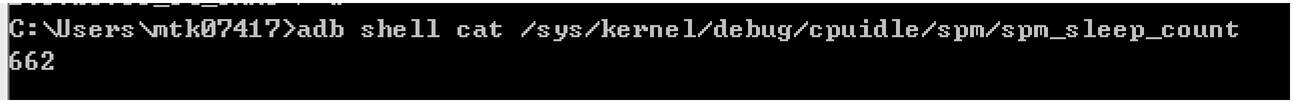
  不 0



```
evb6765_64_emmc:/ # cat /sys/kernel/debug/cpuidle/spm/spm_sleep_count
0
```

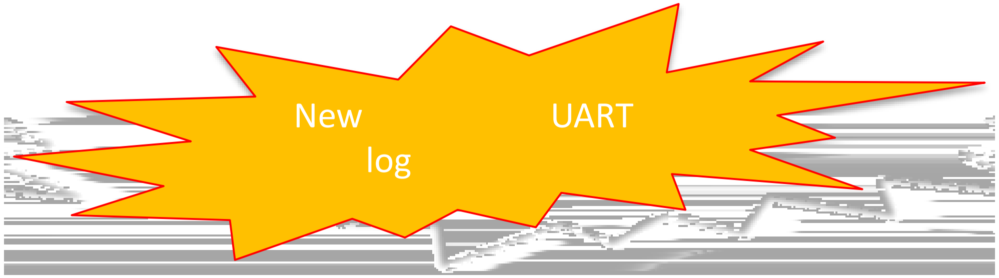
USB USB 不 662

1.USB 2.



```
C:\Users\mtk07417>adb shell cat /sys/kernel/debug/cpuidle/spm/spm_sleep_count
662
```

- **Step6.** “ rc 3 5”
- **Step7.** >3 不



New UART log

USB

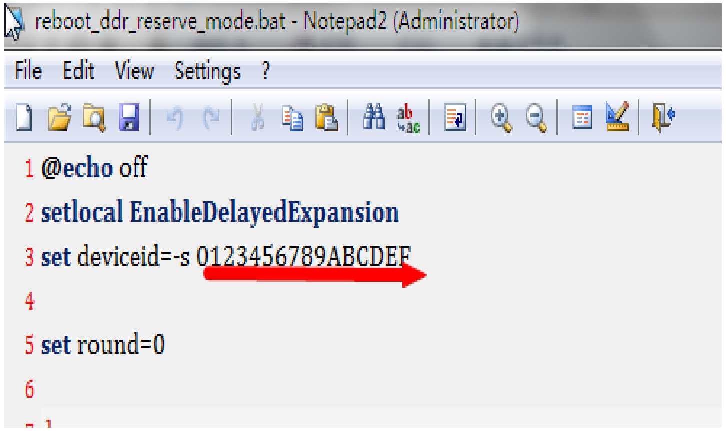
REBOOT
(DDR RESERVE MODE , FULL-K FAST K)

DDR reserve mode Reboot (1/2)

- DDR Reserve mode test DDR reserve mode 务 不 reboot DDR reserve mode reboot DRAM self refresh, reboot DRAM , reboot debug
- **Step1. Preloader bin .**

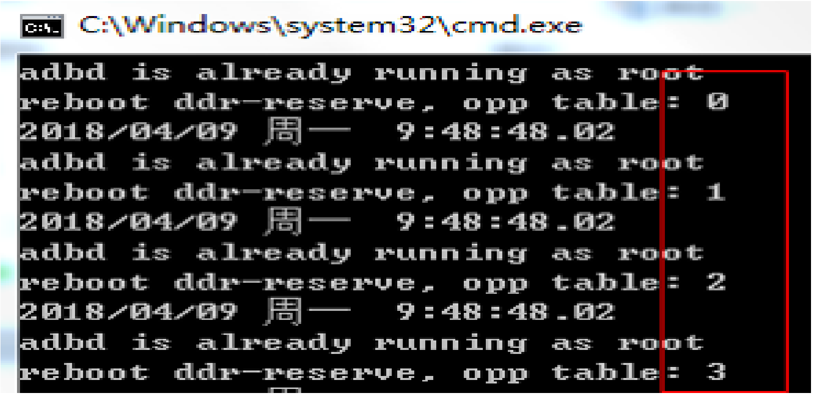
  always on MTK mobile log
- **Step2. reboot_script reboot_ddr_reserve_mode.bat device id id 不 reboot ”reboot with ddr reserve mode”**

