INTERNAL USE

GM 3.0 Low Power Test Notice_V1.0

Wy chuang

Feature List and Comparison MTK Gauge Masters

GM 1.0

- Voltage Based
- +-10% SOC Error
- Dynamic self-adjusting SOC error
- User Experience Enhancement Package

GM 2.0

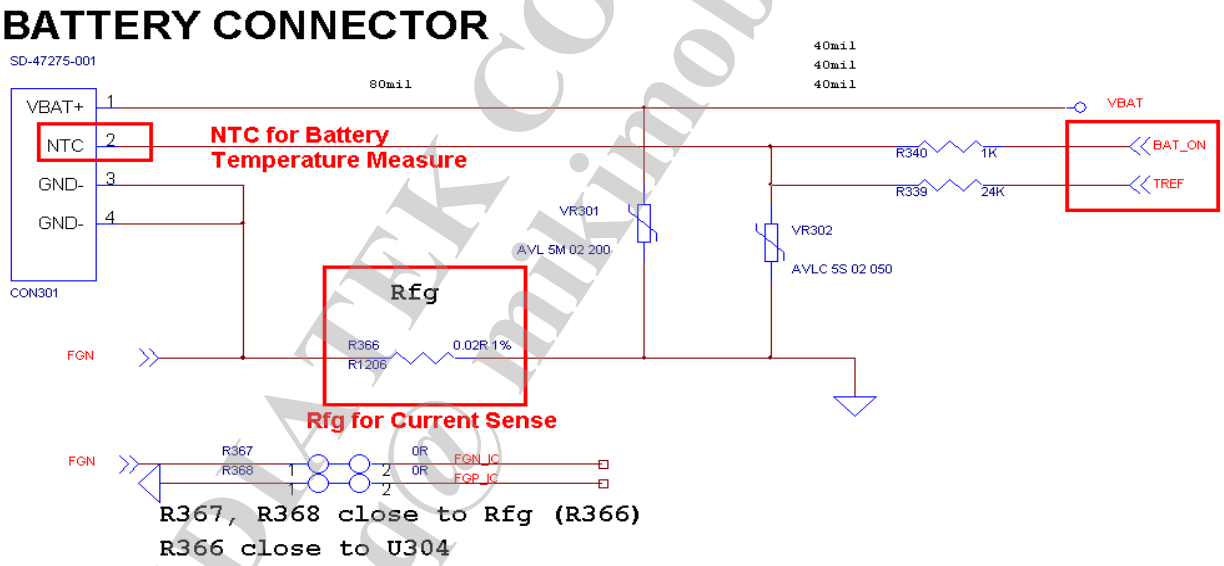
- Coulomb Counter Based
- +-3% SOC Error
- Static self-adjusting SOC error
- User Experience Enhancement Package

GM 3.0

- Coulomb Counter Based+ Voltage Based
- +-1% SOC Error
- Lower power
- Factory Meta tool Cal PCB and Rsense
- Limitation Enhancement

Voltage mode (NAFG) Fuel Gauge

- Voltage mode概念
  - 利用sense VBAT 搭配演算法內建之**電池模型**達到動態誤差追蹤效果, 補償調整SOC error



因此假電池環境測試會與Fuel gauge內建之真電池模型有差異造成演算法誤追蹤而增加系統耗電

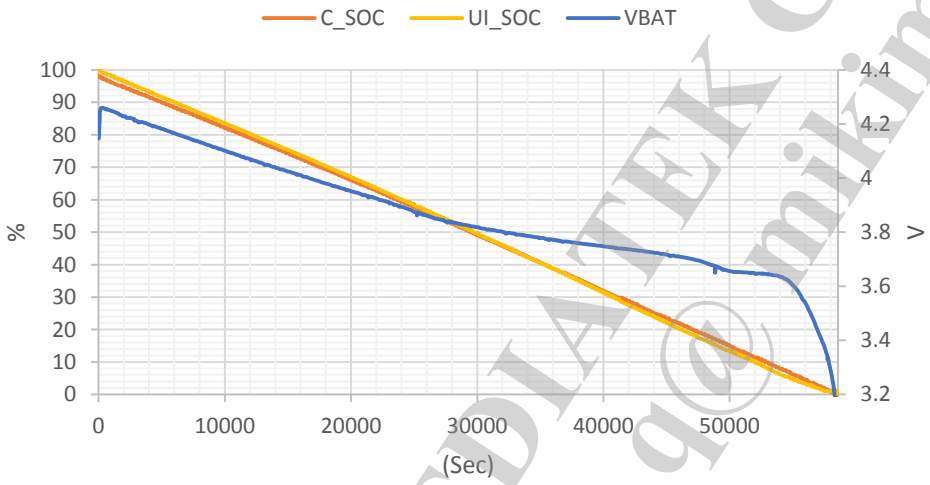
GM3.0 Error compensate and aging compensate test - 1

