

MediaTek Inc.

Mediatek HW Fuel Gauge User

GM2.0_Fuel Gauge Test Flow

| NO. | Version | Date | Author | Comments |
|-----|---------|-----------|-------------|--|
| 1 | V1.0 | 2017/6/6 | Xiaoyong.Li | 1st version for customer. |
| 2 | V1.1 | 2017/7/17 | Xiaoyong.Li | Modify “2.1 Input the command as follow” |
| 3 | | | | |
| 4 | | | | |

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GM2.0_Fuel Gauge Test Flow

1. Preparatory Work

- ❖ **SW:** eng version
- ❖ **HW:** Fuel Gauge car tune value calibration
Please refer to *GM1.0 and 2.0 Customized Setting Flow* to get how to do.

2. Get valid log

2.1 Input the command as follow

Step1.adb root

Step2.adb shell

Step3.setprop persist.mediatek.fg.log.enable 1

Step4.setenforce 0

Step5.exit

```
G:\Users\mtk07635>adb shell
adb server is out of date. killing...
* daemon started successfully *
android:/ # setprop persist.mediatek.fg.log.enable 1
setprop persist.mediatek.fg.log.enable 1
android:/ # exit
exit
```

2.2 MTK log Setting

Step1. Open mobile log, and disable others

Step1. Enable Android log & kernel log in mobile log, and setting auto run in next power on

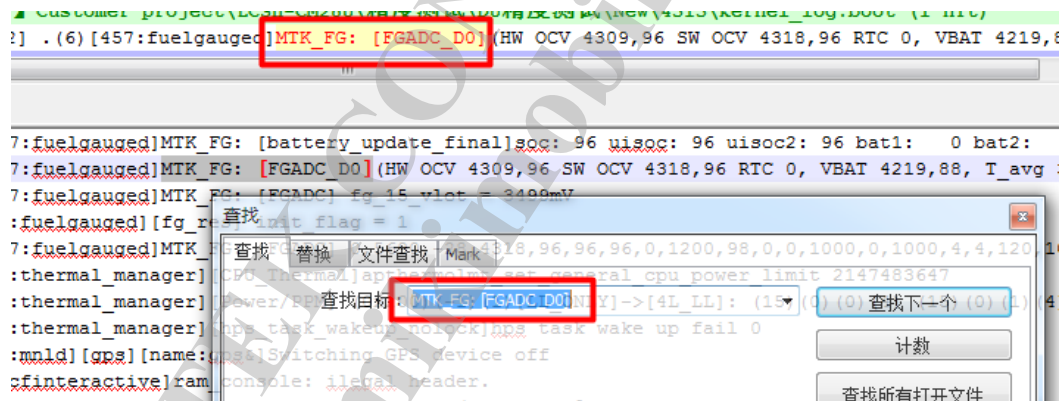
Step2. Setting the max capacity to 5000M





3. Check whether GM2.0 log is enable

Open the kernel_log.boot and search the key words: **MTK_FG: [FGADC_D0]**
If there's **MTK_FG: [FGADC_D0]**, the GM2.0 log is enable.



4. D0 precision test

- Step1. Enable mobile log, and setting auto run in next power on
- Step2. Disconnect the phone and the battery, and waiting 30minutes
- Step3. Test the OCV (Open Circuit Voltage) of battery: V0
- Step4. Connect the Battery and the phone and power on
- Step5. Waiting 1min after power on, and stop MTK log. Then setting mobile log to auto run in next power on for next step using
- Step6. Open the log and search the key words: **MTK_FG: [FGADC_D0]**

```
[347:fuelgauged]MTK FG: [fg_tracking]battery_tracking_time:0 left:0 type:0
[347:fuelgauged]MTK FG: [battery_update_final]soc:100 uisoc:100 uisoc2:100 bat1: 0 bat2: 0 time:0 duration:3 chr:0:0 bat:
[347:fuelgauged]MTK FG: [FGADC_D0] HW OCV 4390,100 SW OCV 4350,100 RTC 0, VBAT 4341,99, T_avg 51, I 3848, is_charging 0, is_c
[343:thermal_manager][name:qsa16]: thermal command can not be send: STP is not enable(1) or ready(0)
[343:thermal_manager][name:qsa16]: thermal command can not be send: STP is not enable(1) or ready(0)
[343:thermal_manager][name:qsa16]: thermal command can not be send: STP is not enable(1) or ready(0)
[343:thermal_manager][name:qsa16]: [Thermal] current_temp = 0x0
[343:thermal_manager][name:qsa16]: [Thermal] current_temp = 0x0
```

MTK_FG: [FGADC_D0](HW OCV 4390,100 SW OCV 4350,100 RTC 0, VBAT

Note: HW OCV (defined as V1) is the voltage sensing by the phone, and for example, the V1=4390mV.

Please test the battery voltage and get HW OCV in log successively, and judge the error in spec of 10mV.

| NO. | Battery OCV/mV | HW OCV/mV | Error /mV | Pass/Fail |
|-----|----------------|-----------|-----------|-----------|
| 1 | 4300 | | | |
| 2 | 4200 | | | |
| 3 | 4100 | | | |
| 4 | 4000 | | | |
| 5 | 3900 | | | |
| 6 | 3850 | | | |
| 7 | 3800 | | | |
| 8 | 3750 | | | |
| 9 | 3700 | | | |
| 10 | 3650 | | | |
| 11 | 3600 | | | |
| 12 | 3500 | | | |
| 13 | 3450 | | | |

