CONFIDENTIAL B

MT6771 AF Case Study

Case study list

Category	Issue description	Issue example
对焦模糊	低对比景	低对比景模糊
	平坦景	天空失焦
对焦速度	走PD且对焦幅度大(PD target接近)	对办公室盆栽touch对焦幅度大
	走PD且对焦幅度大(PD target不准)	PD target不准 The preview is out of focus in the PD moving
	走CAF且对焦速度慢(对焦框内有过曝区)	过曝区导致low conf, 走的CAF，改为走PD case study : adjust the saturation threshold
触发速度	第一次进相机触发速度	首次进入camera 触发速度慢
	CAF 不触发	从远景到近景时对焦模糊，不触发对焦
	CAF 触发速度慢(对焦框内有过曝区)	过曝区导致low conf, 走的CAF，改为走PD case study : adjust the saturation threshold
faceAF对焦不准	厘清是否为手震影响	
	厘清是否为人脸移动影响	
点光源	判断是否为点光源及PD PL	
	没有中点光源	固定支架touch日光灯失焦
		点光远景 失焦
		夜景点光源失焦
	误中点光源	非点光源景误中点光源
	失焦(CAF)	某场景点光源大概率失焦

对焦模糊

低对比景模糊

低对比景

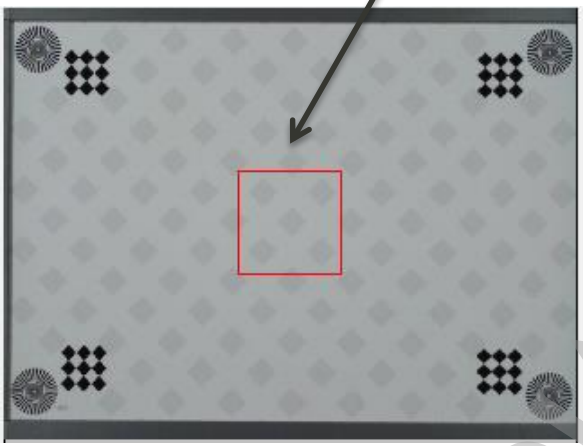
Low contrast issue – 6% chart

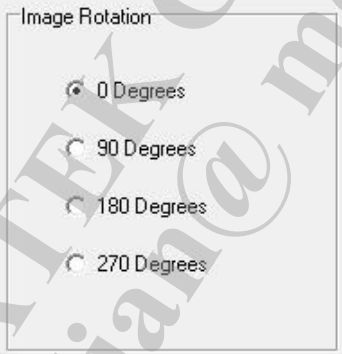
- Test item : low contrast by 6% chart
- Test description
  - Environment : 6500K , 500lux
  - Distance : 30~40cm

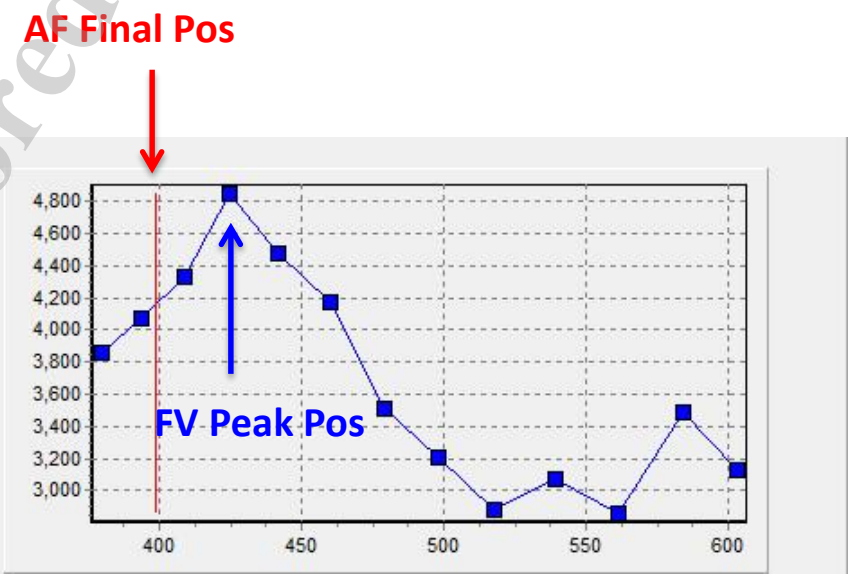
Low contrast issue – 6% chart

- **Step 1**: Check the focus results.
  - If **(Focus fail)** : go to step 2
  - Else if **(Focus success)**: go to step 4

