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Qualcomm Technologies, Inc. 5775 Morehouse Drive San Diego, CA 92121 U.S.A.
高通技术股份有限公司，美国加利福尼亚州圣地亚哥市莫豪斯路 5775 号，邮编 92121

Revision History

Revision	Date	Description
A	April 2015	Initial release

Note: There is no Rev. I, O, Q, S, X, or Z per Mil. standards.

内容

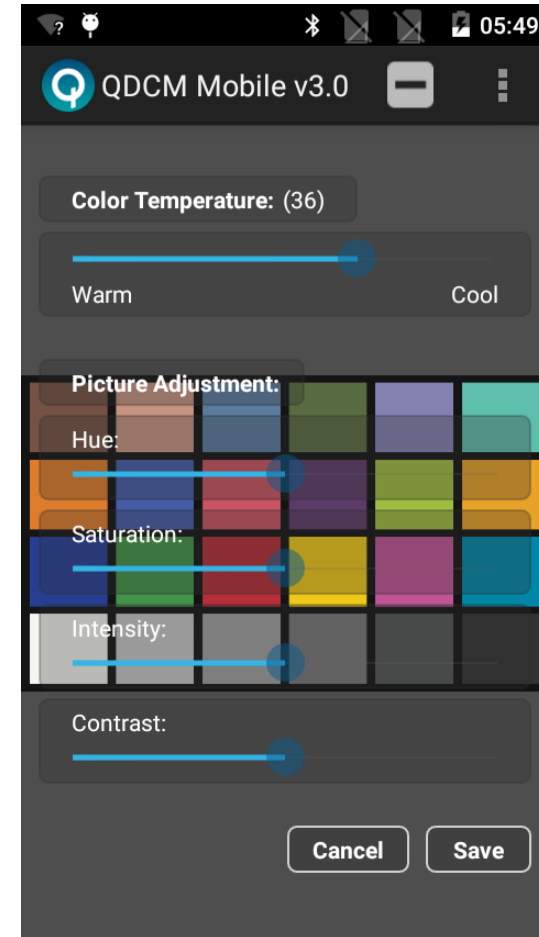
- Display
 - 8x09 平台相关的信息
 - QDCM Mobile App
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 - Extreme Color Detection导致某些场景下出现闪烁
 - Flat Scene Detection参数导致AEC在某些场景下出现闪烁
 - ISP/Sensor Gain同步问题导致AEC在某些场景下出现闪烁



Display

QDCM Mobile APP on device tuning

- 在8x09平台上，由于使用MDP3，故
 - 不支持PC 上的 QDCM tuning tool
 - 只支持手机上的 QDCM Mobile tuning apk
- 对于QDCM Mobile App 支持下面功能：
 - 色温调节color temperature
 - Picture adjustment (HSIC)
- 具体Apk的界面，见右图



QDCM Mobile APP on device tuning –续–

- 需要确保下面的文件在手机上存在，如下：
 - /system/framework/com.qti.snapdragon.sdk.display.jar
 - /system/app/colorservice/colorservice.apk
 - /system/app/QDCMMobileApp/QDCMMobileApp.apk
 - /system/app/DisplaySDKSample/DisplaySDKSample.apk
 - /system/vendor/lib/libsd_sdk_display.so
 - /system/etc/permissions/com.qti.snapdragon.sdk.display.xml
- QDCM mobile app的开源代码目录：
 - [vendor/qcom/proprietary/snapdragon-sdk/display/qdcm_mobile/](#)
- 参考文档：
 - 80-NV054-1_A_QDCM_Mobile_30_On-Target_Display_Color_Tuning_Tool_UG.pdf

Display Performance 的调试

- **增加MDP Bus BW Vote**
- echo 1 > mas
- echo 512 > slv
- echo 0 > ab
- echo 2456000000 > ib
- echo 1 > update_request
- echo 22 > mas
- echo 512 > slv
- echo 0 > ab
- echo 4912000000 > ib
- echo 1 > update_request

Display Performance 的调试 – 续一

- 增加 MDP Core Clock
- 在[kernel/drivers/video/msm/mdss/mdp3.h](#) 文件中，使用307200000 来替换下面三个宏的值
- #define [MDP_CORE_CLK_RATE_SVS](#) 160000000
- #define [MDP_CORE_CLK_RATE_SUPER_SVS](#) 200000000
- #define [MDP_CORE_CLK_RATE_MAX](#) 307200000