5. Discharge test

- Step1. Enable mobile log, and setting auto run in next power on.
- Step2. Charge full
- Step3. Power off and disconnect the battery and the phone
- Step4. wait for 30min
- Step5. Connect the Battery and the phone and Enable the LCM always on in Engineer mode
- Step6. Discharge in the loading of repeat playing Video or the customer loading method until power off
- Step7. Put out the MTK log
- Step8. Search the keyword: **AvgVbat**, and search all information

```

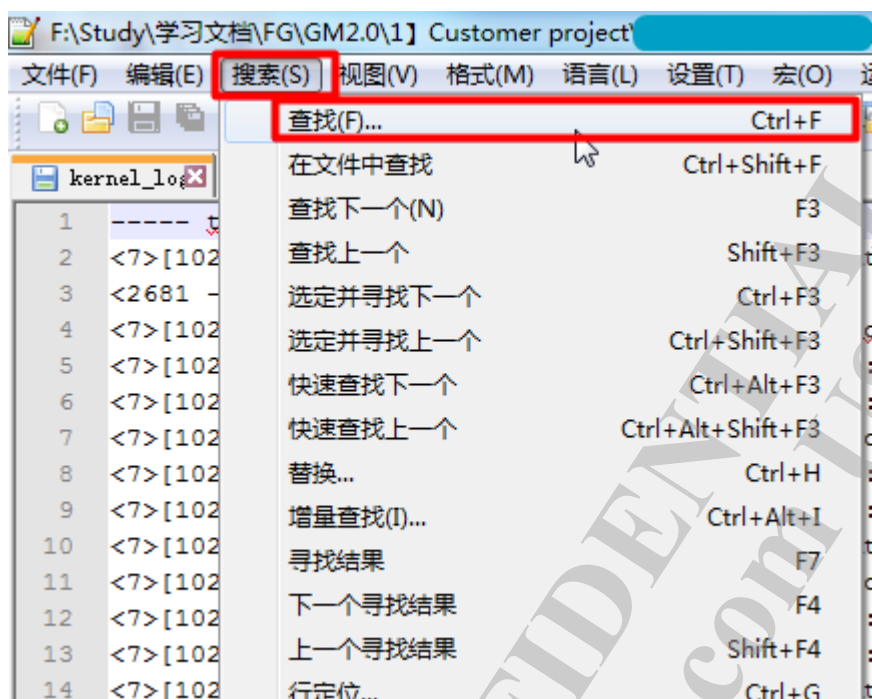
%g_206][kernel]AvgVbat 3530,bat_vol 3376, AvgI 0, I 0, VChr 0, AvgT 29, T 32, ZCV 3663, CHR_Type 0, SOC 4: 4: 1, bccr 0:0, Ichg 650, IB
%g_206][kernel]AvgVbat 3522,bat_vol 3365, AvgI 0, I 0, VChr 0, AvgT 29, T 32, ZCV 3621, CHR_Type 0, SOC 3: 4: 2, bccr 0:0, Ichg 650, IB
%g_206][kernel]AvgVbat 3513,bat_vol 3359, AvgI 0, I 0, VChr 0, AvgT 30, T 32, ZCV 3621, CHR_Type 0, SOC 3: 4: 2, bccr 0:0, Ichg 650, IB
%g_206][kernel]AvgVbat 3503,bat_vol 3346, AvgI 0, I 0, VChr 0, AvgT 30, T 33, ZCV 3621, CHR_Type 0, SOC 3: 4: 2, bccr 0:0, Ichg 650, IB
%g_206][kernel]AvgVbat 3494,bat_vol 3337, AvgI 0, I 0, VChr 0, AvgT 30, T 33, ZCV 3621, CHR_Type 0, SOC 3: 3: 1, bccr 0:0, Ichg 650, IB
%g_206][kernel]AvgVbat 3484,bat_vol 3328, AvgI 0, I 0, VChr 0, AvgT 30, T 32, ZCV 3621, CHR_Type 0, SOC 3: 3: 1, bccr 0:0, Ichg 650, IB
%g_206][kernel]AvgVbat 3473,bat_vol 3316, AvgI 0, I 0, VChr 0, AvgT 30, T 32, ZCV 3621, CHR_Type 0, SOC 3: 3: 1, bccr 0:0, Ichg 650, IB
%g_206][kernel]AvgVbat 3462,bat_vol 3304, AvgI 0, I 0, VChr 0, AvgT 30, T 32, ZCV 3621, CHR_Type 0, SOC 3: 3: 1, bccr 0:0, Ichg 650, IB
%g_206][kernel]AvgVbat 3451,bat_vol 3290, AvgI 0, I 0, VChr 0, AvgT 31, T 32, ZCV 3545, CHR_Type 0, SOC 2: 3: 1, bccr 0:0, Ichg 650, IB
%g_206][kernel]AvgVbat 3439,bat_vol 3278, AvgI 0, I 0, VChr 0, AvgT 31, T 32, ZCV 3545, CHR_Type 0, SOC 2: 3: 1, bccr 0:0, Ichg 650, IB
%g_206][kernel]AvgVbat 3431,bat_vol 3359, AvgI 0, I 0, VChr 0, AvgT 31, T 31, ZCV 3534, CHR_Type 0, SOC 2: 3: 1, bccr 0:0, Ichg 650, I
%g_206][kernel]AvgVbat 3425,bat_vol 3370, AvgI 0, I 0, VChr 0, AvgT 31, T 31, ZCV 3534, CHR_Type 0, SOC 2: 2: 1, bccr 0:0, Ichg 650, I
%g_206][kernel]AvgVbat 3417,bat_vol 3353, AvgI 0, I 0, VChr 0, AvgT 31, T 30, ZCV 3534, CHR_Type 0, SOC 2: 2: 1, bccr 0:0, Ichg 650, I
%g_206][kernel]AvgVbat 3409,bat_vol 3365, AvgI 0, I 0, VChr 0, AvgT 31, T 30, ZCV 3534, CHR_Type 0, SOC 2: 2: 1, bccr 0:0, Ichg 650, I
%g_206][kernel]AvgVbat 3402,bat_vol 3349, AvgI 0, I 0, VChr 0, AvgT 31, T 30, ZCV 3534, CHR_Type 0, SOC 2: 2: 1, bccr 0:0, Ichg 650, I
%g_206][kernel]AvgVbat 3395,bat_vol 3341, AvgI 0, I 0, VChr 0, AvgT 31, T 29, ZCV 3534, CHR_Type 0, SOC 2: 2: 1, bccr 0:0, Ichg 650, I
%g_206][kernel]AvgVbat 3389,bat_vol 3342, AvgI 0, I 0, VChr 0, AvgT 31, T 29, ZCV 3534, CHR_Type 0, SOC 2: 1: 1, bccr 0:0, Ichg 650, I
%g_206][kernel]AvgVbat 3384,bat_vol 3346, AvgI 0, I 0, VChr 0, AvgT 31, T 29, ZCV 3534, CHR_Type 0, SOC 2: 0: 0, bccr 0:0, Ichg 650, I