Red border: Fail
Green border: Success



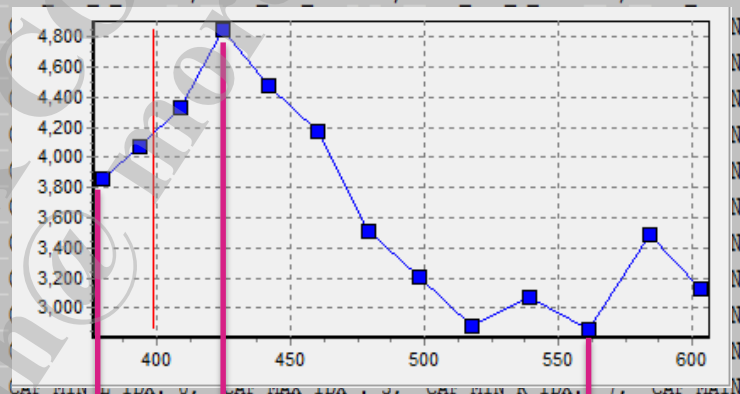




Low contrast issue – 6% chart

- **Step 2**: Check the AF search information.
  - (1) Check the last AF search information of “CAF_MIN_L_IDX”, “CAF_MAX_IDX”, “CAF_MIN_R_IDX”.

```
CAF_IDX :  0,  CAF_POS:  479,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3781, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 0,  CAF_MIN_R_IDX:  0,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  1,  CAF_POS:  460,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4224, CAF_MIN_L_IDX: 1,  CAF_MAX_IDX : 1,  CAF_MIN_R_IDX:  0,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  2,  CAF_POS:  442,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4600, CAF_MIN_L_IDX: 2,  CAF_MAX_IDX : 2,  CAF_MIN_R_IDX:  0,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  3,  CAF_POS:  425,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4744, CAF_MIN_L_IDX: 3,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  0,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  4,  CAF_POS:  409,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4294,                                                                                    N_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  5,  CAF_POS:  394,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4553,                                                                                    N_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  6,  CAF_POS:  380,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3916,                                                                                    N_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  0,  CAF_POS:  380,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3854,                                                                                    N_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  1,  CAF_POS:  394,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4067,                                                                                    N_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  2,  CAF_POS:  409,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4328,                                                                                    N_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  3,  CAF_POS:  425,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4846,                                                                                    N_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  4,  CAF_POS:  442,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4471,                                                                                    N_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  5,  CAF_POS:  460,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4167,                                                                                    N_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  6,  CAF_POS:  479,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3507,                                                                                    N_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  7,  CAF_POS:  498,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3209,                                                                                    N_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  8,  CAF_POS:  518,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 2876, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  8,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  9,  CAF_POS:  539,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3076, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  8,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX : 10,  CAF_POS:  561,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 2859, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX: 10,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX : 11,  CAF_POS:  584,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3489, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX: 10,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX : 12,  CAF_POS:  603,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3132, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX: 10,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
```



The last AF search information!!!

Low contrast issue – 6% chart

- **Step 2**: Check the AF search information.
  - (2) Check the “CAF_FV_LSB” value of “CAF_MIN_L_IDX”, “CAF_MAX_IDX”, “CAF_MIN_R_IDX”.

```
CAF_IDX :  0,  CAF_POS:  479,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3781, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 0,  CAF_MIN_R_IDX:  0,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  1,  CAF_POS:  460,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4224, CAF_MIN_L_IDX: 1,  CAF_MAX_IDX : 1,  CAF_MIN_R_IDX:  0,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  2,  CAF_POS:  442,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4600, CAF_MIN_L_IDX: 2,  CAF_MAX_IDX : 2,  CAF_MIN_R_IDX:  0,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  3,  CAF_POS:  425,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4744, CAF_MIN_L_IDX: 3,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  0,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  4,  CAF_POS:  409,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4294, CAF_MIN_L_IDX: 4,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  0,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  5,  CAF_POS:  394,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4553, CAF_MIN_L_IDX: 4,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  0,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  6,  CAF_POS:  380,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3916, CAF_MIN_L_IDX: 6,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  0,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  0,  CAF_POS:  380,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3854, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 0,  CAF_MIN_R_IDX:  0,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  1,  CAF_POS:  394,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4067, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 1,  CAF_MIN_R_IDX:  1,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  2,  CAF_POS:  409,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4328, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 2,  CAF_MIN_R_IDX:  2,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  3,  CAF_POS:  425,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4846, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  3,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  4,  CAF_POS:  442,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4471, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  4,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  5,  CAF_POS:  460,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4167, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  5,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  6,  CAF_POS:  479,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3507, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  6,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  7,  CAF_POS:  498,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3209, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  7,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  8,  CAF_POS:  518,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 2876, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  8,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  9,  CAF_POS:  539,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3076, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  8,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX : 10,  CAF_POS:  561,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 2859, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX: 10,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX : 11,  CAF_POS:  584,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3489, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX: 10,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX : 12,  CAF_POS:  603,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3132, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX: 10,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
```

Low contrast issue – 6% chart

- **Step 2**: Check the AF search information.
  - (3) Calculate the value of max{(CAF_MAX_FV - CAF_MIN_L_FV), (CAF_MAX_FV - CAF_MIN_R_FV)}.
    - Ans. = max{(4846-3854), (4846-2859)} = max{992,1987} = 1987
  - (4) The value obtained by (3) is **less than** CAF_Main_Thres. Try to check it.

```
CAF_IDX :  0,  CAF_POS:  479,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3781, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 0,  CAF_MIN_R_IDX:  0,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  1,  CAF_POS:  460,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4224, CAF_MIN_L_IDX: 1,  CAF_MAX_IDX : 1,  CAF_MIN_R_IDX:  0,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  2,  CAF_POS:  442,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4600, CAF_MIN_L_IDX: 2,  CAF_MAX_IDX : 2,  CAF_MIN_R_IDX:  0,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  3,  CAF_POS:  425,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4744, CAF_MIN_L_IDX: 3,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  0,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  4,  CAF_POS:  409,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4294, CAF_MIN_L_IDX: 4,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  0,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  5,  CAF_POS:  394,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4553, CAF_MIN_L_IDX: 4,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  0,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  6,  CAF_POS:  380,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3916, CAF_MIN_L_IDX: 6,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  0,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  0,  CAF_POS:  380,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3854, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 0,  CAF_MIN_R_IDX:  0,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  1,  CAF_POS:  394,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4067, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 1,  CAF_MIN_R_IDX:  1,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  2,  CAF_POS:  409,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4328, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 2,  CAF_MIN_R_IDX:  2,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  3,  CAF_POS:  425,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4846, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  3,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  4,  CAF_POS:  442,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4471, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  4,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  5,  CAF_POS:  460,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 4167, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  5,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  6,  CAF_POS:  479,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3507, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  6,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  7,  CAF_POS:  498,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3209, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  7,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  8,  CAF_POS:  518,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 2876, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  8,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX :  9,  CAF_POS:  539,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3076, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX:  8,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX : 10,  CAF_POS:  561,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 2859, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX: 10,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX : 11,  CAF_POS:  584,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3489, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX: 10,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
CAF_IDX : 12,  CAF_POS:  603,  CAF_FV_MSB  :  0,  CAF_FV_LSB  : 3132, CAF_MIN_L_IDX: 0,  CAF_MAX_IDX : 3,  CAF_MIN_R_IDX: 10,  CAF_MAIN_THRES: 2000,  CAF_SUB_THRES: 2000,
```

Low contrast issue – 6% chart

- **Step 3**: Check the parameter settings for CAF_Main_Thres.
  - (5) **CAF_Main_Thres** = max {(CAF_MAX_FV *NV_MAIN_THRES/100), SCN_MIN_TH}
    - max{4846*15/100, 2000} = max{727, **2000**}