Property value 的设置说明

- debug.hwc.dynThreshold 属性
- 如何设置：
在[device/qcom/msm8909/system.prop](#) 文件中，
 - [debug.composition.type](#)=dyn
 - debug.hwc.dynThreshold=1.5
- 属性说明：
 - 从性能角度分析，当满足下面条件时，GPU 合成的性能比MDP3 Blit 合成要好些。
$$\text{Total layers area} \geq 1.5 * \text{FB area}$$
- 动态合成策略根据上面条件进行切换，即GPU 合成 和MDP3 合成之间的切换。
- 部分代码：
 - ```
if (compositionType & qdutils::COMPOSITION_TYPE_DYN) {
 // DYN Composition:
 // use copybit, if (TotalRGBRenderArea < threshold * FB Area)
```

# Property value 的设置说明 – 续一

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- debug.sf.hwc.canUseABC 属性
- 如何设置：  
在[device/qcom/msm8909/system.prop](#) 文件中，
  - debug.sf.hwc.canUseABC=1
- 属性说明：
  - ABC 表示 Application Buffer Composition
  - When we use serial blits for composition, content of all visible layers is required to be composed on to FrameBuffer (Destination Buffer) one by one and it takes more time.
  - ABC checks if there are two layers and if there is a top tiny layer overlapping with bottom full screen layer, we can compose that small layer directly onto the below layer/application buffer on which it is overlapping through blit hardware.
  - Since content that requires to be composed is reduced a lot, it helps in improving the overall performance

## Property value 的设置说明 – 续二

---

- debug.sf.swaprect 属性
- 如何设置：  
在[device/qcom/msm8909/system.prop](#) 文件中，
  - debug.sf.swaprect=1
- 属性说明：
  - Swap Rect 也称为 dirty Region
  - Surface Flinger does copying of the complete region for every layer (in effect the full screen) whether or not the layer's information has changed (dirty region).
  - There is scope for optimizing the area that is composed on to the frame buffer by MDP/GPU by considering the Dirty regions of layers.
  - SwapRect allows copying of only the dirty regions during composition by MDP/GPU.
  - Propagates the Dirty portion information of layers from HWUI to Surface flinger
  - Uses the Dirty information for optimizing the area to be composed by the Hardware.

# Property value 的设置说明 – 续三

---

- persist.mdp3.partialUpdate 属性
- 如何设置：  
在[device/qcom/msm8909/system.prop](#) 文件中，
  - persist.mdp3.partialUpdate=1
- 属性说明：
  - Partial Update 仅适用于command mode panel
  - The feature computes a ROI based on the updating layers and their dirty regions.
  - Partial Update will update only those regions of the panel where the data has actually changed (ROI).
  - Unchanged layers are omitted from blitting (blit in MDP3).
- 使用限制：
  - Layer scaling
  - Post processing (CABL/APICAL/SVI/ABA/SRC Histogram)

# 睡眠唤醒White flickering 问题

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- 对于一些panel，在唤醒的时候 需要延时几帧，从而避免闪烁的问题，具体的实现如下：
- LK：
- 在[target/msm8909/oem\\_panel.c](#)中，函数oem\_panel\_on，通过调用mdelay 来延时，例如，延时4帧，如下
- #define ILI9806E\_FWVGA\_VIDEO\_PANEL\_POST\_INIT\_DELAY 68
- 其中，68为16.67ms \*4 frame.
- Codeaurora的链接为
- target: msm8909: add necessary delay before turn on backlight  
<https://www.codeaurora.org/cgit/quic/la/kernel/lk/commit/?h=LA.BR.1.2.3&id=1da292f65f822a8d2f063de580450329b6c08fe2>

# 睡眠唤醒White flickering 问题 – 续一

---

- Kernel :
- 需要添加qcom,mdss-dsi-post-init-delay在LCD panel dtsi文件中 , 比如 :
- qcom,mdss-dsi-post-init-delay = <4>; // 延时4 帧
- Codeaurora的连接为
- msm: mdss: add support to read panel post init delay  
<https://www.codeaurora.org/cgit/quic/la/kernel/msm-3.10/commit/?h=LA.BR.1.2.3&id=410f0dfda4e8e5e2d50aa1dbd5c08f7d147ac0fb>
- ARM: dts: msm: add required post init delay for ili9806e panel  
<https://www.codeaurora.org/cgit/quic/la/kernel/msm-3.10/commit/?h=LA.BR.1.2.3&id=40b79fb77a837d29e23a3b8931644cb6754d620c>