```

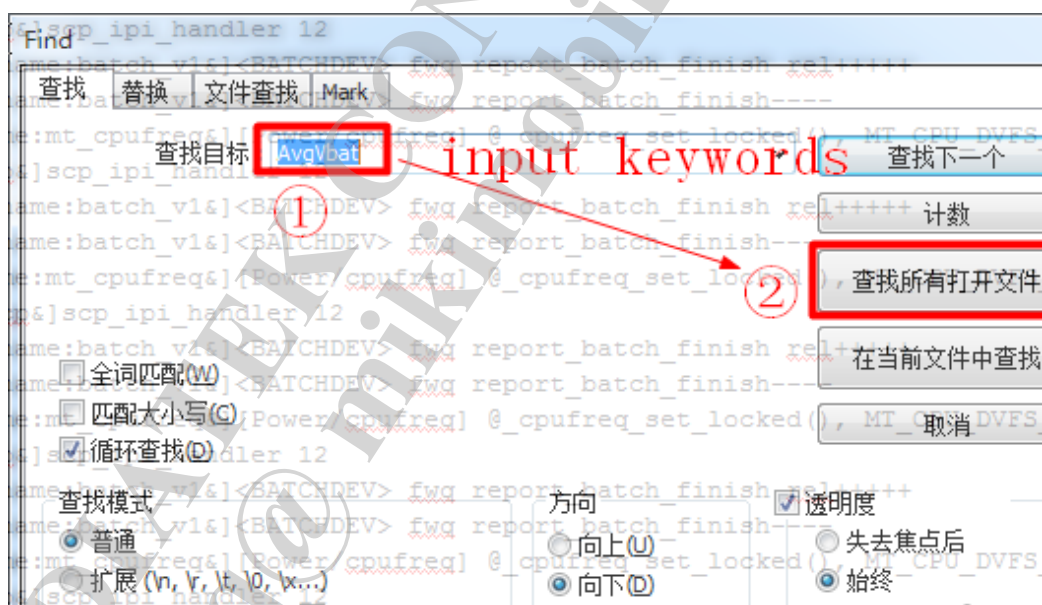
6. How to draw the UISOC &VBAT Curve

The example is base on discharge by using notepad++, and the charge is the same operation.

- Step1. Open the kernel log with notepad++
- Step2. Search (Ctrl+F)



Step3. Input keywords and search in all files




```

Find result - 1282 hits
3505: <3>[10319.779087] .(4) [210:bat_routine_thr][kernel]AvgVbat 4369,bat_vol 4319, AvgI 0, I 0, VChr 0, AvgT 28, T 29, ZCV 3560, CHR_Type 0, SOC 100:100:100
5008: <3>[10329.782567] .(4) [210:bat_routine_thr][kernel]AvgVbat 4362,bat_vol 4180, AvgI 0, I 0, VChr 0, AvgT 28, T 30, ZCV 4355, CHR_Type 0, SOC 100:100:100
6689: <3>[10339.779915] .(5) [210:bat_routine_thr][kernel]AvgVbat 4354,bat_vol 4108, AvgI 0, I 0, VChr 0, AvgT 28, T 34, ZCV 4355, CHR_Type 0, SOC 100:100:100
9727: <3>[10349.785363] .(7) [210:bat_routine_thr][kernel]AvgVbat 4347,bat_vol 4159, AvgI 0, I 0, VChr 0, AvgT 28, T 36, ZCV 4355, CHR_Type 0, SOC 100:100:100
13219: <3>[10359.780087] .(2) [210:bat_routine_thr][kernel]AvgVbat 4336,bat_vol 4039, AvgI 0, I 0, VChr 0, AvgT 29, T 38, ZCV 4355, CHR_Type 0, SOC 100:100:100
17043: <3>[10369.791200] .(7) [210:bat_routine_thr][kernel]AvgVbat 4329,bat_vol 4156, AvgI 0, I 0, VChr 0, AvgT 29, T 38, ZCV 4355, CHR_Type 0, SOC 99:99:99
20865: <3>[10379.812366] .(3) [210:bat_routine_thr][kernel]AvgVbat 4322,bat_vol 4158, AvgI 0, I 0, VChr 0, AvgT 29, T 38, ZCV 4355, CHR_Type 0, SOC 99:99:99
24553: <3>[10389.787369] .(0) [210:bat_routine_thr][kernel]AvgVbat 4315,bat_vol 4155, AvgI 0, I 0, VChr 0, AvgT 30, T 38, ZCV 4355, CHR_Type 0, SOC 99:100:100
28381: <3>[10399.786633] .(4) [210:bat_routine_thr][kernel]AvgVbat 4307,bat_vol 4118, AvgI 0, I 0, VChr 0, AvgT 30, T 38, ZCV 4355, CHR_Type 0, SOC 99:100:100
32192: <3>[10409.786090] .(1) [210:bat_routine_thr][kernel]AvgVbat 4299,bat_vol 4132, AvgI 0, I 0, VChr 0, AvgT 30, T 38, ZCV 4355, CHR_Type 0, SOC 99:100:100
35910: <3>[10419.791285] .(5) [210:bat_routine_thr][kernel]AvgVbat 4291,bat_vol 4132, AvgI 0, I 0, VChr 0, AvgT 31, T 38, ZCV 4355, CHR_Type 0, SOC 99:99:99