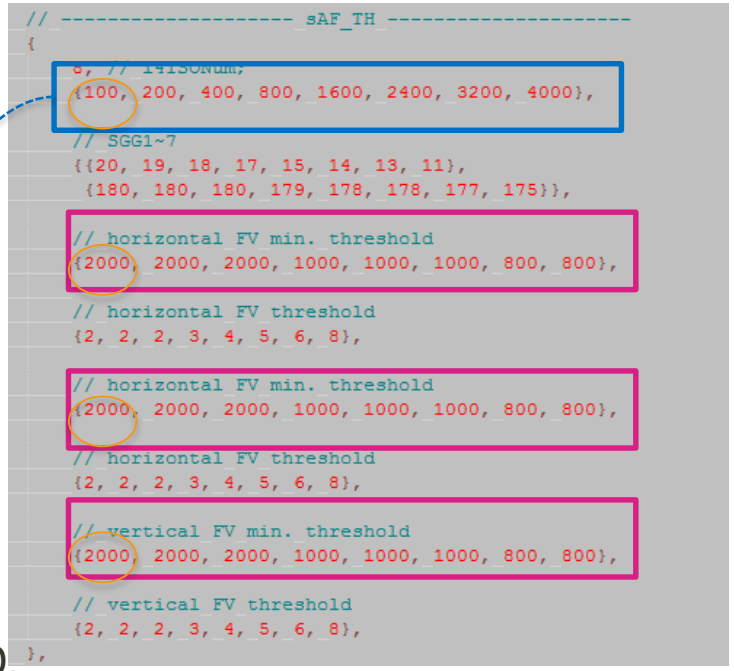
NV_MAIN_THRES	15

SCN_MIN_TH	2000

    - Try to adjust SCN_MIN_TH.
  - (6) SCN_MIN_TH :
    - The value of "SCN_MIN_TH" is determined by the ISO.

SCN_ISO	100

    - Check the ISO table and get the min threshold value with matched ISO.



Low contrast issue – 6% chart

- **Step 3**: Check the parameter settings for SCN_MIN_TH.
  - (7) Adjust SCN_MIN_TH : **2000 -> 1800**
    - Path:\vendor\mediatek\proprietary\custom\mt6757\hal\lens\ver2\<lens_name>af\lens_param_<lens_name>_xx.cpp

Before.txt

```
// -------------------- sAF_TH --------------------
{
    8, // i4ISONum;
    {100, 200, 400, 800, 1600, 2400, 3200, 4000},

    // SGG1~7
    {{20, 19, 18, 17, 15, 14, 13, 11},
     {30, 29, 28, 26, 25, 23, 22, 19},
     {43, 42, 41, 40, 38, 37, 35, 32},
     {62, 61, 60, 59, 57, 56, 54, 51},
     {89, 88, 87, 86, 84, 83, 82, 79},
     {127, 126, 125, 124, 123, 122, 121, 118},
     {180, 180, 180, 179, 178, 178, 177, 175}},

    // horizontal FV min. threshold
    {2000, 2000, 2000, 1000, 1000, 1000, 800, 800},

    // horizontal FV threshold
    {2, 2, 2, 3, 4, 5, 6, 8},

    // horizontal FV min. threshold
    {2000, 2000, 2000, 1000, 1000, 1000, 800, 800},

    // horizontal FV threshold
    {2, 2, 2, 3, 4, 5, 6, 8},

    // vertical FV min. threshold
    {2000, 2000, 2000, 1000, 1000, 1000, 800, 800},

    // vertical FV threshold
    {2, 2, 2, 3, 4, 5, 6, 8},
},
```

After.txt

```
// -------------------- sAF_TH --------------------
{
    8, // i4ISONum;
    {100, 200, 400, 800, 1600, 2400, 3200, 4000},

    // SGG1~7
    {{20, 19, 18, 17, 15, 14, 13, 11},
     {30, 29, 28, 26, 25, 23, 22, 19},
     {43, 42, 41, 40, 38, 37, 35, 32},
     {62, 61, 60, 59, 57, 56, 54, 51},
     {89, 88, 87, 86, 84, 83, 82, 79},
     {127, 126, 125, 124, 123, 122, 121, 118},
     {180, 180, 180, 179, 178, 178, 177, 175}},

    // horizontal FV min. threshold
    {1800, 2000, 2000, 1000, 1000, 1000, 800, 800},

    // horizontal FV threshold
    {2, 2, 2, 3, 4, 5, 6, 8},

    // horizontal FV min. threshold
    {1800, 2000, 2000, 1000, 1000, 1000, 800, 800},

    // horizontal FV threshold
    {2, 2, 2, 3, 4, 5, 6, 8},

    // vertical FV min. threshold
    {1800, 2000, 2000, 1000, 1000, 1000, 800, 800},

    // vertical FV threshold
    {2, 2, 2, 3, 4, 5, 6, 8},
},
```

Low contrast issue – 6% chart

- **Step 4**: Check the Pre-Check items.
  - If **“pass”**, go to Step 5.
  - If **“fail”**, change the module to test again and check the module assembly problem with module house.

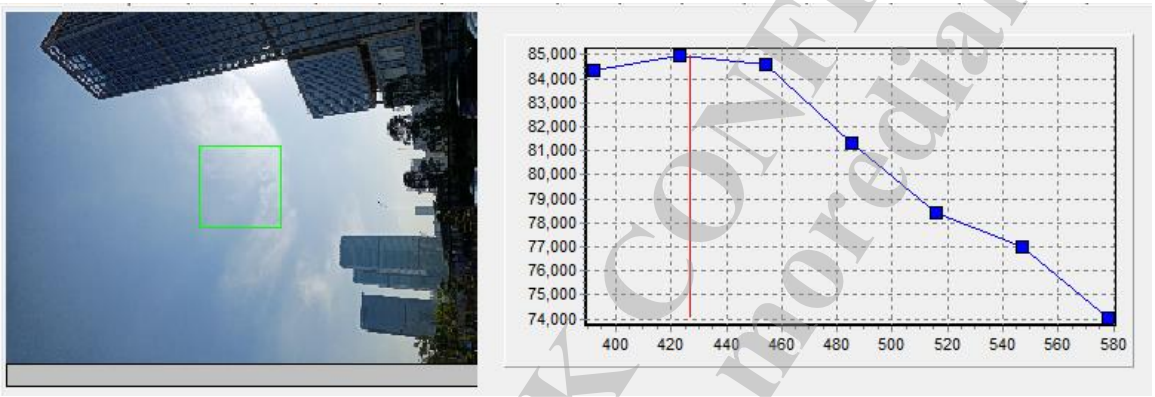
- **Step 5**: Set the “**frame wait table**” parameters to “**{0, 0, 500, 500, 500}**”.