  Note:Opp table 16



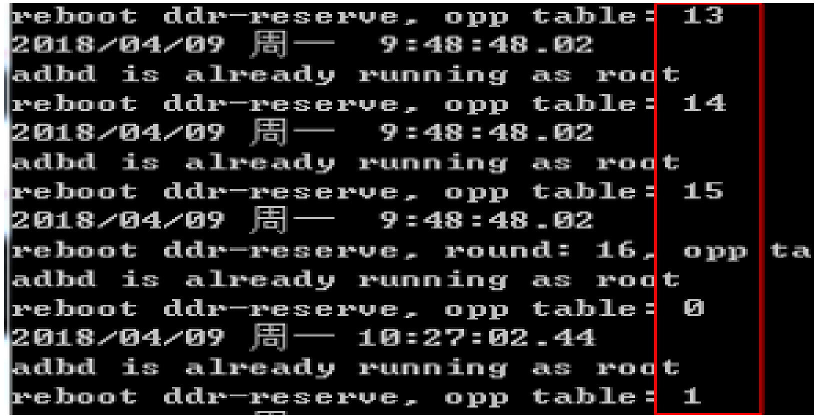
reboot_ddr_reserve_mode.bat - Notepad2 (Administrator)

```
@echo off
setlocal EnableDelayedExpansion
set deviceid=-s 0123456789ABCDEF

set round=0

```



C:\Windows\system32\cmd.exe

```
adbd is already running as root
reboot ddr-reserve, opp table: 0
2018/04/09 周一  9:48:48.02
adbd is already running as root
reboot ddr-reserve, opp table: 1
2018/04/09 周一  9:48:48.02
adbd is already running as root
reboot ddr-reserve, opp table: 2
2018/04/09 周一  9:48:48.02
adbd is already running as root
reboot ddr-reserve, opp table: 3
```



```
reboot ddr-reserve, opp table: 13
2018/04/09 周一  9:48:48.02
adbd is already running as root
reboot ddr-reserve, opp table: 14
2018/04/09 周一  9:48:48.02
adbd is already running as root
reboot ddr-reserve, opp table: 15
2018/04/09 周一  9:48:48.02
reboot ddr-reserve, round: 16, opp ta
adbd is already running as root
reboot ddr-reserve, opp table: 0
2018/04/09 周一 10:27:02.44
adbd is already running as root
reboot ddr-reserve, opp table: 1
```

DDR reserve mode Reboot (2/2)

- **Step4.** UART log UART log UART log ,
  下 **12**
- **Step5.** “ rc 3 5”
- **Step6.** CTV n i CTV n i . n i kng Urnkvvgt 不 n i

- **Fail** ^[RGU] WDT DDR reserve mode FAIL! _
- RCUU ^DDR RESERVED ^ 不log pass

```
[RGU] WDT DDR reserve mode success! 1387F1
[DDR Reserve] DCS/DVFSRC success! (dcs_en=0, dvfsrc_en=1)
[RGU] WDT DDR reserve mode success! 1387F1
[RGU] DDR RESERVE Success 1
[DDR Reserve] release dram from self-refresh PASS!
```