39618: <3>[10429.806812] .(4) [210:bat_routine_thr][kernel]AvgVbat 4284,bat_vol 4141, AvgI 0, I 0, VChr 0, AvgT 31, T 39, ZCV 4355, CHR_Type 0, SOC 99:99:99
43338: <3>[10439.788698] .(3) [210:bat_routine_thr][kernel]AvgVbat 4277,bat_vol 4164, AvgI 0, I 0, VChr 0, AvgT 31, T 38, ZCV 4355, CHR_Type 0, SOC 99:99:99
47045: <3>[10449.806837] .(3) [210:bat_routine_thr][kernel]AvgVbat 4269,bat_vol 4129, AvgI 0, I 0, VChr 0, AvgT 32, T 38, ZCV 4355, CHR_Type 0, SOC 99:99:99
50698: <3>[10459.790600] .(1) [210:bat_routine_thr][kernel]AvgVbat 4262,bat_vol 4152, AvgI 0, I 0, VChr 0, AvgT 32, T 39, ZCV 4356, CHR_Type 0, SOC 98:99:99
54536: <3>[10469.786666] .(7) [210:bat_routine_thr][kernel]AvgVbat 4253,bat_vol 4119, AvgI 0, I 0, VChr 0, AvgT 32, T 39, ZCV 4356, CHR_Type 0, SOC 98:99:99
58456: <3>[10479.791671] .(3) [210:bat_routine_thr][kernel]AvgVbat 4247,bat_vol 4170, AvgI 0, I 0, VChr 0, AvgT 33, T 38, ZCV 4356, CHR_Type 0, SOC 98:99:99
62178: <3>[10489.788392] .(2) [210:bat_routine_thr][kernel]AvgVbat 4241,bat_vol 4174, AvgI 0, I 0, VChr 0, AvgT 33, T 38, ZCV 4331, CHR_Type 0, SOC 98:99:99
65957: <3>[10499.802494] .(1) [210:bat_routine_thr][kernel]AvgVbat 4233,bat_vol 4141, AvgI 0, I 0, VChr 0, AvgT 33, T 38, ZCV 4343, CHR_Type 0, SOC 98:99:99
69696: <3>[10509.791413] .(0) [210:bat_routine_thr][kernel]AvgVbat 4226,bat_vol 4168, AvgI 0, I 0, VChr 0, AvgT 34, T 39, ZCV 4331, CHR_Type 0, SOC 98:99:99

kernel_log
1 ----- timezone:GMT
2 <7>[10274.993911] .(0) [63:cfinteractive][name:mt_cpufreq][Power/cpufreq] @ cpufreq_set_locked(), MT_CPU_DVFS_LL:(15,0): freq=118000(118000), volt =9
3 <2681 -> 3588>
4 <7>[10274.996123] .(0) [63:cfinteractive][name:app]scop_ipi_handler 12
5 <7>[10274.999376] .(0) [1101:SensorService][name:batch_vls]<BATCHDEV> %s report_batch_finish %l++++
6 <7>[10274.999376] .(0) [1101:SensorService][name:batch_vls]<BATCHDEV> %s report_batch_finish----
7 <7>[10275.060867] .(0) [0:swapper/0][name:app]scop_ipi_handler 12
8 <7>[10275.061884] .(0) [1101:SensorService][name:batch_vls]<BATCHDEV> %s report_batch_finish %l++++