天空失焦

平坦景

Flat FV Protect

- **Issue:** sky scene blur



- **Root cause:** G-sum dominate FV at this flat scene. When lens move toward infinity, image get brighter but scene is flat, FV increased by pixel get brighter not edge clear

- **Solution:** check FV is dominate by G-sum, move to hyper-focus(fail_pos)

Flat FV Protect

- **Tuning**
  - Step1: dump fail image EXIF data
  - Step2: find search process tag

DP_IDX	0	DP_POS	392	DP_VLU	0	DP_VLU 84339
DP_IDX	1	DP_POS	423	DP_VLU	0	DP_VLU 84963
DP_IDX	2	DP_POS	454	DP_VLU	0	DP_VLU 84612
DP_IDX	3	DP_POS	485	DP_VLU	0	DP_VLU 81319
DP_IDX	4	DP_POS	516	DP_VLU	0	DP_VLU 78419
DP_IDX	5	DP_POS	547	DP_VLU	0	DP_VLU 76987
DP_IDX	6	DP_POS	578	DP_VLU	0	DP_VLU 74035

  - Step3: find corresponding G-sum value of each lens position

HANDLEAF_CNT	720	392	FM_STATUS	3	FM_GYRO	606013	FM_ACCE_XYZ	4079047	FM_G_SUM_LV 7534 0 158 F
HANDLEAF_CNT	721	423	FM_STATUS	3	FM_GYRO	199013	FM_ACCE_XYZ	5077046	FM_G_SUM_LV 7403 0 158 F
HANDLEAF_CNT	722	454	FM_STATUS	3	FM_GYRO	75017	FM_ACCE_XYZ	4078047	FM_G_SUM_LV 7320 0 158 F
HANDLEAF_CNT	723	485	FM_STATUS	3	FM_GYRO	54010	FM_ACCE_XYZ	4078047	FM_G_SUM_LV 7255 0 158 F
HANDLEAF_CNT	724	516	FM_STATUS	3	FM_GYRO	35007	FM_ACCE_XYZ	5079047	FM_G_SUM_LV 7166 0 158 F
HANDLEAF_CNT	725	547	FM_STATUS	3	FM_GYRO	3004	FM_ACCE_XYZ	3080047	FM_G_SUM_LV 7151 0 158 F
HANDLEAF_CNT	726	578	FM_STATUS	3	FM_GYRO	2004	FM_ACCE_XYZ	4079046	FM_G_SUM_LV 7093 0 158 F

AAA0BBB

frame # lens pos

CCC0DDD

G-sum LV

Flat FV Protect

- **Tuning**
  - Step4: calculate FV/G

							FV	G-sum	FV/G
DP_IDX	0	DP_POS	392	DP_VLU	0	DP_VLU	84339	7534	11.19
DP_IDX	1	DP_POS	423	DP_VLU	0	DP_VLU	84963	7403	11.48
DP_IDX	2	DP_POS	454	DP_VLU	0	DP_VLU	84612	7320	11.56
DP_IDX	3	DP_POS	485	DP_VLU	0	DP_VLU	81319	7255	11.21
DP_IDX	4	DP_POS	516	DP_VLU	0	DP_VLU	78419	7166	10.94
DP_IDX	5	DP_POS	547	DP_VLU	0	DP_VLU	76987	7151	10.77
DP_IDX	6	DP_POS	578	DP_VLU	0	DP_VLU	74035	7093	10.44

  - Step5: check change ratio
    - Max FV/G: 11.56
    - Min FV/G: 10.44
    - Change ratio: (Max-Min)/Max = 9.6%
  - Step6: change parameter to fit FV/G change ratio
    - To satisfy flat FV protect function let parameter [5] = 10%

■ Parameter

When peak find < af table index [6] and curve FV/G 's delta/max < [5]%. Move lens to fail position

```
//===================================
// Section: General AutoFocus Parameter (III)
//===================================/
 10,      //[5] flat fv protect: flat threshold
2,      //[6] flat fv protect: active af table index
```

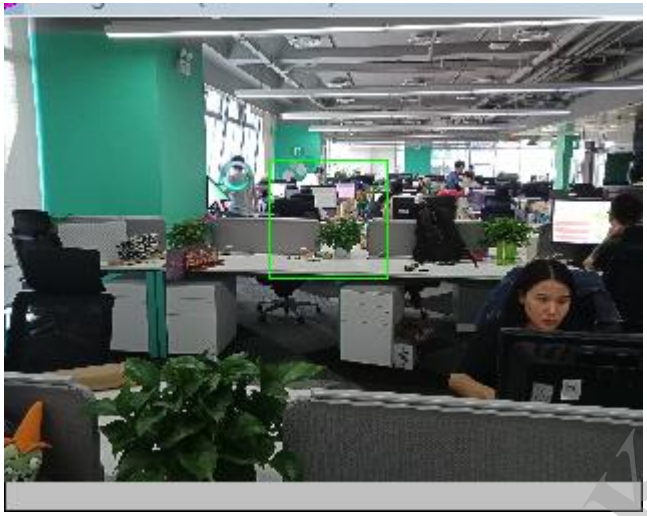
对焦速度

对办公室盆栽touch对焦幅度大

走PD且对焦幅度大(PD TARGET接近)

对办公室盆栽touch对焦幅度大—Pd景touch

- **Problem**
  - 对办公室盆栽touch对焦幅度大



HB_CUR_POS	38000000	HB_TAR_POS
HB_CUR_POS	39700000	HB_TAR_POS
HB_CUR_POS	39700000	HB_TAR_POS
HB_SUB_WIN	0	
HB_CUR_POS	39700397	HB_TAR_POS
HB_CUR_POS	40400403	HB_TAR_POS
HB_CUR_POS	43100427	HB_TAR_POS
HB_CUR_POS	40400411	HB_TAR_POS
HB_CUR_POS	37700381	HB_TAR_POS
HB_CUR_POS	34900353	HB_TAR_POS

- **Analysis**
  - 从DP看fs的step size 比较大，因此缩小taf fs的步伐

```
40,  //[11] finesearch_step_caf_inf
40,  //[12] finesearch_step_caf_mac
60,  //[13] finesearch_step_fd_inf
50,  //[14] finesearch_step_fd_mac
100,  //[15] finesearch_step_taf_inf
100,  //[16] finesearch_step_taf_mac
```

```
1035
1036
1037
1038
1039
1040
```

```
40,  //[11] finesearch_step_caf_inf
40,  //[12] finesearch_step_caf_mac
60,  //[13] finesearch_step_fd_inf
50,  //[14] finesearch_step_fd_mac
30,  //[15] finesearch_step_taf_inf
30,  //[16] finesearch_step_taf_mac
```