# 不接panel时，当使能ESD，系统crash的问题

---

- 问题描述：
  - 使用video mode panel，并使能ESD check，在产线上不接panel的时候，系统会出现crash问题。
- 解决办法：
  - <https://www.codeaurora.org/cgit/quic/la/kernel/msm-3.10/commit/?h=LA.BR.1.2.3&id=c857f1bce7a5a4c9d56bda6e26cb31aa04e00c42>
  - <https://www.codeaurora.org/cgit/quic/la/kernel/msm-3.10/commit/?h=LA.BR.1.2.3&id=bfef0ffd726bbc92c7b95756de39ae6617a66890>





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# Camera

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# AEC 常见闪烁问题分析

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- AEC闪烁一般导致的原因
  - Tuning 文件中的Flat scene/Extreme color/Bright region detection参数卡的不够严，导致太容易判断为这类的场景(Hist ENT Enable已经为0)
  - Low light luma target 和indoor luma target相差太大，或者low light luma target的trigger start/end index比较接近
  - ISP digital gain 和sensor的analog gain生效时间点不同步
  - Sensor driver原因所致
- 实际案例分析
  - Extreme Color Detection导致某些场景下出现闪烁
  - Flat Scene Detection参数导致AEC在某些场景下出现闪烁
  - ISP gain同步问题导致AEC在某些场景下出现闪烁

# Tuning参数导致AEC闪烁的排除方法

- 关掉Bright region/Extreme color/Flat scene detection

```
1, /* Bright Region Influence ADJ Enable */
265, /* Bright Weight Lux Index Trigger */
0.500000f, /* Bright Weight Def */
220, /* Bright Level */
1, /* Color-Based Metering Enable */
1.000000f, /* Color Saturated Weight */
2.000000f, /* Color Luma Decrease Ratio */
0.887240f, /* RG Ratio lth */
2.206151f, /* RG Ratio hth */
0.772082f, /* BG Ratio lth */
1.800000f, /* BG Ratio hth */
1.100000f, /* Flat White Gray vs Nongray Thresh */
0.500000f, /* Flat Dark Gray vs Nongray Thresh */
```

```
1, /* Enable */
42, /* Start Level */
200, /* End Level */
40, /* Range */
0.800000f, /* Delta Threshold */
1.200000f, /* Bright Flat Det Th */
10.000000f, /* Dark Flat Det Th */
0.001000f, /* Bright Flat Tail Det */
0.100000f, /* Dark Flat Tail Det */
},
0.600000f, /* Bright Flat Compensation Ratio */
1.800000f, /* Dark Flat Compensation Ratio */
},
```

- 若关掉之后不能复制到，请参考“80-NC789-1”和“80-NK872-5”进行调试
- 将low light luma target设置为与indoor一样

“Aec.h” - 8916/8939平台

“Chromatix tuning文件” - 8994平台

```
: /* prameters for low light luma target */
: #define AEC_LOW_LIGHT_LUMA_TARGET_INIT 26
: #define AEC_LOW_LIGHT_LUMA_START_IDX_INIT 350
: #define AEC_LOW_LIGHT_LUMA_END_IDX_INIT 420
:
```

```
39, /* Low Light Luma Target */
360, /* Lux Index Start Trigger */
410, /* Lux Index End Trigger */
```

# ISP/Sensor Gain和曝光时间生效点不同步的排除方法

- 不同步带来的AE闪烁一般发生在室内场景
  - 关闭camera app参数中的anti-banding选项
    - 如果问题不能复制，则说明是ISP/Sensor gain不同步所致
  - 修改sensor driver，不使用sensor gain，并在app中打开anti-banding，测试能否复制到问题

```
static uint16_t imx135_real_to_register_gain(float gain) {
 uint16_t reg_gain;
 if (gain < 1.0)
 gain = 1.0;
 if (gain > 8.0)
 gain = 8.0;
 reg_gain = (uint16_t)(256.0 - 256.0 / gain);
 return reg_gain;
}
```



```
static uint16_t imx135_real_to_register_gain(float gain) {
 uint16_t reg_gain;
 if (gain < 1.0)
 gain = 1.0;
 if (gain > 1.0)
 gain = 1.0;
 reg_gain = (uint16_t)(256.0 - 256.0 / gain);
 return reg_gain;
}
```