```

Step4. Select all and save it in text file

```

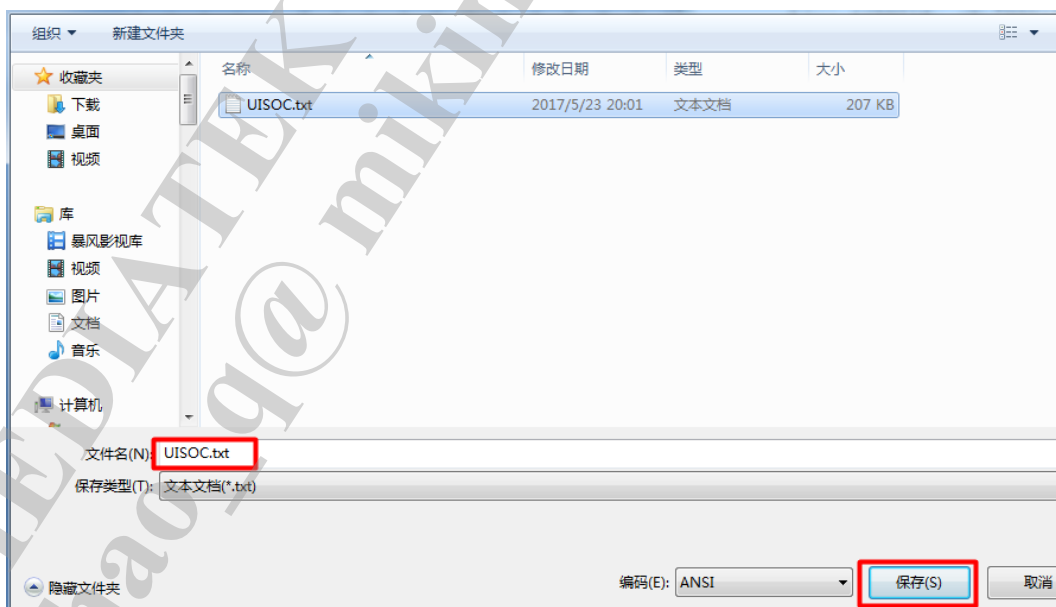
Find result - 1282 hits
3505: <3>[10319.779087] .(4) [210:bat_routine_thr][kernel]AvgVbat 4369,bat_vol 4319, AvgI 0, I 0, VChr 0, AvgT 28, T 29, ZCV 3560, CHR_Type 0, SOC 100:100:100
5008: <3>[10329.782567] .(4) [210:bat_routine_thr][kernel]AvgVbat 4362,bat_vol 4180, AvgI 0, I 0, VChr 0, AvgT 28, T 30, ZCV 4355, CHR_Type 0, SOC 100:100:100
6689: <3>[10339.779915] .(5) [210:bat_routine_thr][kernel]AvgVbat 4354,bat_vol 4108, AvgI 0, I 0, VChr 0, AvgT 28, T 34, ZCV 4355, CHR_Type 0, SOC 100:100:100
9727: <3>[10349.785363] .(7) [210:bat_routine_thr][kernel]AvgVbat 4347,bat_vol 4159, AvgI 0, I 0, VChr 0, AvgT 28, T 36, ZCV 4355, CHR_Type 0, SOC 100:100:100
13219: <3>[10359.780087] .(2) [210:bat_routine_thr][kernel]AvgVbat 4336,bat_vol 4039, AvgI 0, I 0, VChr 0, AvgT 29, T 38, ZCV 4355, CHR_Type 0, SOC 100:100:100
17043: <3>[10369.791200] .(7) [210:bat_routine_thr][kernel]AvgVbat 4329,bat_vol 4156, AvgI 0, I 0, VChr 0, AvgT 29, T 38, ZCV 4355, CHR_Type 0, SOC 99:99:99
20865: <3>[10379.812366] .(3) [210:bat_routine_thr][kernel]AvgVbat 4322,bat_vol 4158, AvgI 0, I 0, VChr 0, AvgT 29, T 38, ZCV 4355, CHR_Type 0, SOC 99:99:99
24553: <3>[10389.787369] .(0) [210:bat_routine_thr][kernel]AvgVbat 4315,bat_vol 4155, AvgI 0, I 0, VChr 0, AvgT 30, T 38, ZCV 4355, CHR_Type 0, SOC 99:100:100
28381: <3>[10399.786633] .(4) [210:bat_routine_thr][kernel]AvgVbat 4307,bat_vol 4118, AvgI 0, I 0, VChr 0, AvgT 30, T 38, ZCV 4355, CHR_Type 0, SOC 99:100:100
32192: <3>[10409.786090] .(1) [210:bat_routine_thr][kernel]AvgVbat 4299,bat_vol 4132, AvgI 0, I 0, VChr 0, AvgT 30, T 38, ZCV 4355, CHR_Type 0, SOC 99:100:100
35910: <3>[10419.791285] .(5) [210:bat_routine_thr][kernel]AvgVbat 4291,bat_vol 4132, AvgI 0, I 0, VChr 0, AvgT 31, T 38, ZCV 4355, CHR_Type 0, SOC 99:99:99
39618: <3>[10429.806812] .(4) [210:bat_routine_thr][kernel]AvgVbat 4284,bat_vol 4141, AvgI 0, I 0, VChr 0, AvgT 31, T 39, ZCV 4355, CHR_Type 0, SOC 99:99:99
43338: <3>[10439.788698] .(3) [210:bat_routine_thr][kernel]AvgVbat 4277,bat_vol 4164, AvgI 0, I 0, VChr 0, AvgT 31, T 38, ZCV 4355, CHR_Type 0, SOC 99:99:99
47045: <3>[10449.806837] .(3) [210:bat_routine_thr][kernel]AvgVbat 4269,bat_vol 4129, AvgI 0, I 0, VChr 0, AvgT 32, T 38, ZCV 4355, CHR_Type 0, SOC 99:99:99
50698: <3>[10459.790600] .(1) [210:bat_routine_thr][kernel]AvgVbat 4262,bat_vol 4152, AvgI 0, I 0, VChr 0, AvgT 32, T 39, ZCV 4356, CHR_Type 0, SOC 98:99:99
54536: <3>[10469.786666] .(7) [210:bat_routine_thr][kernel]AvgVbat 4253,bat_vol 4119, AvgI 0, I 0, VChr 0, AvgT 32, T 39, ZCV 4356, CHR_Type 0, SOC 98:99:99
58456: <3>[10479.791671] .(3) [210:bat_routine_thr][kernel]AvgVbat 4247,bat_vol 4170, AvgI 0, I 0, VChr 0, AvgT 33, T 38, ZCV 4356, CHR_Type 0, SOC 98:99:99
62178: <3>[10489.788392] .(2) [210:bat_routine_thr][kernel]AvgVbat 4241,bat_vol 4174, AvgI 0, I 0, VChr 0, AvgT 33, T 38, ZCV 4331, CHR_Type 0, SOC 98:99:99
65957: <3>[10499.802494] .(1) [210:bat_routine_thr][kernel]AvgVbat 4233,bat_vol 4141, AvgI 0, I 0, VChr 0, AvgT 33, T 38, ZCV 4343, CHR_Type 0, SOC 98:99:99
69696: <3>[10509.791413] .(0) [210:bat_routine_thr][kernel]AvgVbat 4226,bat_vol 4168, AvgI 0, I 0, VChr 0, AvgT 34, T 39, ZCV 4331, CHR_Type 0, SOC 98:99:99

kernel_log
1 ----- timezone:GMT
2 <7>[10274.993911] .(0) [63:cfinteractive][name:mt_cpufreq][Power/cpufreq] @ cpufreq_set_locked(), MT_CPU_DVFS_LL:(15,0): freq=118000(118000), volt =9
3 <2681 -> 3588>
4 <7>[10274.996123] .(0) [63:cfinteractive][name:app]scop_ipi_handler 12
5 <7>[10274.999376] .(0) [1101:SensorService][name:batch_vls]<BATCHDEV> %s report_batch_finish %l++++
6 <7>[10274.999376] .(0) [1101:SensorService][name:batch_vls]<BATCHDEV> %s report_batch_finish----
7 <7>[10275.060867] .(0) [0:swapper/0][name:app]scop_ipi_handler 12
8 <7>[10275.061884] .(0) [1101:SensorService][name:batch_vls]<BATCHDEV> %s report_batch_finish %l++++