对办公室盆栽touch对焦幅度大—Pd景touch

- **Solution**
  - 缩小FS step size，由以下两部分参数决定
    - 1. face-touch-CAF step size magnification for different ISO
    - 2. fine search step size at infinity/macro

```
//Description:face-touch-CAF step size magnification for diffirent ISO
        //        zzzyyyxxx,   //[]  ISO
        //        zzz: face AF
        //        yyy: touch AF
        //        xxx: CAF
        90120100,    //[70] ISO100
        90120100,    //[71] ISO200
        100140125,   //[72] ISO400
        100140125,   //[73] ISO800
        130180150,   //[74] ISO1600
        180220200,   //[75] ISO3200
        250250250,   //[76] ISO6400
        250250250,   //[77] ISO9600

//=============================================================================/
        //[78]~[128]
    },
```

1

2

注意：最终fs的缩放比例=1*2由这两部分共同决定的

```
40,  //[11] finesearch_step_caf_inf
40,  //[12] finesearch_step_caf_mac
60,  //[13] finesearch_step_fd_inf
50,  //[14] finesearch_step_fd_mac
30, //[15] finesearch_step_taf_inf
30, //[16] finesearch_step_taf_mac
```

PD target不准

The preview is out of focus in the PD moving

走PD且对焦幅度大(PD TARGET不准)

The preview is out of focus in the PD moving. (1/2)

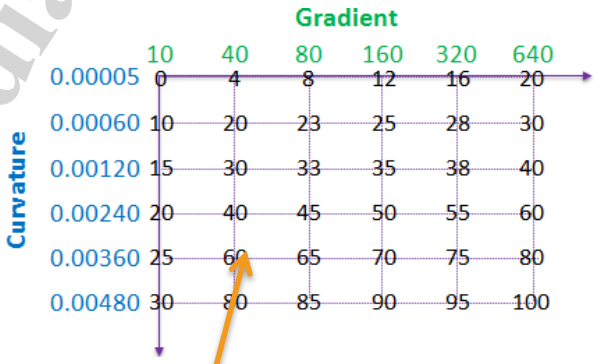
- **Problem: The preview is out of focus in the PD moving. (scenario: video)**
- **Step 1:** Examine the foc. (target position)

```
PdAlgo  : [calSrchRng] Start=-20, End=20, En=1, MinPos=0, MaxPos=0
PdAlgo  : [cPD2D] pd=17.29095, r.=0.99470, r var.=0.00381
PdAlgo  : [calF] cur.=760, s=21.75738, foc.=384
PdAlgo  : [calConf] conf=60, curv=0.00365, grad=42, idx=(5,2), sat=0.00000
```

  - If you find that inaccurate target positions correspond to middle or high confidence levels (≥ 60), the gradient-index table may need to be adjusted.

The preview is out of focus in the PD moving. (2/2)

- **Problem: The preview is out of focus in the PD moving. (scenario: video)**
- **Step 2:** To adjust relative gradient threshold 40 , modify it to larger then 43, and this scene will output pd conf lower then 60.




```
PdAlgo  : GradThd = 10 40 80 160 320 640
```

```
PdAlgo  : [calSrchRng] Start=-20, End=20, En=1, MinPos=0, MaxPos=0
PdAlgo  : [cPD2D] pd=17.29095, r.=0.99470, r var.=0.00381
PdAlgo  : [calF] cur.=760, s=21.75738, foc.=384
PdAlgo  : [calConf] conf=60, curv=0.00355, grad=43, idx=(4,2), sat=0.00000
```

过曝区导致low CAF，改为走PD

case study : adjust the saturation threshold

走CAF且对焦速度慢(对焦框内有过曝区)

Steps to adjust the saturation threshold (1/2)

- **Problem**
  - At light-source scenes, some saturated PD blocks may have accurate target positions.
  - If you want to use the following labeled data, you may need to adjust the saturation threshold.

15 means
15/512=2.93%

```
PdAlgo  : m_tuningData.SL = 240, m_tuningData.ST = 15
```

```
PdAlgo  : [sPDBlock] PD block = (2040, 1544, 576, 384), S var. = 268, S Cnt. = 201
PdAlgo  : [calConf] conf. level = 0 , curv=0.00121, grad=204, idx=(3,4), sat=0.05815
```

In this example:
pd density x=8 pd density y=8
Total pd num=(576/8)*(384/8)=3456
Sat = 201/3456=0.05815=5.815% > 2.3%, so conf = 0

Steps to adjust the saturation threshold (2/2)

- **To adjust the saturation threshold**
  - For example
    - satCnt = 201
    - The number of pixels = block width × block height = 72 × 48 = 3456
  - The saturation threshold should be set to 35 (≥ 201/3456×512=29).

触发速度

首次进入camera 触发速度慢

第一次进相机触发速度

1st enter camera trigger time

- **Problem**
  - 1st enter camera too slow
- **Solution**
  - decrease stable_cnt or time_out (depends on case)
- **Tuning**
  - Case 1: Stable condition : stable cnt ↓ , trigger time ↓

```
AfAlgoC : [INIT] -> INIT status. Keep and postpone for roi sel 0->4
AfAlgoC : [INIT][fv]54080767[g]4 [AEStbl]1 [ISO]101==========================
AfAlgoC : [ret]0 [cnt]29 [6]194760604 [5]191252094 [4]180841451 [3]178725267 [2]191885295 [1]187638651[0]54080767 [TH]6489692 [StableCnt]0
AfAlgoC : [INIT][fv]55806579[g]4 [AEStbl]1 [ISO]101==========================
AfAlgoC : [ret]0 [cnt]30 [6]191252094 [5]180841451 [4]178725267 [3]191885295 [2]187638651 [1]54080767[0]55806579 [TH]6696789 [StableCnt]1
AfAlgoC : [INIT][fv]59708416[g]4 [AEStbl]1 [ISO]101==========================
AfAlgoC : [ret]0 [cnt]31 [6]180841451 [5]178725267 [4]191885295 [3]187638651 [2]54080767 [1]55806579[0]59708416 [TH]7165009 [StableCnt]2
AfAlgoC : [INIT][fv]61548032[g]4 [AEStbl]1 [ISO]101==========================
AfAlgoC : [ret]0 [cnt]32 [6]178725267 [5]191885295 [4]187638651 [3]54080767 [2]55806579 [1]59708416[0]61548032 [TH]7385763 [StableCnt]3
AfAlgoC : [INIT][fv]57811748[g]4 [AEStbl]1 [ISO]101==========================
AfAlgoC : [ret]0 [cnt]34 [6]187638651 [5]54080767 [4]55806579 [3]59708416 [2]61548032 [1]57811748[0]63004161 [TH]7560499 [StableCnt]4
AfAlgoC : [INIT][fv]62748886[g]4 [AEStbl]1 [ISO]101==========================
AfAlgoC : [ret]0 [cnt]35 [6]54080767 [5]55806579 [4]59708416 [3]61548032 [2]57811748 [1]63004161[0]62748886 [TH]7529866 [StableCnt]5
AfAlgoC : [INIT][fv]59380932[g]4 [AEStbl]1 [ISO]101==========================
AfAlgoC : [ret]1 [cnt]36 [6]55806579 [5]59708416 [4]61548032 [3]57811748 [2]63004161 [1]62748886[0]59380932 [TH]7125711 [StableCnt]6
AfAlgoC : [INIT] -> PREPARE status. waited stable or timeout.
```

```
6,      // fv_1st_stable_num
6,      // fv_1st_stable_cnt
```

