高通8996功耗温升优化技术期刊-20151225

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Checklist

- Power Consumption Data Document/Link

- Power Measurement Checklist

- Power Debug Guide

- CR/Patches Checklist

- Tips

Checklist --- Power Consumption Data

- External Document
  - MSM8996_LA_Current_Consumption_Data
    - Document #: 80-NT204-7
    - You can find detailed power break down data in this document
  - Power Data for MSM8996.LA.1.0 Release 01600
    - Document #: 80-NT204-7
    - You can find power data for this release

Checklist --- Power Measurement

- Use perf_defconfig instead defconfig
  - Remove "Debug" features
  - Double check if "CORESIGHT" config is removed
  - Double check if "CONFIG_MSM_DEBUG_LAR_UNLOCK" config is removed
- Disable UART console
  - Especially for smart panel
- Remove unnecessary debug log with high frequency
- Remove on-device logging tools

Checklist --- Power Debug

- ## Power Debug Guide with Simplified Chinese
  - Document #: 80-P0955-1SC
  - There is detail guide on how to debug almost all cases like RBSC, MP3, MP4, camera etc. Just need to follow step by step

- ## Power Debug Guide with English
  - Document #: 80-P0955-1

- ## Camera Power Debug Guide
  - Document #: 80-NP961-1

- ## PerfLock API Overview
  - Document #: 80-NT384-1

- ## Multimedia Power Debugging Case
  - Document #: 80-NT616-1

- ## QUALCOMM ONDEVICE POWER DASHBOARD TEST GUIDE
  - Document #: 80-P1818-1EC

- ## LA Power Optimization
  - Document #: 80-NA157-246

- ## Android Power Overview
  - Document #: 80-NA157-246

Checklist --- CR/Patches

N -- No Impact   - means Side Effect   + means Good Impact

CR	Fix	Patches	Perf	Power	Stability	Comment
CR1462552	Fix "CPU DCVS governor wrongly changed into performance mode	https://review-android.quicinc.com/#/c/1462552/2	N	+	N	
CR869281	On Isatri we are observing that DIAG_WS wakelock in not being released when we remove USB.		N	+	N	
CR1483407	15ms peaks on static display	https://review-android.quicinc.com/#/c/1483407/	N	+	N	
CR1356625	Cpu floor frequency settings	https://review-android.quicinc.com/#/c/1356625/9	N	N	N	
	> video dec regression fix	https://review-android.quicinc.com/#/c/1483407/ -	N	+	N	
	logd verbose removal for ViLTE	https://review-android.quicinc.com/#/c/1476833/ https://review-android.quicinc.com/#/c/1476832/ https://review-android.quicinc.com/#/c/1484835/	N	+	N	

CR	Fix	Patches	Perf	Power	Stability	Comment
	thermal kernel code fix (right now it is merged in LA.HB.1.1.1 only)	https://review-android.quicinc.com/#/c/1478225/	N	+	N	
	Camera capture XO shutdown block	https://review-android.quicinc.com/#/c/1453869/	N	+	N	

Checklist --- Tips

RBSC-1/2

- Use IR camera to scan board's hot spot if RBSC current is high ;

- Power breakdown board is strongly recommended to OEMs;

- If no power breakdown board and even IR scan can`t find abnormal leakage , HW guys should be involved , they are helpful on removing some HW modules to figure out where does the leakage comes from;

- UART is very helpful as the debug information channel when do RBSC tunning, due to system can`t enter VDDmin with USB connected, you can get the kernel logs from UART terminators in time;

- Use cmd line to enable dump enabled clocks befor vddmin instead;
  echo 1 > /sys/kernel/debug/clk/debug_suspend   and then get kernel log after disconnect USB cable

Checklist --- Tips

RBSC-2/2

- Use full dump script for PMIC and GPIO dump

- Remove the corresponding drivers directly if need to see if RBSC can be improved or not ;

- When CX voltage is probed not match the voltage table in rpm code, for VDDmin case, please check if system went to VDDmin or not, there is a case that system can`t go to VDDmin but can go to VDDlow due to finger print driver request CXO, but at that time RBSC just 2-3mA higher than VDDmin`s

Checklist --- Tips

MP3

- Identify the decoder used by OEM is software or hardware;

- If there are 3rd party sound effect lib in OEM`s build for headset case, try to disable it when comparing with reference;

- Check is there any Hi-Fi function, try to get breakdown data when Hi-Fi enabled, especially for Hi-Fi PA;

Checklist --- Tips

Static Display

•OEM UI may keep refreshing the home screen, peaks can be observed periodically on current waveforms;

•Touch panel may generate too much interrupts and leads a bigger power number;

•Get ftrace for further checking when other abnormal wakeups observed on current waveforms;

•Check with OEMs on if there is any display effective enhance technology they are using, which may adjust the display solution , not only the backlight, according the ambient light, please disable it when you get power number for this case

•15ms periodical peaks observed , and can be reproduced on all display relate cases, there is a video regression fix for 1700, root cause is auto-refresh for cmd panel feature broken and fixed by the following CR
 FYI : https://review-android.quicinc.com/#/c/1483407/

Checklist --- Tips

Camera

•Lower down the fps to 25fps for preview case if OEMs agree;

•Set a smaller output size of camera sensor;

•Face detection and auto focus cost more power;

Checklist --- Tips

Other CPU Intensive Use Case

• Ptable should be match to the power/DMIPs curve of specific chipset version(like MSM8996 chipset V3.1.3) ;

• Ptable can be get or replaced by :

<u>Steps to push energy-awareness:</u>

```
adb shell

mv /system/bin/energy-awareness /system/bin/energy-awareness-original

adb push <energy-awareness> /system/bin/energy-awareness

adb shell chmod 777 /system/bin/energy-awareness

adb shell sync
```

reboot the device and check for new ptable values. One should see following output for LVT in bold.

```
adb shell

cat /d/msm_core/ptable
```

• Confirmed there was a bug related with BCL/Governor setting in 8996 init.qcom.post_boot.sh.

Will result in big cluster keep running at "performance" instead of "interactive" mode, and 100~200mA increasing for some cases
FYI CR 1478225

Checklist --- Tips

DoU

- Brightness should be adjust to a reasonable value when do apple to apple comparing with the target HW;

- Camera case should have a much better power number for MSM8996 comparing with MSM8992/8994/8974, due to MSM8996 has a strong GPU;

- Thermal facts should be taken into account when do DoU test, different thermal configuration may leads a difference DoU result;

Checklist --- Tips

Thermal

- Thermal-engine thread sometime rise up to the top on cpu occupying list.

Root cause is "VIRTUAL-CPUS" sensor is higher than 60°C and works in polling mode for temperature read. A fix has been mainlined by rise up threshold from 60C to 75C to minimize power impact;

- Currently when using cpu_voltage rule there is an implied floor at 1GHz for gold cluster and 729MHz for silver cluster by default (despite not having device_max_limit set);

FYI

https://review-android.quicinc.com/#/c/1356625/9