```



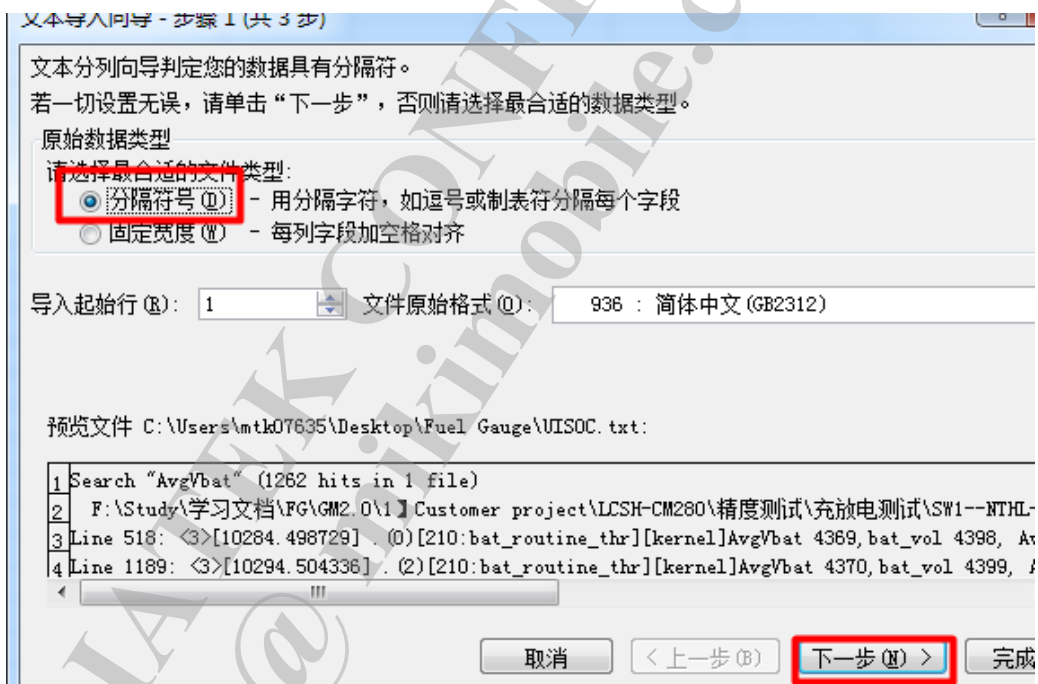

Step5. Save as UISOC.txt

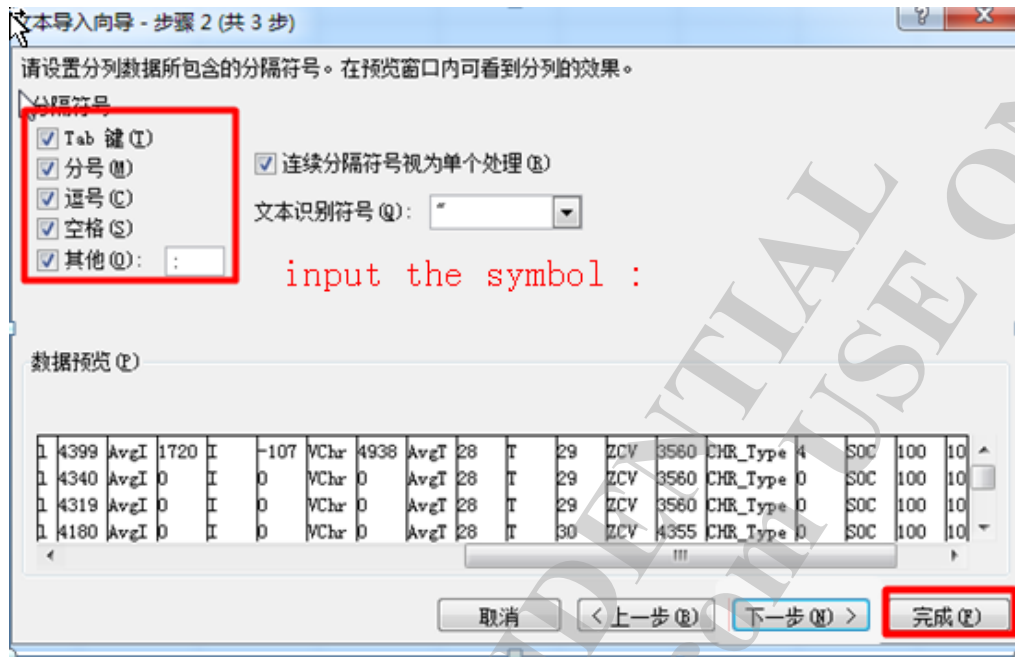


Step6. Open a new excel and open the UISOC.txt



Step7. Click next





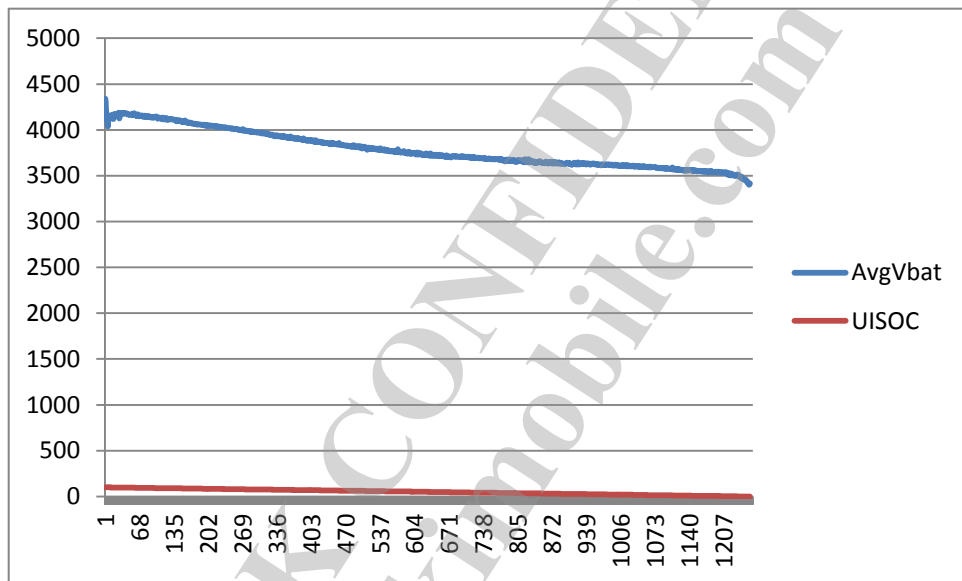
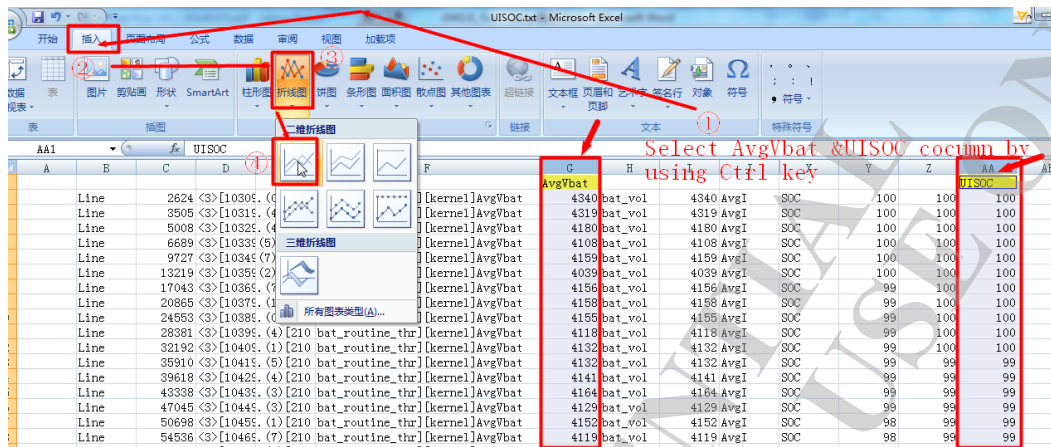
Step8. Now the data in different column