Current timeout cnt is 6.
When stable cnt reaches 6 , it will enter to PREPARE state .

1st enter camera trigger time

- **Tuning**
  - Case 1: Stable condition : stable cnt ↓ , trigger time ↓

    [Solution]

```
6,      // fv_1st_stable_num
6,      // fv_1st_stable_cnt
```

```
2,      // fv_1st_stable_num
2,      // fv_1st_stable_cnt
```

1st enter camera trigger time

- **Tuning**
  - Case 2 : Timeout condition : timeout cnt↓ , trigger time ↓

```
AfAlgoC : [AFParam][FDAF][Param]:  (0-9) 2 1 1 3 3 30 15 0 0 0 (10-19) 0 0 50 3 3 0 80 7 7 30 (20-29) 0 0 0 0 0 0 0 0 0 0 (30-39) 0
MtkCam/SensorListener: (13270)[init] GyroCollector First user(0)
AfAlgoC : [ret]0 [cnt]100 [6]20773892 [5]16410520 [4]17901670 [3]108040 [2]7923 [1]9093[0]117617 [TH]50000 [StableCnt]0
AfAlgoC : [ret]0 [cnt]101 [6]16410520 [5]17901670 [4]108040 [3]7923 [2]9093 [1]117617[0]115066 [TH]50000 [StableCnt]0
AfAlgoC : [INIT][fv]204023[g]94 [AEStbl]0 [ISO]587==========================
AfAlgoC : [ret]0 [cnt]102 [6]17901670 [5]108040 [4]7923 [3]9093 [2]117617 [1]115066[0]204023 [TH]24482 [StableCnt]0
AfAlgoC : [INIT][fv]286894[g]99 [AEStbl]0 [ISO]587==========================
AfAlgoC : [ret]0 [cnt]103 [6]108040 [5]7923 [4]9093 [3]117617 [2]115066 [1]204023[0]286894 [TH]34427 [StableCnt]0
AfAlgoC : [INIT][fv]637067[g]147 [AEStbl]0 [ISO]587==========================
AfAlgoC : [ret]0 [cnt]104 [6]7923 [5]9093 [4]117617 [3]115066 [2]204023 [1]286894[0]637067 [TH]76448 [StableCnt]0
AfAlgoC : [INIT][fv]1041813[g]149 [AEStbl]0 [ISO]677==========================
AfAlgoC : [ret]0 [cnt]105 [6]9093 [5]117617 [4]115066 [3]204023 [2]286894 [1]637067[0]1041813 [TH]125017 [StableCnt]0
AfAlgoC : [INIT][fv]501458[g]148 [AEStbl]0 [ISO]677==========================
AfAlgoC : [ret]0 [cnt]106 [6]117617 [5]115066 [4]204023 [3]286894 [2]637067 [1]1041813[0]501458 [TH]60174 [StableCnt]0
AfAlgoC : [INIT][fv]585089[g]148 [AEStbl]0 [ISO]677==========================
AfAlgoC : [ret]0 [cnt]107 [6]115066 [5]204023 [4]286894 [3]637067 [2]1041813 [1]501458[0]585089 [TH]70210 [StableCnt]0
AfAlgoC : [INIT][fv]646846[g]147 [AEStbl]0 [ISO]677==========================
AfAlgoC : [ret]0 [cnt]108 [6]204023 [5]286894 [4]637067 [3]1041813 [2]501458 [1]585089[0]646846 [TH]77621 [StableCnt]0
AfAlgoC : [INIT][fv]605454[g]154 [AEStbl]0 [ISO]677==========================
AfAlgoC : [ret]0 [cnt]109 [6]286894 [5]637067 [4]1041813 [3]501458 [2]585089 [1]646846[0]605454 [TH]72654 [StableCnt]0
AfAlgoC : [INIT][fv]536955[g]129 [AEStbl]0 [ISO]653==========================
AfAlgoC : [ret]0 [cnt]110 [6]637067 [5]1041813 [4]501458 [3]585089 [2]646846 [1]605454[0]536955 [TH]64434 [StableCnt]0
AfAlgoC : [INIT] -> PREPARE status. waited stable or timeout.
AfAlgoC : [Speed] [Prepare]AFing0[CurrPos]477 [PreparePos]-1, dirSel 0, dir -1
```

Enter to INIT state

Not stable cnt : 1

Not stable cnt : 2

Not stable cnt : 3

Not stable cnt : 4

Not stable cnt : 5

Not stable cnt : 6

Not stable cnt : 7

Not stable cnt : 8

Not stable cnt : 9

```
8,          //enter_cam_stable_timeout
```

Current timeout cnt is 8.
When not stable cnt is larger than 8, it will enter to PREPARE state due to timeout.