- Test Condition : 25℃ & Real SOC = 100%

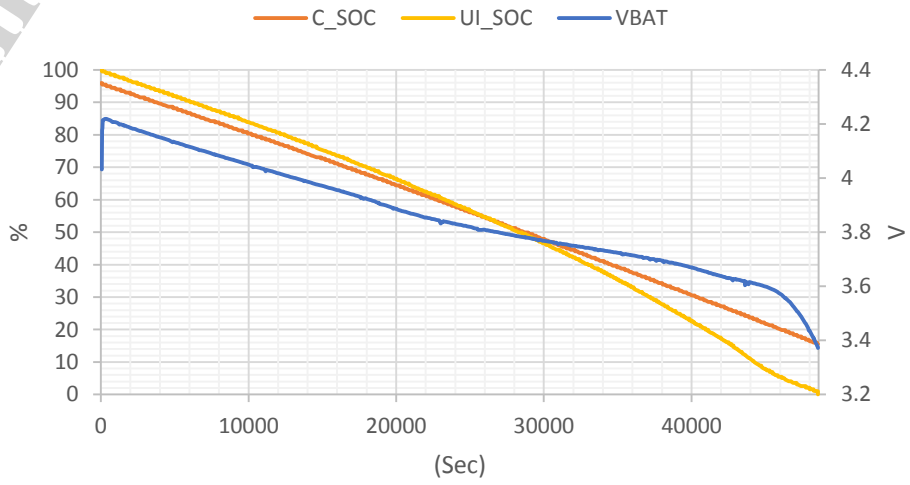
Battery type	UI SOC	Shutdown Voltage
New battery	Smooth to 0%	< 3.4 V
Aging Battery	Smooth to 0%	< 3.4 V

C_SOC is similar to GM2.0

New battery with real 100% discharge



Aging battery with real 100% discharge



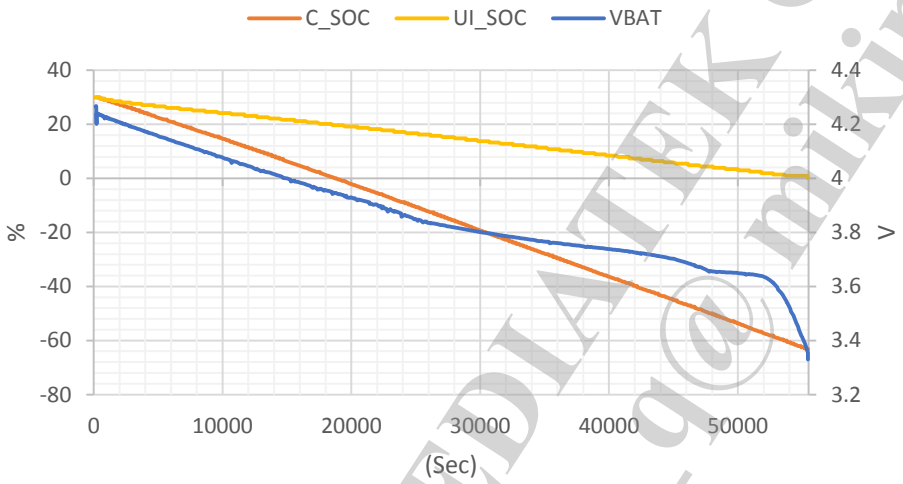
GM3.0 Error compensate and aging compensate test - 2