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O |
|----|------|-------|-------------|-----------------------|--------|---------|--------------|-----------|---|---|---|---|---|---|---|
| 10 | Line | 24593 | <[10385, 0] | [210 bat_routine_thr] | kernel | AvgVbat | 4155 bat_vol | 4155 AvgI | 0 | I | 0 | 0 | 0 | 0 | 0 |
| 11 | Line | 28381 | <[10395, 4] | [210 bat_routine_thr] | kernel | AvgVbat | 4118 bat_vol | 4118 AvgI | 0 | I | 0 | 0 | 0 | 0 | 0 |
| 12 | Line | 32192 | <[10405, 1] | [210 bat_routine_thr] | kernel | AvgVbat | 4132 bat_vol | 4132 AvgI | 0 | I | 0 | 0 | 0 | 0 | 0 |
| 13 | Line | 35910 | <[10415, 5] | [210 bat_routine_thr] | kernel | AvgVbat | 4132 bat_vol | 4132 AvgI | 0 | I | 0 | 0 | 0 | 0 | 0 |
| 14 | Line | 39618 | <[10425, 4] | [210 bat_routine_thr] | kernel | AvgVbat | 4141 bat_vol | 4141 AvgI | 0 | I | 0 | 0 | 0 | 0 | 0 |
| 15 | Line | 43338 | <[10435, 3] | [210 bat_routine_thr] | kernel | AvgVbat | 4164 bat_vol | 4164 AvgI | 0 | I | 0 | 0 | 0 | 0 | 0 |
| 16 | Line | 47045 | <[10445, 9] | [210 bat_routine_thr] | kernel | AvgVbat | 4129 bat_vol | 4129 AvgI | 0 | I | 0 | 0 | 0 | 0 | 0 |
| 17 | Line | 50698 | <[10455, 1] | [210 bat_routine_thr] | kernel | AvgVbat | 4152 bat_vol | 4152 AvgI | 0 | I | 0 | 0 | 0 | 0 | 0 |
| 18 | Line | 54536 | <[10465, 7] | [210 bat_routine_thr] | kernel | AvgVbat | 4119 bat_vol | 4119 AvgI | 0 | I | 0 | 0 | 0 | 0 | 0 |
| 19 | Line | 58456 | <[10475, 3] | [210 bat_routine_thr] | kernel | AvgVbat | 4170 bat_vol | 4170 AvgI | 0 | I | 0 | 0 | 0 | 0 | 0 |
| 20 | Line | 62178 | <[10485, 2] | [210 bat_routine_thr] | kernel | AvgVbat | 4174 bat_vol | 4174 AvgI | 0 | I | 0 | 0 | 0 | 0 | 0 |
| 21 | Line | 65957 | <[10495, 1] | [210 bat_routine_thr] | kernel | AvgVbat | 4141 bat_vol | 4141 AvgI | 0 | I | 0 | 0 | 0 | 0 | 0 |
| 22 | Line | 69696 | <[10505, 0] | [210 bat_routine_thr] | kernel | AvgVbat | 4168 bat_vol | 4168 AvgI | 0 | I | 0 | 0 | 0 | 0 | 0 |
| 23 | Line | 73677 | <[10515, 0] | [210 bat_routine_thr] | kernel | AvgVbat | 4165 bat_vol | 4165 AvgI | 0 | I | 0 | 0 | 0 | 0 | 0 |
| 24 | Line | 77536 | <[10525, 3] | [210 bat_routine_thr] | kernel | AvgVbat | 4165 bat_vol | 4165 AvgI | 0 | I | 0 | 0 | 0 | 0 | 0 |
| 25 | Line | 81302 | <[10535, 2] | [210 bat_routine_thr] | kernel | AvgVbat | 4174 bat_vol | 4174 AvgI | 0 | I | 0 | 0 | 0 | 0 | 0 |
| 26 | Line | 85068 | <[10545, 3] | [210 bat_routine_thr] | kernel | AvgVbat | 4172 bat_vol | 4172 AvgI | 0 | I | 0 | 0 | 0 | 0 | 0 |
| 27 | Line | 88746 | <[10555, 1] | [210 bat_routine_thr] | kernel | AvgVbat | 4182 bat_vol | 4182 AvgI | 0 | I | 0 | 0 | 0 | 0 | 0 |
| 28 | Line | 92300 | <[10565, 0] | [210 bat_routine_thr] | kernel | AvgVbat | 4174 bat_vol | 4174 AvgI | 0 | I | 0 | 0 | 0 | 0 | 0 |

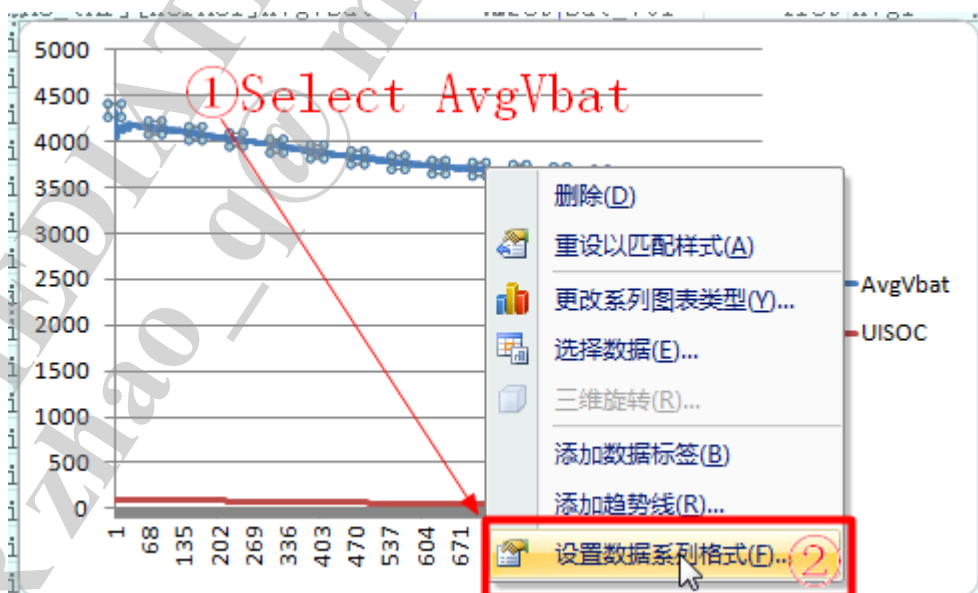
Step9. Define the name AvgVbat and UISOC