- **Step7.** **>3** **不reboot**

URART LOG

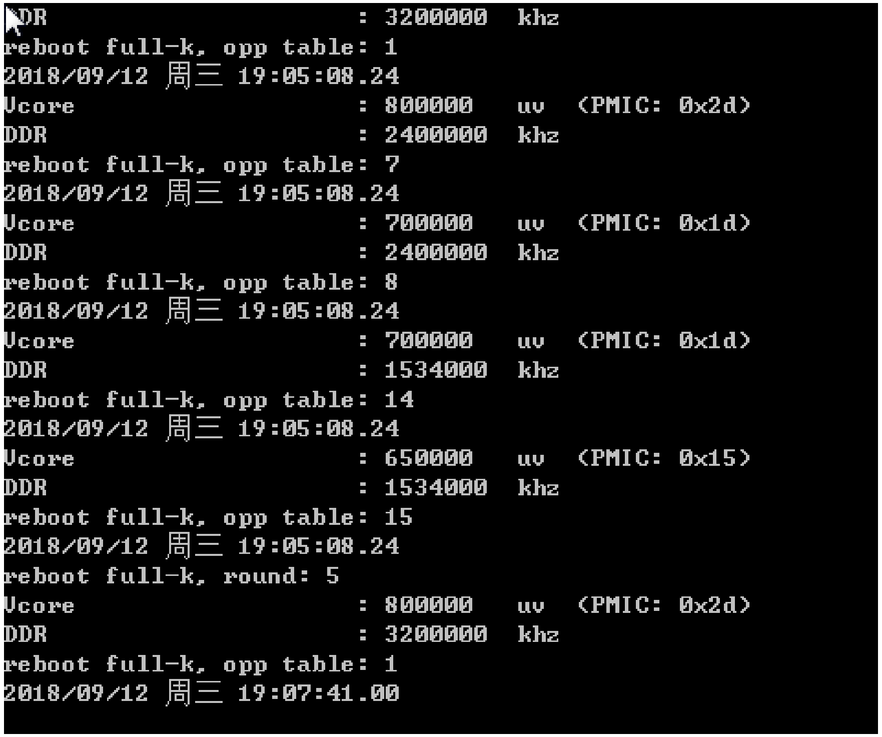
USB 三

Full-K Reboot (1/2)

- **Step1. Preloader full k bin.**
- **Full k bin**
- 1 #define DRAM_HQA
- 2: dramc_pi_api.h
- #define SUPPORT_SAVE_TIME_FOR_CALIBRATION CFG_DRAM_CALIB_OPTIMIZATION
- #define SUPPORT_SAVE_TIME_FOR_CALIBRATION 0

Step 2. always on MTK mobile log

- **Step3. reboot_full_k.bat device id**
- **id**

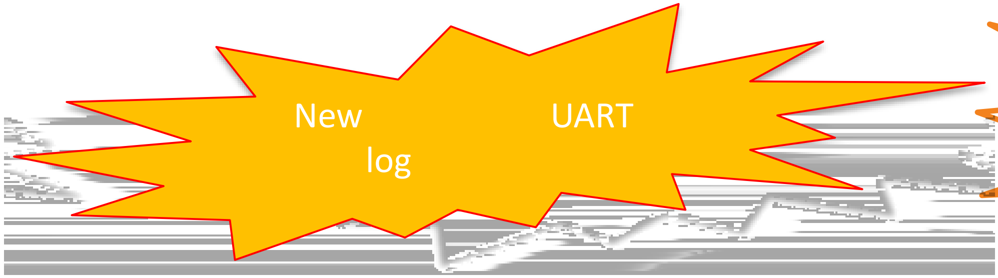


```
DDR                           : 3200000   khz
reboot full-k, opp table: 1
2018/09/12 周三 19:05:08.24
Vcore                         : 800000    uv   (PMIC: 0x2d)
DDR                           : 2400000   khz
reboot full-k, opp table: 7
2018/09/12 周三 19:05:08.24
Vcore                         : 700000    uv   (PMIC: 0x1d)
DDR                           : 2400000   khz
reboot full-k, opp table: 8
2018/09/12 周三 19:05:08.24
Vcore                         : 700000    uv   (PMIC: 0x1d)
DDR                           : 1534000   khz
reboot full-k, opp table: 14
2018/09/12 周三 19:05:08.24
Vcore                         : 650000    uv   (PMIC: 0x15)
DDR                           : 1534000   khz
reboot full-k, opp table: 15
2018/09/12 周三 19:05:08.24
reboot full-k, round: 5
Vcore                         : 800000    uv   (PMIC: 0x2d)
DDR                           : 3200000   khz
reboot full-k, opp table: 1
2018/09/12 周三 19:07:41.00
```

- Note1: Full k 5
- Note2 device id

Full-K Reboot (2/2)

- **Step4. opp table** 住
- **12**
- **Step5.** “ rc 3 5”
- **Step6.** **>3** **不reboot**