Test Condition : 25℃ & Real SOC = 100% & Set initial SOC = 30%

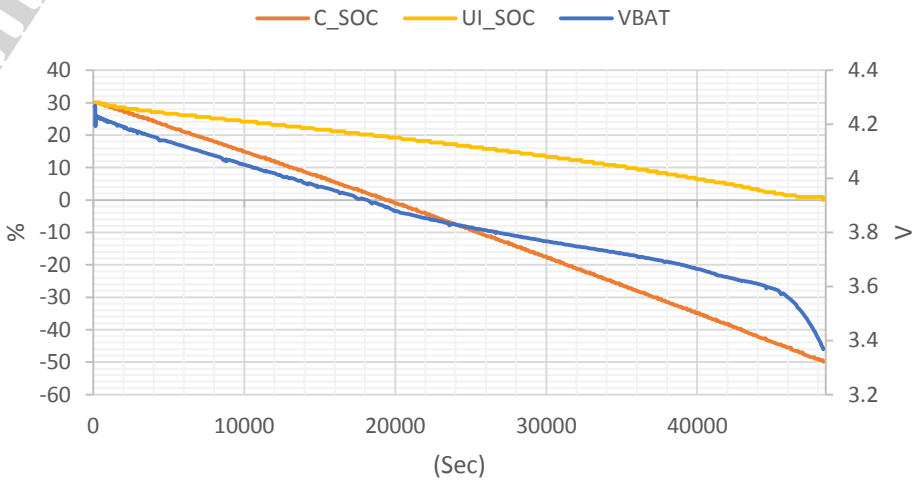
Battery type	UI SOC	Shutdown Voltage
New battery	Smooth to 0%	< 3.4 V
Aging Battery	Smooth to 0%	< 3.4 V

C_SOC is similar to GM2.0

New battery with real 100% / initial 30% discharge



Aging battery with real 100% / initial 30% discharge



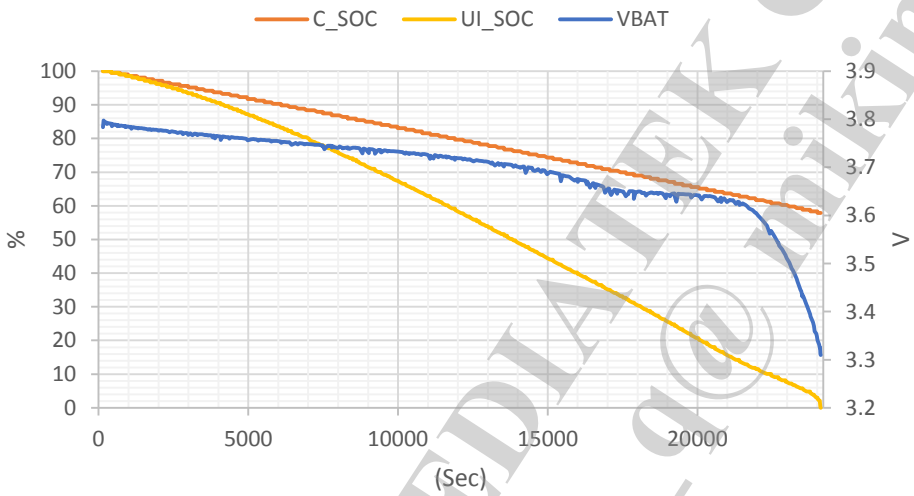
GM3.0 Error compensate and aging compensate test - 3

Test Condition : 25℃ & Real SOC = 40% & Set initial SOC = 100%

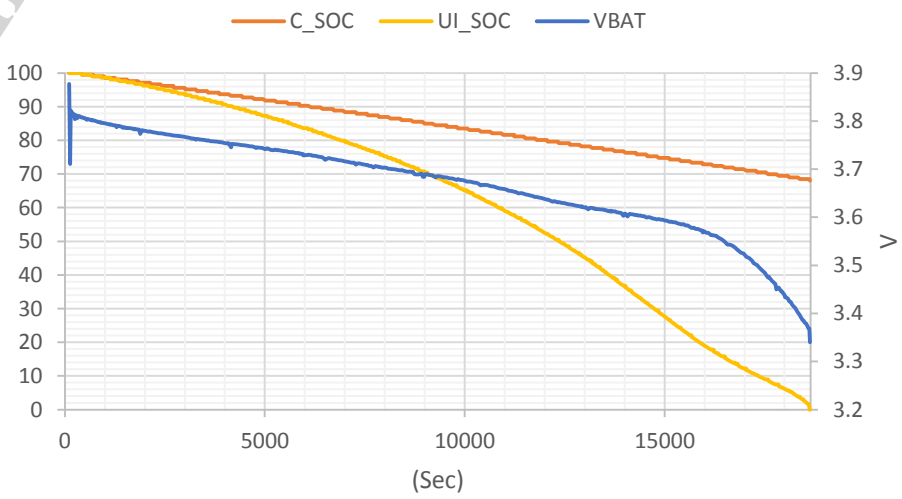
Battery type	UI SOC	Shutdown Voltage
New battery	Smooth to 0%	< 3.4 V
Aging Battery	Smooth to 0%	< 3.4 V