1st enter camera trigger time

- **Tuning**
  - Case 2 : Timeout condition : timeout cnt↓ , trigger time ↓

    [Solution]

```
8,        //enter_cam_stable_timeout
```

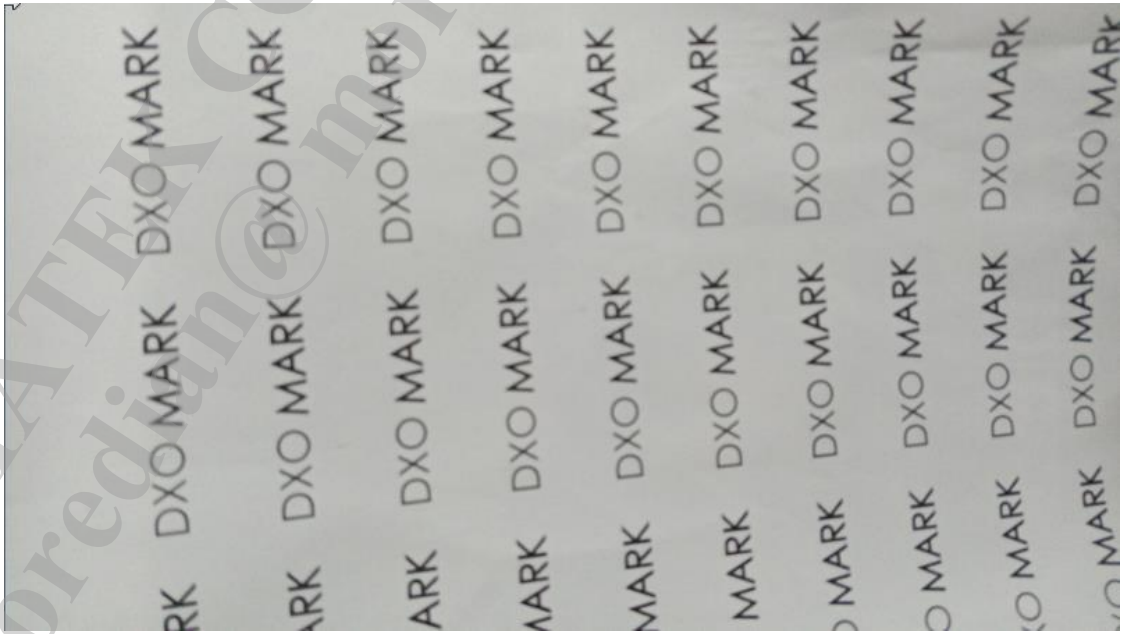
```
2,        //enter_cam_stable_timeout
```

从远景到近景时对焦模糊，不触发对焦

CAF不触发

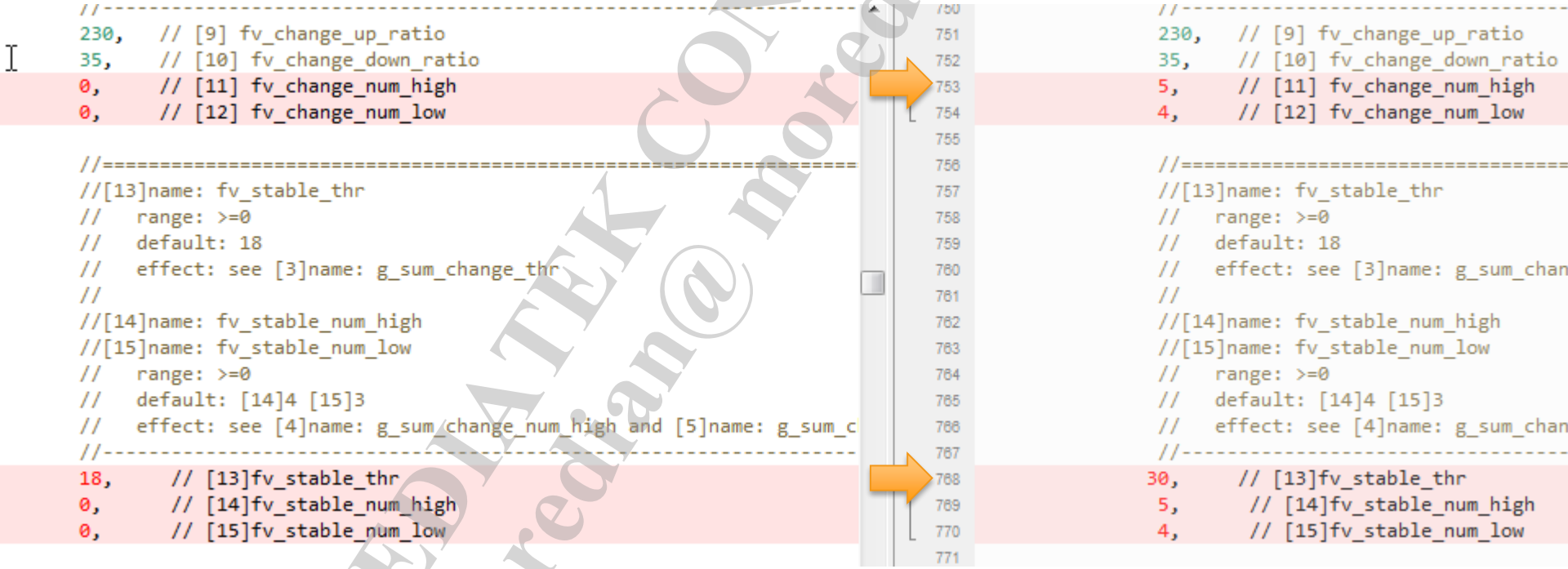
支架Video，从远景到近景时对焦模糊，不触发对焦（1/2）

- **Problem**
  - 近景为何不触发对焦
- **Analysis**
  - 从log看没有触发对焦，都处于stbl状态，支架测试，因此gyro &g sensor不用考虑，ghist对这种白纸黑字景比较小，因此考虑利用fv来触发对焦



支架Video，从远景到近景时对焦模糊，不触发对焦（2/2）

- **Solution**
  - 通过fv来触发对焦，利用fv来chg，并且把stable 调的比较宽松些



```
//-------------------------------------------------------------
230,   // [9] fv_change_up_ratio
35,    // [10] fv_change_down_ratio
0,     // [11] fv_change_num_high
0,     // [12] fv_change_num_low

//=============================================================
//[13]name: fv_stable_thr
//   range: >=0
//   default: 18
//   effect: see [3]name: g_sum_change_thr
//
//[14]name: fv_stable_num_high
//[15]name: fv_stable_num_low
//   range: >=0
//   default: [14]4 [15]3
//   effect: see [4]name: g_sum_change_num_high and [5]name: g_sum_c
//-------------------------------------------------------------
18,     // [13]fv_stable_thr
0,      // [14]fv_stable_num_high
0,      // [15]fv_stable_num_low
```

```
//-------------------------------------
230,   // [9] fv_change_up_ratio
35,    // [10] fv_change_down_ratio
5,     // [11] fv_change_num_high
4,     // [12] fv_change_num_low

//=====================================
//[13]name: fv_stable_thr
//   range: >=0
//   default: 18
//   effect: see [3]name: g_sum_chan
//
//[14]name: fv_stable_num_high
//[15]name: fv_stable_num_low
//   range: >=0
//   default: [14]4 [15]3
//   effect: see [4]name: g_sum_chan
//-------------------------------------
30,     // [13]fv_stable_thr
5,      // [14]fv_stable_num_high
4,      // [15]fv_stable_num_low
```