- 如果依然复制到问题，则说明是ISP gain生效不同步所致
  - 如果不能复制到问题，则说明是sensor gain生效不同步所致
- 解决办法
  - 如果是8916/8939/8974等平台，请提case寻求QC的帮忙
  - 如果是8994平台，可先尝试调试driver中的以下参数

```
.app_delay = {
 [SENSOR_DELAY_EXPOSURE] = 0,
 [SENSOR_DELAY_ANALOG_SENSOR_GAIN] = 0,
 [SENSOR_DELAY_DIGITAL_SENSOR_GAIN] = 0,
 [SENSOR_DELAY_ISP_GAIN] = 0,
},
```

# Sensor Driver导致AEC闪烁

- 在前面的排除法都使用过之后，问题原因依然没有找到，并且实际场景的log中发现，场景不变的情况下即使是exp index差异1，亮度都会有很大变化，此时需要考虑是否为sensor driver本身的问题，如line count和frame length之间的关系错误设置等
  - 此时需要做aec\_eztune\_test，请提case寻求QC的帮助

```
aec_process_pack_output:target_luma=65 cur_luma=102 stored_digital_gain=1.000000 exp_index=296, real_gain=4.000000, linecnt=1534 , aec_settled 0
aec_process_pack_output:target_luma=65 cur_luma=102 stored_digital_gain=1.000000 exp_index=296, real_gain=4.000000, linecnt=1534 , aec_settled 0
aec_process_pack_output:target_luma=65 cur_luma=102 stored_digital_gain=1.000000 exp_index=296, real_gain=4.000000, linecnt=1534 , aec_settled 0
aec_process_pack_output:target_luma=65 cur_luma=99 stored_digital_gain=1.000000 exp_index=297, real_gain=4.000000, linecnt=1580 , aec_settled 0
aec_process_pack_output:target_luma=65 cur_luma=99 stored_digital_gain=1.000000 exp_index=297, real_gain=4.000000, linecnt=1580 , aec_settled 0
aec_process_pack_output:target_luma=65 cur_luma=99 stored_digital_gain=1.000000 exp_index=298, real_gain=4.000000, linecnt=1627 , aec_settled 0
aec_process_pack_output:target_luma=65 cur_luma=99 stored_digital_gain=1.000000 exp_index=298, real_gain=4.000000, linecnt=1627 , aec_settled 0
aec_process_pack_output:target_luma=65 cur_luma=99 stored_digital_gain=1.000000 exp_index=298, real_gain=4.000000, linecnt=1627 , aec_settled 0
aec_process_pack_output:target_luma=65 cur_luma=99 stored_digital_gain=1.000000 exp_index=299, real_gain=4.000000, linecnt=1675 , aec_settled 0
aec_process_pack_output:target_luma=65 cur_luma=99 stored_digital_gain=1.000000 exp_index=299, real_gain=4.000000, linecnt=1675 , aec_settled 0
aec_process_pack_output:target_luma=65 cur_luma=99 stored_digital_gain=1.000000 exp_index=299, real_gain=4.000000, linecnt=1675 , aec_settled 0
aec_process_pack_output:target_luma=65 cur_luma=99 stored_digital_gain=1.000000 exp_index=300, real_gain=4.000000, linecnt=1725 , aec_settled 0
aec_process_pack_output:target_luma=65 cur_luma=99 stored_digital_gain=1.000000 exp_index=300, real_gain=4.000000, linecnt=1725 , aec_settled 0
aec_process_pack_output:target_luma=65 cur_luma=99 stored_digital_gain=1.000000 exp_index=300, real_gain=4.000000, linecnt=1725 , aec_settled 0
aec_process_pack_output:target_luma=65 cur_luma=125 stored_digital_gain=1.000000 exp_index=301, real_gain=4.000000, linecnt=1776 , aec_settled 0
aec_process_pack_output:target_luma=65 cur_luma=125 stored_digital_gain=1.000000 exp_index=301, real_gain=4.000000, linecnt=1776 , aec_settled 0
aec_process_pack_output:target_luma=65 cur_luma=125 stored_digital_gain=1.000000 exp_index=301, real_gain=4.000000, linecnt=1776 , aec_settled 0
```