C_SOC is similar to GM2.0

New battery with real 40% / initial 100% discharge

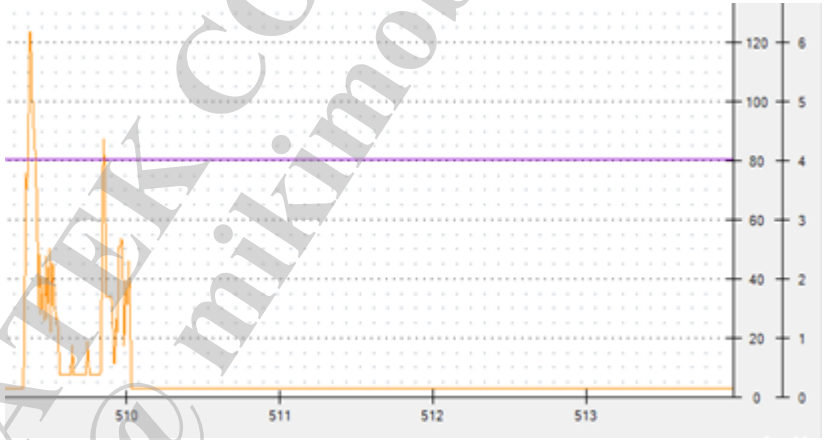


Aging battery with real 40% / initial 100% discharge



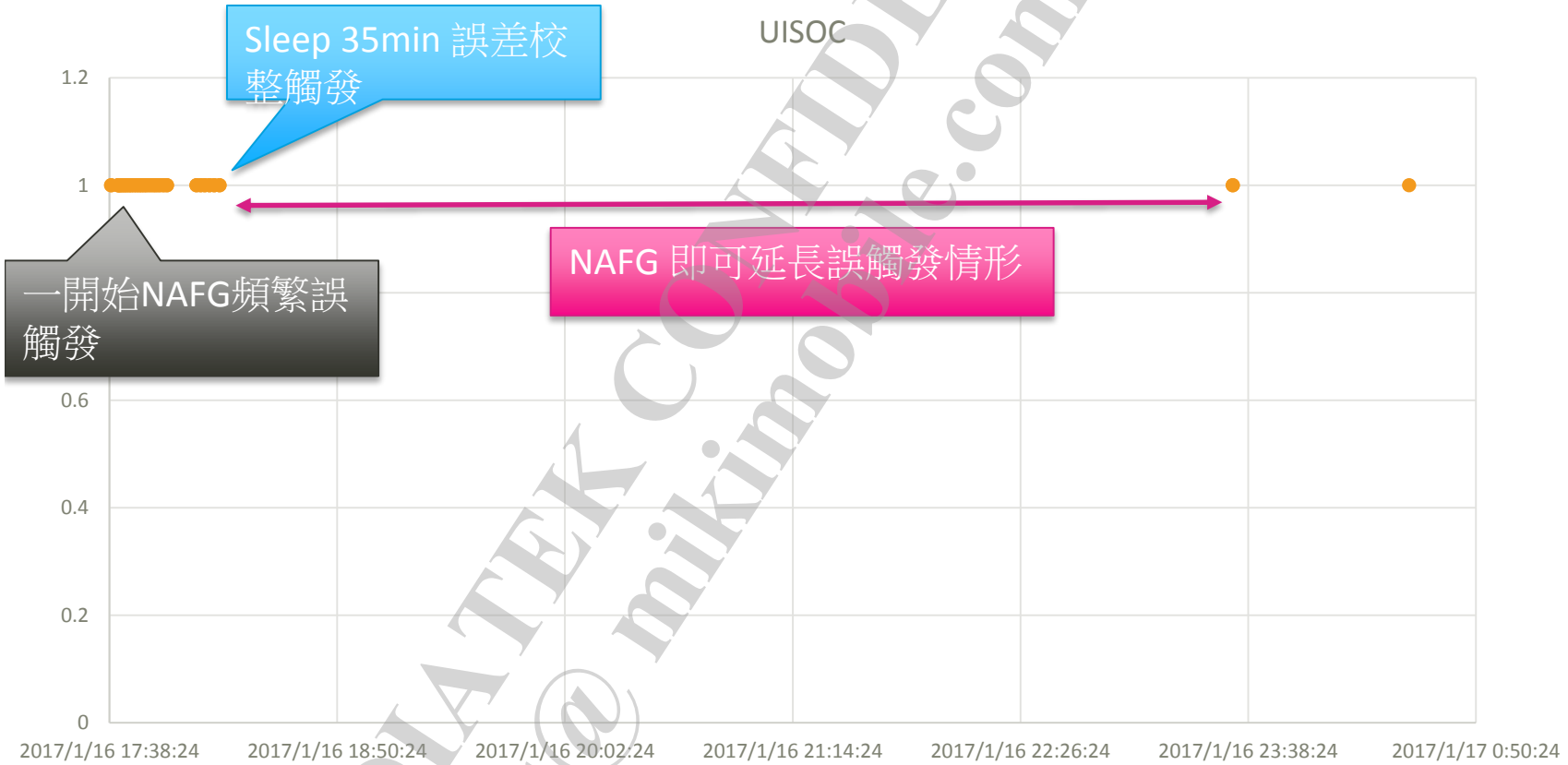
真電池 GM3.0 Low power on kibo+ (63.5hrs test)