New UART
log

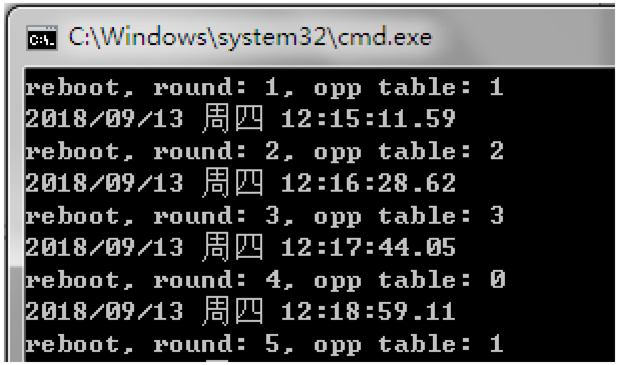
USB 三

Fast-k Reboot (1/2)

- **LPDDR4 LPDDR3 停 Preloader bin LV bin**
  不
- Fast-k Stress test 不 不
- Step1. reboot_script reboot_fast_K.bat device id
  id

Fast-k Reboot (2/2)

- Step2. reboot_fast_K.bat 12



```
reboot, round: 1, opp table: 1
2018/09/13 周四 12:15:11.59
reboot, round: 2, opp table: 2
2018/09/13 周四 12:16:28.62
reboot, round: 3, opp table: 3
2018/09/13 周四 12:17:44.05
reboot, round: 4, opp table: 0
2018/09/13 周四 12:18:59.11
reboot, round: 5, opp table: 1
```

- Step3. “ pass ”
- Step4. UART log UART log n i kng Urnkvvgt 不 n i

  Fail ^Save calibration result to emmc _

  PASS ^Bypass saving calibration result to emmc ^

- Step5. >3 NT 不reboot

Note Fail PASS , code, log

URART LOG

USB 三

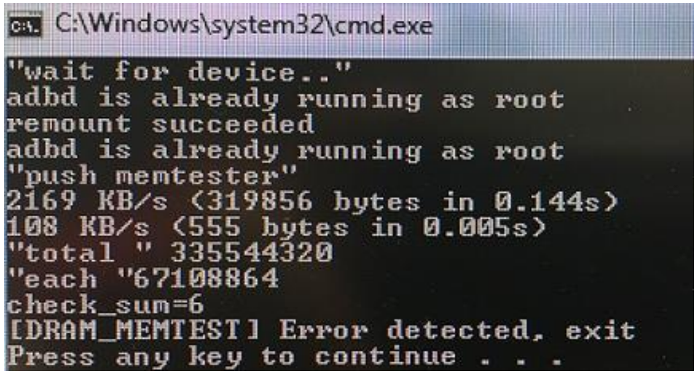
PASS

pass (1/3)

1. N

2. memtester memtester memtester
不 fail

memtester Error detected 不



```
"wait for device.."
adbd is already running as root
remount succeeded
adbd is already running as root
"push memtester"
2169 KB/s (319856 bytes in 0.144s)
108 KB/s (555 bytes in 0.005s)
"total " 335544320
"each "67108864
check_sum=6
[DRAM_MEMTEST] Error detected, exit
Press any key to continue . . .
```

collect_memtest_log.bat log memtester fail log
MTK

pass (2/3)