# Extreme Color Detection导致某些场景下出现闪烁

- D65光源下，对18%灰卡，出现AEC闪烁的问题
  - adb打开AEC的log
    - 8916/8939/8974 -> adb shell setprop persist.camera.stats.debug.mask 1
    - 8994 -> adb shell setprop persist.camera.stats.debug 3
  - 查询关键字” aec\_process\_pack\_output:target\_luma|extr\_blu”
    - 从log中可以看出在场景不变，exp\_inedx只有1的变化的情况下，extreme blue的数量有较大的波动
    - 将Chromatix tuning文件中“/\* Color Luma Decrease Ratio \*/”设置为1，之后现象消失

```
aec_process_pack_output:target_luma=53 cur_luma=48 stored_digital_gain=1.000000 exp_index=308, real_gain=3.075877, linecnt=2875 , aec_settled 0
aec_process_calc_current_bayer_metered_luma: extr_red=0, extr_blu=116, extr_gr=0
aec_process_pack_output:target_luma=53 cur_luma=58 stored_digital_gain=1.000000 exp_index=307, real_gain=2.985156, linecnt=2875 , aec_settled 0
aec_process_calc_current_bayer_metered_luma: extr_red=0, extr_blu=120, extr_gr=0
aec_process_pack_output:target_luma=53 cur_luma=60 stored_digital_gain=1.000000 exp_index=307, real_gain=2.985156, linecnt=2875 , aec_settled 0
aec_process_calc_current_bayer_metered_luma: extr_red=0, extr_blu=63, extr_gr=0
aec_process_pack_output:target_luma=53 cur_luma=48 stored_digital_gain=1.000000 exp_index=308, real_gain=3.075877, linecnt=2875 , aec_settled 0
aec_process_calc_current_bayer_metered_luma: extr_red=0, extr_blu=62, extr_gr=0
aec_process_pack_output:target_luma=53 cur_luma=48 stored_digital_gain=1.000000 exp_index=308, real_gain=3.075877, linecnt=2875 , aec_settled 0
aec_process_calc_current_bayer_metered_luma: extr_red=0, extr_blu=115, extr_gr=0
aec_process_pack_output:target_luma=53 cur_luma=59 stored_digital_gain=1.000000 exp_index=307, real_gain=2.985156, linecnt=2875 , aec_settled 0
aec_process_calc_current_bayer_metered_luma: extr_red=0, extr_blu=121, extr_gr=0
aec_process_pack_output:target_luma=53 cur_luma=59 stored_digital_gain=1.000000 exp_index=307, real_gain=2.985156, linecnt=2875 , aec_settled 0
aec_process_calc_current_bayer_metered_luma: extr_red=0, extr_blu=62, extr_gr=0
aec_process_pack_output:target_luma=53 cur_luma=48 stored_digital_gain=1.000000 exp_index=308, real_gain=3.075877, linecnt=2875 , aec_settled 0
aec_process_calc_current_bayer_metered_luma: extr_red=0, extr_blu=64, extr_gr=0
aec_process_pack_output:target_luma=53 cur_luma=49 stored_digital_gain=1.000000 exp_index=308, real_gain=3.075877, linecnt=2875 , aec_settled 0
aec_process_calc_current_bayer_metered_luma: extr_red=0, extr_blu=116, extr_gr=0
aec_process_pack_output:target_luma=53 cur_luma=58 stored_digital_gain=1.000000 exp_index=307, real_gain=2.985156, linecnt=2875 , aec_settled 0
aec_process_calc_current_bayer_metered_luma: extr_red=0, extr_blu=118, extr_gr=0
aec_process_pack_output:target_luma=53 cur_luma=59 stored_digital_gain=1.000000 exp_index=307, real_gain=2.985156, linecnt=2875 , aec_settled 0
aec_process_calc_current_bayer_metered_luma: extr_red=0, extr_blu=75, extr_gr=0
aec_process_pack_output:target_luma=53 cur_luma=50 stored_digital_gain=1.000000 exp_index=307, real_gain=2.985156, linecnt=2875 , aec_settled 1
```