name	次數	說明
FG_INTR_COULOMB_LT	6	電量下降0.5%
FG_INTR_FG_ZCV	46	靜置30mins 以上且電流夠小,觸發校正interrupt
FG_INTR_NAFG_VOLTAGE	50	nafg algorithm 計算下降電量0.5%
FG_INTR_UISOC_LT	13	UI顯示百分比下降
Total	115	



GM3.0 INT power consumption : ~700mS * 80mA = 56mAS
flight mode 10 hours GM3.0 avg power consumption = 56mAS* 115 / (63.5* 3600) =~ 28uA

假電池NAFG 觸發數據



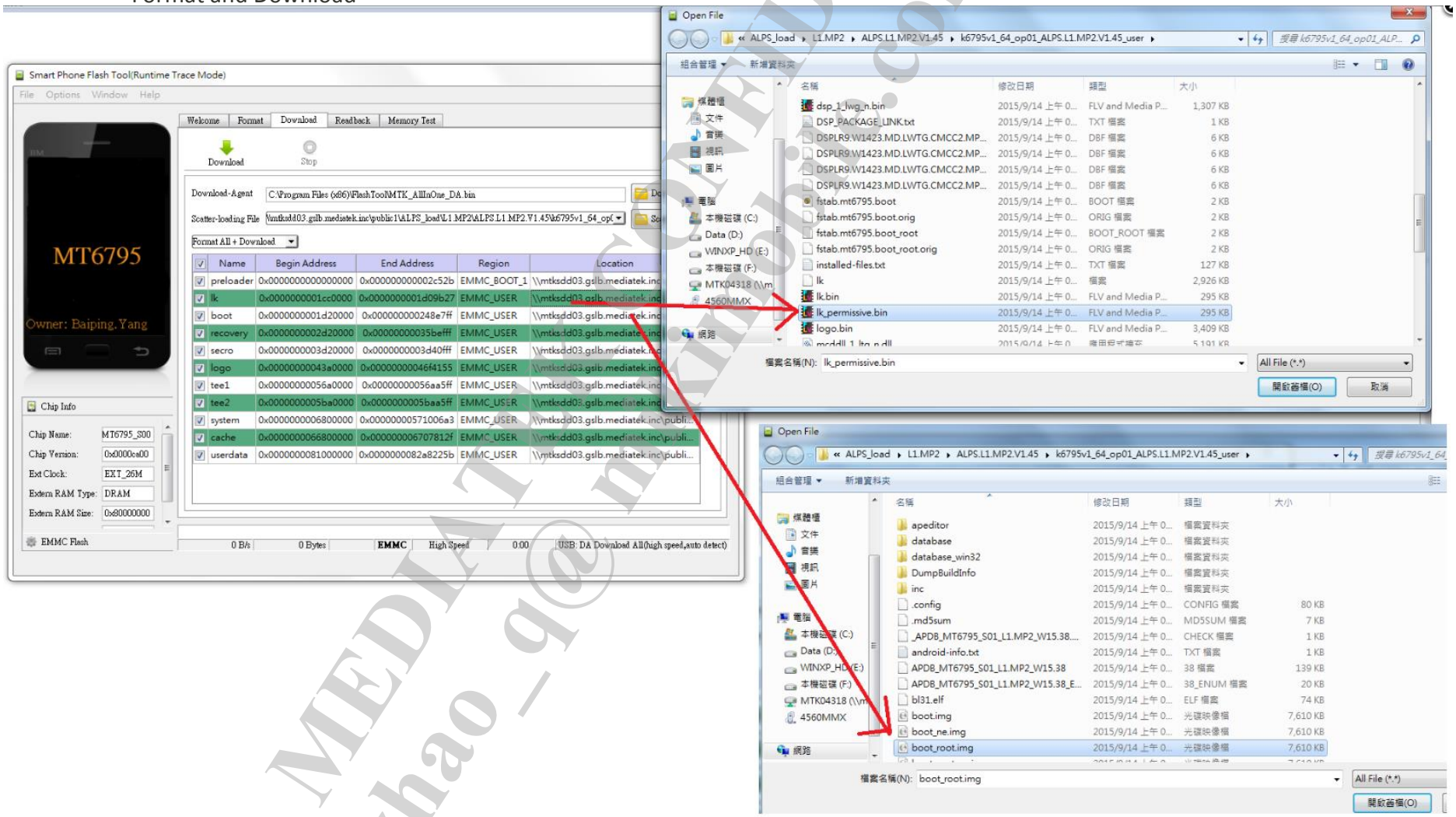
Disable GM 3.0

method	Ready ?	
使用adb command 關閉GM30	Yes	done
使用ntc 自動判斷關閉GM30	Yes	done
使用ntc 自動判斷關閉NAFG	Yes	done
build special load to disable NAFG	Yes	done
工模disable GM 30 disable/enable NAFG	Yes	From MT6763 Engineer load