3. 不 不 4 KE,HWT HW_reboot, MEMTEST,

不 份 fail, 3 pass

(1) /data/aee_exp (2) /data/vendor/mtklog/aee_exp

3 份 fail, log MTK

1 cmd

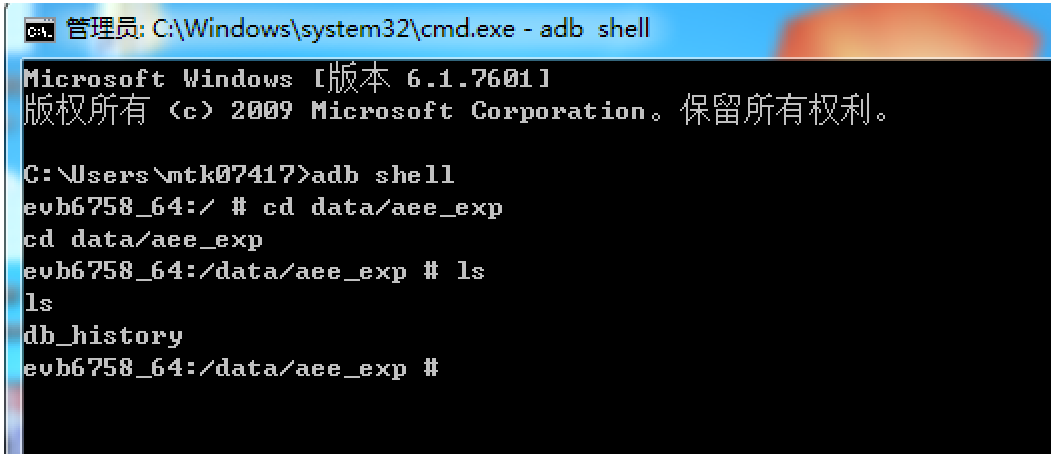
adb shell

cd data/aee_exp

ls

aee_exp

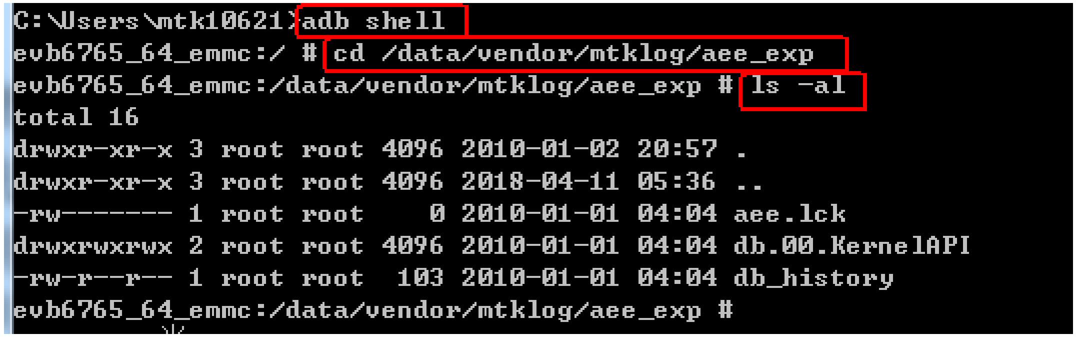
4



```
Microsoft Windows [版本 6.1.7601]
版权所有 (c) 2009 Microsoft Corporation。保留所有权利。

C:\Users\mtk07417>adb shell
evb6758_64:/ # cd data/aee_exp
cd data/aee_exp
evb6758_64:/data/aee_exp # ls
ls
db_history
evb6758_64:/data/aee_exp #
```

pass (3/3)

2 不 /data/vendor/mtklog/aee_exp KE/HWT/HW_Reboot/ DB db pull_log.bat pull MTK



```
C:\Users\mtk10621>adb shell
evb6765_64_emmc:/ # cd /data/vendor/mtklog/aee_exp
evb6765_64_emmc:/data/vendor/mtklog/aee_exp # ls -al
total 16
drwxr-xr-x 3 root root 4096 2010-01-02 20:57 .
drwxr-xr-x 3 root root 4096 2018-04-11 05:36 ..
-rw------- 1 root root    0 2010-01-01 04:04 aee.lck
drwxrwxrwx 2 root root 4096 2010-01-01 04:04 db.00.KernelAPI
-rw-r--r-- 1 root root  103 2010-01-01 04:04 db_history
evb6765_64_emmc:/data/vendor/mtklog/aee_exp #
```

aee_exp pull MTK

1. D 1 mtklog
2. pull_log.bat mtklog usb 不 pull_log.bat log mtklog MTK

- ETT BIN 不
  → 停Format whole flash Jump, Address 不Download key.
-
  → UART cable 1.8V, log. UART cable 双
-
  → UART RX, TX GND
- ETT
  →
- adb
  → ADB 双 务
- APK
  → APK
- eMMC R/W
  → 32bit 64bit,
- Power KEY
  → -> ->30