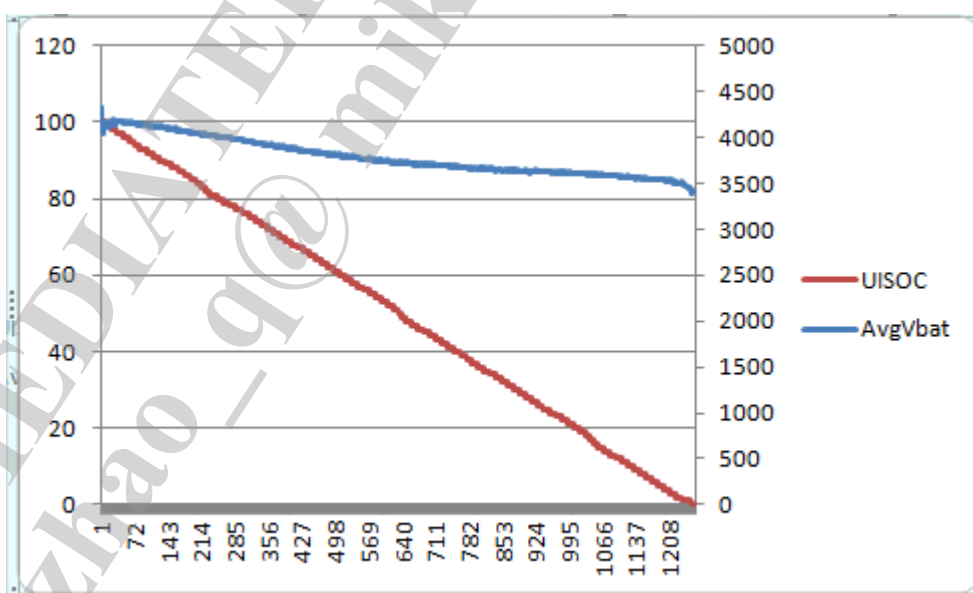
| | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | AA | AB | AC |
|-----|-----------------------|--------|---------|--------------|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| (0) | [210 bat_routine_thr] | kernel | AvgVbat | 4340 bat_vol | 4340 AvgI | SOC | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| (4) | [210 bat_routine_thr] | kernel | AvgVbat | 4319 bat_vol | 4319 AvgI | SOC | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| (4) | [210 bat_routine_thr] | kernel | AvgVbat | 4180 bat_vol | 4180 AvgI | SOC | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 3) | [210 bat_routine_thr] | kernel | AvgVbat | 4108 bat_vol | 4108 AvgI | SOC | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 7) | [210 bat_routine_thr] | kernel | AvgVbat | 4159 bat_vol | 4159 AvgI | SOC | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 2) | [210 bat_routine_thr] | kernel | AvgVbat | 4039 bat_vol | 4039 AvgI | SOC | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| (7) | [210 bat_routine_thr] | kernel | AvgVbat | 4156 bat_vol | 4156 AvgI | SOC | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 |
| (1) | [210 bat_routine_thr] | kernel | AvgVbat | 4158 bat_vol | 4158 AvgI | SOC | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 |
| (0) | [210 bat_routine_thr] | kernel | AvgVbat | 4155 bat_vol | 4155 AvgI | SOC | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 |
| (4) | [210 bat_routine_thr] | kernel | AvgVbat | 4118 bat_vol | 4118 AvgI | SOC | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 |
| (1) | [210 bat_routine_thr] | kernel | AvgVbat | 4132 bat_vol | 4132 AvgI | SOC | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 |
| (5) | [210 bat_routine_thr] | kernel | AvgVbat | 4132 bat_vol | 4132 AvgI | SOC | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 |
| (4) | [210 bat_routine_thr] | kernel | AvgVbat | 4141 bat_vol | 4141 AvgI | SOC | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 |
| (3) | [210 bat_routine_thr] | kernel | AvgVbat | 4164 bat_vol | 4164 AvgI | SOC | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 |
| (3) | [210 bat_routine_thr] | kernel | AvgVbat | 4129 bat_vol | 4129 AvgI | SOC | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 |
| (1) | [210 bat_routine_thr] | kernel | AvgVbat | 4152 bat_vol | 4152 AvgI | SOC | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 |
| (7) | [210 bat_routine_thr] | kernel | AvgVbat | 4119 bat_vol | 4119 AvgI | SOC | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 |
| (3) | [210 bat_routine_thr] | kernel | AvgVbat | 4170 bat_vol | 4170 AvgI | SOC | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 |
| (2) | [210 bat_routine_thr] | kernel | AvgVbat | 4174 bat_vol | 4174 AvgI | SOC | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 |

Step10. Select AvgVbat and UISOC column and input line chart as follow

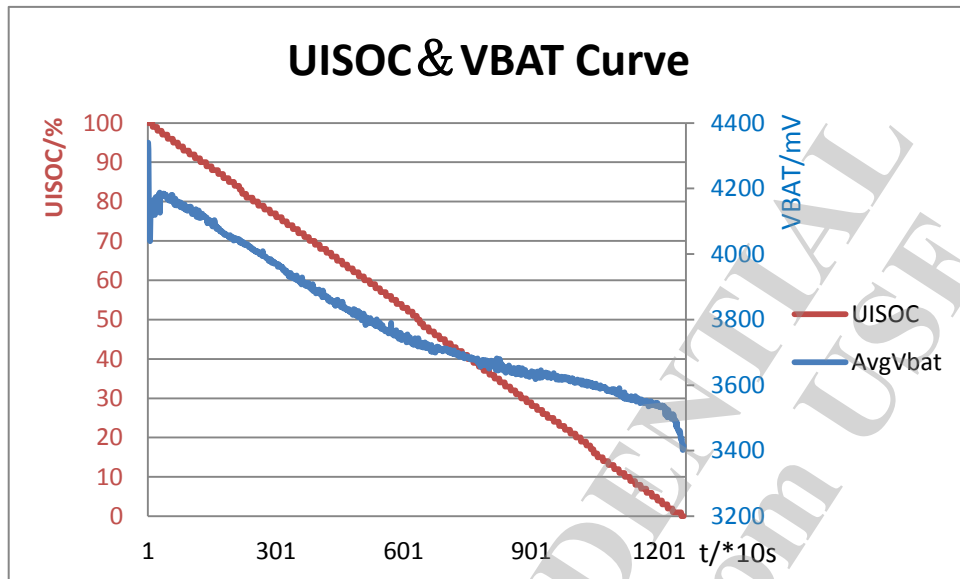


Step11. Select the AvgVbat to secondary axis



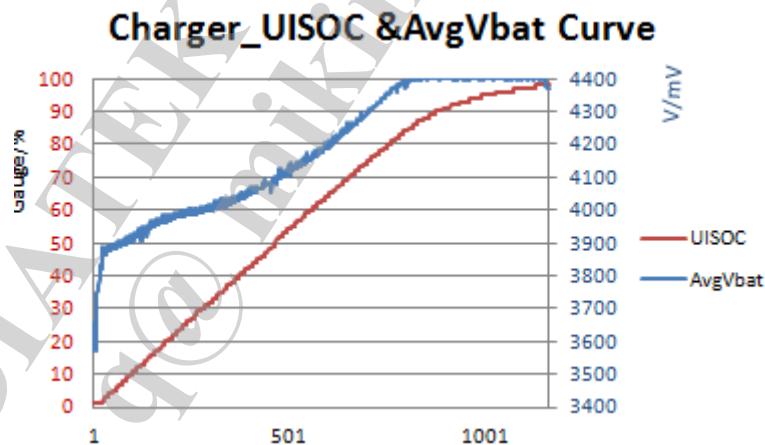


Step12. Get the UISOC&VABT Curve by using some excel setting, as follow



7. Charge test

- Step1. Enable mobile log, and setting auto run in next power on.
- Step2. Battery discharge bellow 3400mV
- Step3. Wait for 30min
- Step4. Insert Adaptor and Power on
- Step5. Get the log after Charger Full
- Step6. Then get the Curve as discharge test, same operation as discharge, and the keyword is also *AvgVbat*.



8. Whether Fuel Gauge pass is base on UISOC & AvgVbat

- 1) UISOC is smoothness, monotonic and no saltus
- 2) The last UISOC is 1% for discharge
- 3) The last AvgVbat is less than 3400mV for discharge
- 4) The maximum UISOC is 100% for charge