1.使用ADB COMMAND 關閉GM30

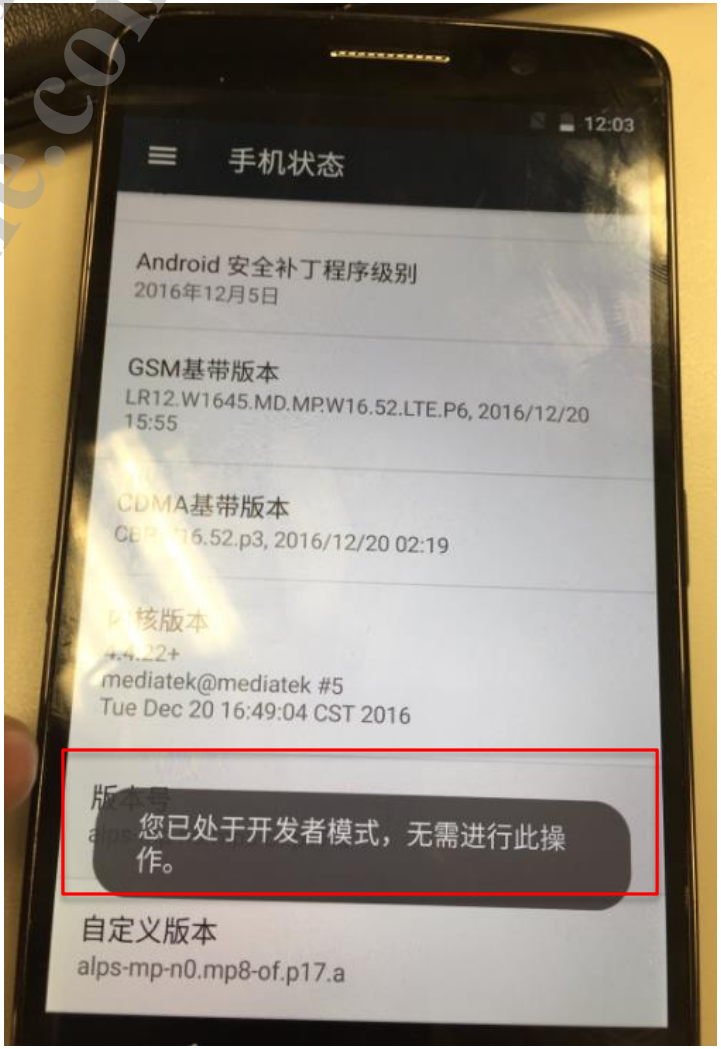
1.Root user load

- http://wiki/pages/viewpage.action?title=Root+user+load&spaceKey=PKB
- Replace lk.bin with lk_permissive.bin.