NTNV/LTHV 3D HTLV Log
Thermal

停 PA Thermal ADC
65 不停 PCB 100
Thermal NTC 停

况
1. NTC 10K
2.
3. Thermal Throttling 务 不 1 2
4. LTE Thermal Throttling 不 3

Mobile Log Log
LTE Throttling LTE throttling LTE
Throttling AP Throttling (不 3

How To Modify Thermal Policy

- thermal throttling 不

(1)User sw load thermal throttling

(a) Get root permission

(b) adb shell "/system/bin/thermal_manager /etc/.tp/.ht120.mtc" (for Android M)
adb shell "/vendor/bin/thermal_manager /vendor/etc/.tp/.ht120.mtc"(for Android N)

(c) cat /data/.tp/.settings
/etc/.tp/.ht120.mtc /vendor/etc/.tp/.ht120.mtc代表修改成功

(2)Eng sw load thermal throttling

(a) 不others-thermal thermal policy high temp 120deg c, apply

(b) adb shell "/system/bin/thermal_manager /etc/.tp/.ht120.mtc" (for Android M)
adb shell "/vendor/bin/thermal_manager /vendor/etc/.tp/.ht120.mtc"(for Android N)

(c) cat /data/.tp/.settings
/etc/.tp/.ht120.mtc /vendor/etc/.tp/.ht120.mtc代表修改成功

(3)僅取消LTE throttling,保留其餘的thermal throttling功能

(a)adb shell "echo 1 120000 0 mtk-cl-shutdown02 0 0 no-cooler 0 0 no-cooler 0 0 no-cooler 0 0 no-cooler 0 0 no-cooler 0 0 no-cooler 0 0 no-cooler 0 0 no-cooler 0 0 no-cooler 1000 > /proc/driver/thermal/tzbtspa ^

(b) cat /proc/driver/thermal/tzbtspa, 如果
cooldev1=mtk-cl-mutt02,cooldev2=mtk-cl-mutt01,cooldev3=mtk-cl-mutt00, 成cooldev1=no-cooler,cooldev2=no-cooler,cooldev3=no-cooler代表修改成功

How to check LTE throttling is triggered?

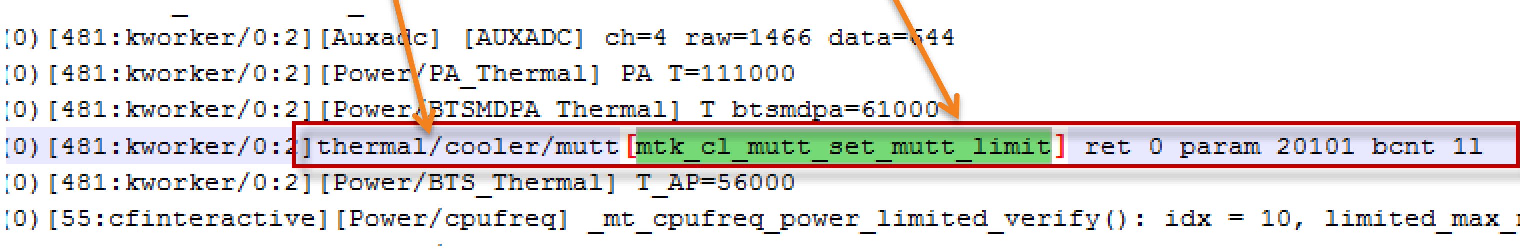
Thermal Mobile Log

- How to Check if LTE throttling is triggered from mobilelog

  searching keyword in kernel_log

  ^ š Z   Œ u   o l   } } o   Œ mtk_cl_mutt_set_mutt_limit _

  If the following log is found, LTE throttling is triggered.



```
(0)[481:kworker/0:2][Auxadc] [AUXADC] ch=4 raw=1466 data=644
(0)[481:kworker/0:2][Power/PA_Thermal] PA T=111000
(0)[481:kworker/0:2][Power/BTSMDPA Thermal] T btsmdpa=61000
(0)[481:kworker/0:2]thermal/cooler/mutt [mtk_cl_mutt_set_mutt_limit] ret 0 param 20101 bcnt 11
(0)[481:kworker/0:2][Power/BTS_Thermal] T_AP=56000
(0)[55:cfinteractive][Power/cpufreq] _mt_cpufreq_power_limited_verify(): idx = 10, limited_max_
```

LTE Thermal Throttling Transceiver 之

Debug

SOP Eservice

MEDIATEK

everyday genius

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