# Flat Scene Detection参数导致AEC在某些场景下出现闪烁

- 普通室外有马路有建筑场景出现AEC闪烁的问题
  - 查询关键字”aec\_process\_pack\_output:target\_luma|tf=|luma\_offset =”
    - luma\_offset为flat scene被探测到之后需要将current luma调整的ratio
    - 由一下log可以看出场景不变的情况下luma\_offset处于震荡的状况导致AEC闪烁
    - 将Chromatix header文件中的flat detection关掉之后，现象消失

```
aec_process_calc_current_bayer_metered_luma: sumluma = 28230.761719, sumluma_all = 660.854736, luma (after offset) = 37, flat_luma_flag = 1, aec->hist_flat_severity = 0.985976, luma_offset = 1.452965
aec_process_pack_output:target_luma=41 cur_luma=37 stored_digital_gain=1.000000 exp_index=201, real_gain=1.003906, linecnt=387, aec_settled 1
tf=1.000000
aec_process_calc_current_bayer_metered_luma: sumluma = 28341.123047, sumluma_all = 535.519409, luma (after offset) = 36, flat_luma_flag = 1, aec->hist_flat_severity = 0.986116, luma_offset = 1.407668
aec_process_pack_output:target_luma=41 cur_luma=36 stored_digital_gain=1.000000 exp_index=202, real_gain=1.000000, linecnt=400, aec_settled 1
tf=1.000000
aec_process_calc_current_bayer_metered_luma: sumluma = 28364.386719, sumluma_all = 545.273132, luma (after offset) = 35, flat_luma_flag = 1, aec->hist_flat_severity = 0.986255, luma_offset = 1.366902
aec_process_pack_output:target_luma=41 cur_luma=35 stored_digital_gain=1.000000 exp_index=202, real_gain=1.000000, linecnt=400, aec_settled 1
tf=1.000000
aec_process_calc_current_bayer_metered_luma: sumluma = 28385.199219, sumluma_all = 541.783813, luma (after offset) = 34, flat_luma_flag = 1, aec->hist_flat_severity = 0.986393, luma_offset = 1.330212
aec_process_pack_output:target_luma=41 cur_luma=34 stored_digital_gain=1.000000 exp_index=204, real_gain=1.000000, linecnt=424, aec_settled 1
tf=1.000000
aec_process_calc_current_bayer_metered_luma: sumluma = 28968.849609, sumluma_all = 583.127136, luma (after offset) = 35, flat_luma_flag = 1, aec->hist_flat_severity = 0.986529, luma_offset = 1.297190
aec_process_pack_output:target_luma=41 cur_luma=35 stored_digital_gain=1.000000 exp_index=204, real_gain=1.000000, linecnt=424, aec_settled 1
tf=1.000000
aec_process_calc_current_bayer_metered_luma: sumluma = 28995.906250, sumluma_all = 564.218933, luma (after offset) = 34, flat_luma_flag = 1, aec->hist_flat_severity = 0.986663, luma_offset = 1.267471
aec_process_pack_output:target_luma=41 cur_luma=34 stored_digital_gain=1.000000 exp_index=206, real_gain=1.000000, linecnt=449, aec_settled 1
tf=1.800000
aec_process_calc_current_bayer_metered_luma: sumluma = 30168.908203, sumluma_all = 643.970093, luma (after offset) = 36, flat_luma_flag = 1, aec->hist_flat_severity = 0.986797, luma_offset = 1.320724
aec_process_pack_output:target_luma=41 cur_luma=36 stored_digital_gain=1.000000 exp_index=206, real_gain=1.000000, linecnt=449, aec_settled 1
tf=1.800000
aec_process_calc_current_bayer_metered_luma: sumluma = 30118.873047, sumluma_all = 650.235657, luma (after offset) = 38, flat_luma_flag = 1, aec->hist_flat_severity = 0.986929, luma_offset = 1.368652
aec_process_pack_output:target_luma=41 cur_luma=38 stored_digital_gain=1.000000 exp_index=206, real_gain=1.000000, linecnt=449, aec_settled 1
tf=1.800000
aec_process_calc_current_bayer_metered_luma: sumluma = 31373.673828, sumluma_all = 747.223145, luma (after offset) = 40, flat_luma_flag = 1, aec->hist_flat_severity = 0.987059, luma_offset = 1.411787
aec_process_pack_output:target_luma=41 cur_luma=40 stored_digital_gain=1.000000 exp_index=206, real_gain=1.000000, linecnt=449, aec_settled 1
tf=1.800000
aec_process_calc_current_bayer_metered_luma: sumluma = 31408.830078, sumluma_all = 738.270081, luma (after offset) = 42, flat_luma_flag = 1, aec->hist_flat_severity = 0.987189, luma_offset = 1.450608
aec_process_pack_output:target_luma=41 cur_luma=42 stored_digital_gain=1.000000 exp_index=206, real_gain=1.000000, linecnt=449, aec_settled 1
tf=1.800000
```