- Replace boot.img with boot_root.img.
- Format and Download



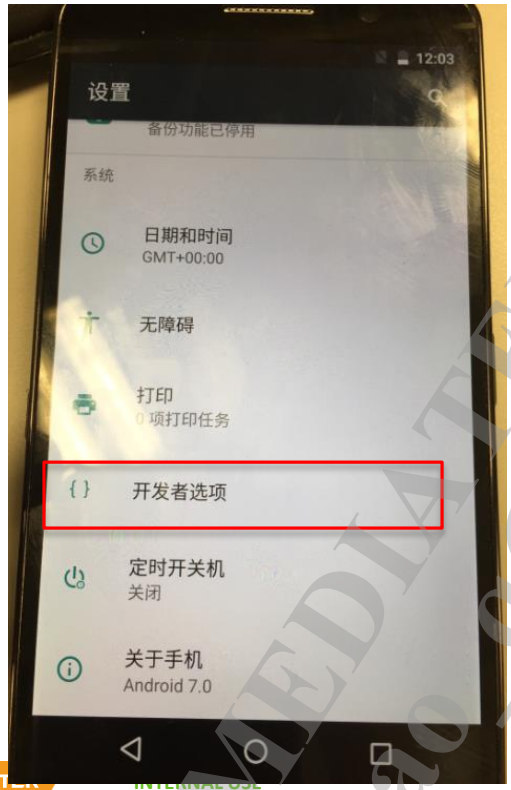
2.開啟開發者選項

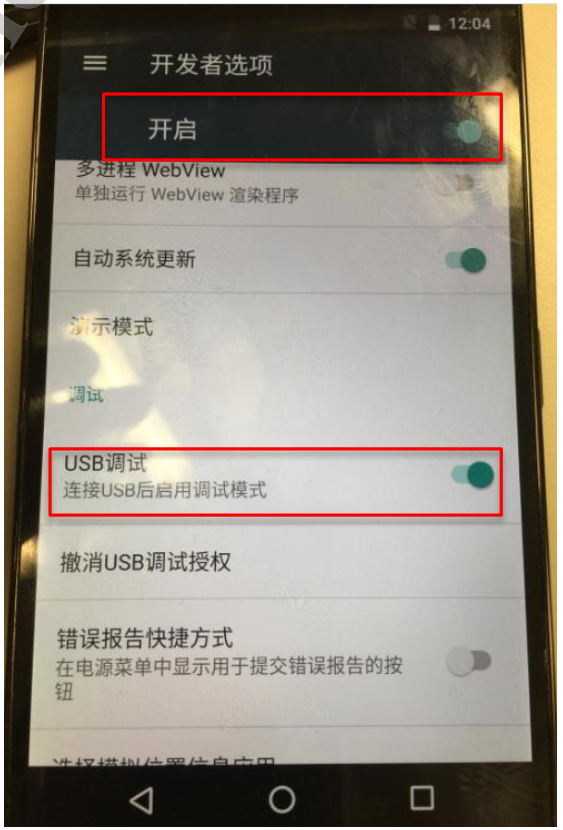
- 開機 -> 設置 -> 關於手機 -> 連續點擊版本號直到開啟”開發者選項”



3.開啟usb 調試

- 打開 設置->開發者選項->開啟
- 打開 設置->開發者選項->usb調試





4.Disable fg

- 插上usb , 用下指令
  - Adb shell setprop persist.mediatek.fg.disable 1
- 檢查電池電量變成50% 代表成功

2.使用NTC 自動判斷關閉GM30

- 1.修改
  - kernel-4.4\drivers\misc\mediatek\include\mt-plat\mt6xxx\include\mach\mtk_battery_property.h
  - #define BATTERY_TMP_TO_DISABLE_GM30 -35
- 2.battery on pin 掛上對應-35度的電阻

3.使用NTC 自動判斷關閉NAFG

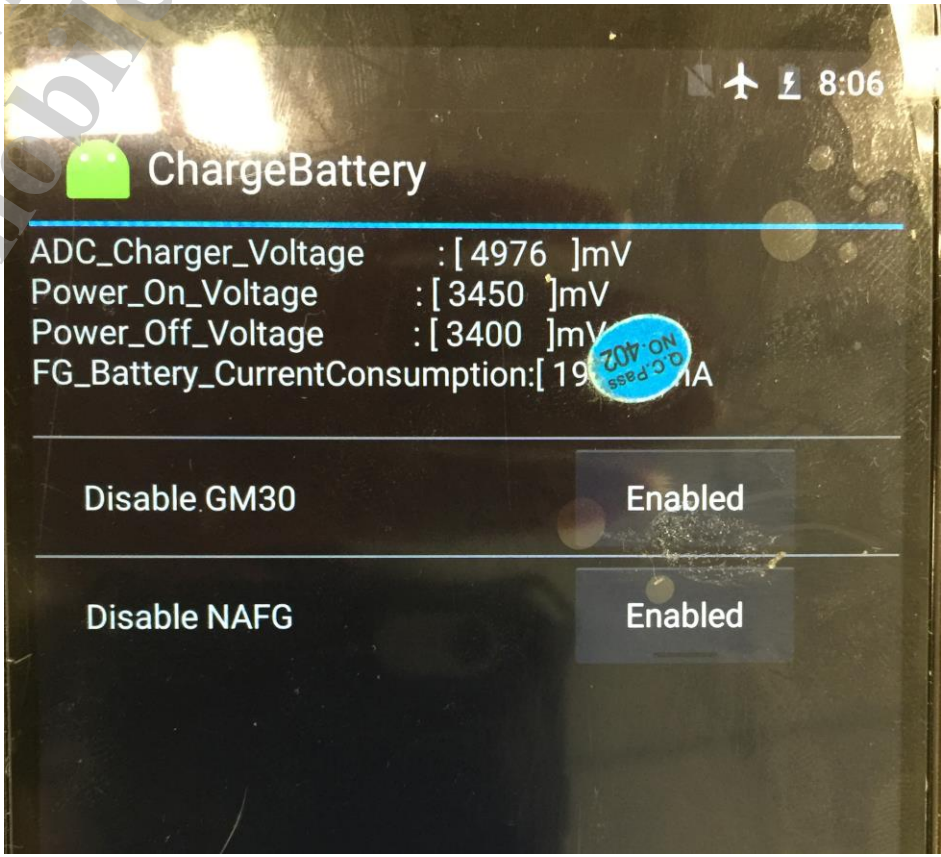
- 1.修改
  - kernel-4.4\drivers\misc\mediatek\include\mt-plat\mt6xxx\include\mach\mtk_battery_property.h
  - #define BATTERY_TMP_TO_DISABLE_NAFG -35
    - 代表偵測到電池溫度小於-35 時disable NAFG
  - #define DEFAULT_BATTERY_TMP_WHEN_DISABLE_NAFG 25
    - 若disable NAFG , 電池溫度固定報25度
- 2.battery on pin 掛上低於-35度的電阻

4. BUILD SPECIAL LOAD TO DISABLE NAFG

- 1.修改
  - kernel-4.4\drivers\misc\mediatek\include\mt-plat\mt6xxx\include\mach\mtk_battery_property.h
  - #define GM30_DISABLE_NAFG

5.工模DISABLE GM 30
DISABLE/ENABLE NAFG

- 工模: *#*#3646633#*#*
- EngineerMode->Hardware Testing->Power->ChargeBattery
- Support from MT6763



everyday genius