# ISP/Sensor Gain同步问题导致AEC在某些场景下出现闪烁

- 室内环境在某些角度存在AEC闪烁的问题
  - 查找关键字“aec\_process\_pack\_output:target\_luma”
  - 由log可以看出在exp\_index由345变化到346时，理论上cur\_luma应该要变大，但是出现了一帧变很小的情况
  - 并且可以看出此情况发生在line count与gain同时变化时(line count变小，并且gain 变大或是line count变大，并且gain变小)
  - 此时如果关闭anti-banding就不会复制到问题了，原因是关闭anti-banding之后不会出现gain和line count同时变化的情况

```
aec_process_pack_output:target_luma=59 cur_luma=64 stored_digital_gain=1.000000 exp_index=345, real_gain=9.142460, linecnt=2871 , aec_settled 0
aec_process_pack_output:target_luma=59 cur_luma=56 stored_digital_gain=1.000000 exp_index=345, real_gain=9.142460, linecnt=2871 , aec_settled 1
aec_process_pack_output:target_luma=59 cur_luma=56 stored_digital_gain=1.000000 exp_index=345, real_gain=9.142460, linecnt=2871 , aec_settled 1
aec_process_pack_output:target_luma=59 cur_luma=45 stored_digital_gain=1.000000 exp_index=346, real_gain=7.061652, linecnt=3828 , aec_settled 0
aec_process_pack_output:target_luma=59 cur_luma=55 stored_digital_gain=1.000000 exp_index=346, real_gain=7.061652, linecnt=3828 , aec_settled 0
aec_process_pack_output:target_luma=59 cur_luma=55 stored_digital_gain=1.000000 exp_index=346, real_gain=7.061652, linecnt=3828 , aec_settled 0
aec_process_pack_output:target_luma=59 cur_luma=64 stored_digital_gain=1.000000 exp_index=345, real_gain=9.142460, linecnt=2871 , aec_settled 0
aec_process_pack_output:target_luma=59 cur_luma=57 stored_digital_gain=1.000000 exp_index=345, real_gain=9.142460, linecnt=2871 , aec_settled 1
aec_process_pack_output:target_luma=59 cur_luma=57 stored_digital_gain=1.000000 exp_index=345, real_gain=9.142460, linecnt=2871 , aec_settled 1
aec_process_pack_output:target_luma=59 cur_luma=45 stored_digital_gain=1.000000 exp_index=346, real_gain=7.061652, linecnt=3828 , aec_settled 0
aec_process_pack_output:target_luma=59 cur_luma=55 stored_digital_gain=1.000000 exp_index=346, real_gain=7.061652, linecnt=3828 , aec_settled 0
aec_process_pack_output:target_luma=59 cur_luma=55 stored_digital_gain=1.000000 exp_index=346, real_gain=7.061652, linecnt=3828 , aec_settled 0
aec_process_pack_output:target_luma=59 cur_luma=64 stored_digital_gain=1.000000 exp_index=345, real_gain=9.142460, linecnt=2871 , aec_settled 0
aec_process_pack_output:target_luma=59 cur_luma=57 stored_digital_gain=1.000000 exp_index=345, real_gain=9.142460, linecnt=2871 , aec_settled 1
aec_process_pack_output:target_luma=59 cur_luma=57 stored_digital_gain=1.000000 exp_index=345, real_gain=9.142460, linecnt=2871 , aec_settled 1
aec_process_pack_output:target_luma=59 cur_luma=46 stored_digital_gain=1.000000 exp_index=346, real_gain=7.061652, linecnt=3828 , aec_settled 0
aec_process_pack_output:target_luma=59 cur_luma=58 stored_digital_gain=1.000000 exp_index=346, real_gain=7.061652, linecnt=3828 , aec_settled 1
aec_process_pack_output:target_luma=59 cur_luma=58 stored_digital_gain=1.000000 exp_index=346, real_gain=7.061652, linecnt=3828 , aec_settled 1
```



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## Questions?

<https://support.cdmatech.com>