过曝区导致low CAF，改为走PD

case study : adjust the saturation threshold

CAF 触发速度慢(对焦框内有过曝区)

- 同”对焦速度 - 走CAF且对焦速度慢(对焦框内有过曝区)”
  - 过曝区导致low CAF，改为走PD

    case study : adjust the saturation threshold

FACE AF

厘清是否为手震影响

gyro change during focusing

AF search frames

Gyro info

HANDLEAF_CNT	27780429	FM_STATUS	1	FM_GYRO	2412012	
HANDLEAF_CNT	27790429	FM_STATUS	8	FM_GYRO	269015	
HANDLEAF_CNT	27800429	FM_STATUS	8	FM_GYRO	224017	
HANDLEAF_CNT	27810429	FM_STATUS	8	FM_GYRO	185011	
HANDLEAF_CNT	27820441	FM_STATUS	3	FM_GYRO	556009	
HANDLEAF_CNT	27830477	FM_STATUS	3	FM_GYRO	488006	
HANDLEAF_CNT	27840495	FM_STATUS	4	FM_GYRO	456004	
HANDLEAF_CNT	27850495	FM_STATUS	4	FM_GYRO	470003	
HANDLEAF_CNT	27860477	FM_STATUS	3	FM_GYRO	374003	
HANDLEAF_CNT	27870441	FM_STATUS	3	FM_GYRO	412001	
HANDLEAF_CNT	27880405	FM_STATUS	3	FM_GYRO	553000	
HANDLEAF_CNT	27890369	FM_STATUS	3	FM_GYRO	444002	
HANDLEAF_CNT	28310419	FM_STATUS	7	FM_GYRO	640003	
HANDLEAF_EXIF_TIME	2831					

If Gyro > 10 during AF search

→ Phone motion by handheld

→ the AF result maybe affected and blur

厘清是否为人脸移动影响

FD change during focusing

AF search frames

FD win X, Y

FD win W, H

HANDLEAF_CNT	4650439	FM_STATUS	1	F72	FM_	10	FM	51	FM	10	FM	330	FM_FD_XY	19361603	FM_FD_WH	5910591	F
HANDLEAF_CNT	4660439	FM_STATUS	10	F15	FM_	30	FM	17	FM	10	FM	101	FM_FD_XY	18811603	FM_FD_WH	5910591	F
HANDLEAF_CNT	4670455	FM_STATUS	10	F9	FM_	30	FM	17	FM	10	FM	670	FM_FD_XY	18811603	FM_FD_WH	5910591	F
HANDLEAF_CNT	4680455	FM_STATUS	10	F10	FM_	30	FM	17	FM	10	FM	560	FM_FD_XY	18811603	FM_FD_WH	5910591	F
HANDLEAF_CNT	4690455	FM_STATUS	11	F30	FM_	30	FM	17	FM	10	FM	500	FM_FD_XY	18811603	FM_FD_WH	5910591	F
HANDLEAF_CNT	4700451	FM_STATUS	11	F30	FM_	30	FM	17	FM	10	FM	470	FM_FD_XY	18811649	FM_FD_WH	5910591	F
HANDLEAF_CNT	4710433	FM_STATUS	11	F11	FM_	20	FM	17	FM	10	FM	440	FM_FD_XY	18811649	FM_FD_WH	5910591	F
HANDLEAF_CNT	4720415	FM_STATUS	11	F80	FM_	10	FM	17	FM	10	FM	430	FM_FD_XY	18811649	FM_FD_WH	5910591	F
HANDLEAF_CNT	4730397	FM_STATUS	11	F40	FM_	20	FM	17	FM	10	FM	410	FM_FD_XY	18811649	FM_FD_WH	5910591	F
HANDLEAF_CNT	4740410	FM_STATUS	12	F80	FM_	30	FM	17	FM	10	FM	400	FM_FD_XY	18811649	FM_FD_WH	5910591	F
HANDLEAF_CNT	5020423	FM_STATUS	7	F23	FM_	20	FM	17	FM	10	FM	350	FM_FD_XY	18811649	FM_FD_WH	5910591	F

FD_Y shift = 1649 – 1603 = 46
FD_H = 591
Y Shift ratio = 46/591 = 7.7%

If FD win shift too much during AF search
→ Face motion by target people move
→ the AF result maybe affected and blur

点光源

判断是否为点光源及PD PL

判断是否为PD点光源

- Pdaf 判断hit点光源的条件：
  - Case1： Snt > //[54] fs_pl_scnt_min_th and
    Sat-cnt change ratio > //[53] fs_pl_scnt_th
  - Case2: Snt > //[54] fs_pl_scnt_min_th and
    gsum change ratio> //[52] fs_pl_gsum_th

- 只有scntmin th满足条件后才会判断是否hit点光源

```
1,      //[51] fs_pl_check
100,    //[52] fs_pl_gsum_th
150,    //[53] fs_pl_scnt_th
250,    //[54] fs_pl_scnt_min_th
235,    //[55] fs_pl_hw_th
150,     //[56] fs_pl_abnormal_gsum_th
150,    //[57] fs_pl_abnormal_scnt_th
3,      //[58] fs_pl_sample_count
```

fs_pl_check: enable开关

Fs_pl_gsum_th: gsum change th(150: 15%)

Fs_pl_scnt_th: Saturation cnt change th

Fs_pl_scnt_min_th: saturation count 超过该阈值才会做pl侦测

Fs_pl_hw_th: 亮度超过该阈值时scnt才会计数。

Fs_pl_abnormal_scnt_th

Fs_pl_abnormal_gsum_th:相邻两帧比较，gsum或者 scnt超过thr，则不做点光源则重新统计max和change th.避免移动手机，误判成点光源

Fs_pl_sample_count: PL侦测需要的采样点数目

i4HybridAFCoefs[128]

HB PL tuning

- **Problem:** How to check is PL or not & How to tuning for HB PL.
- **Step1:** FM_STATUS = 11, with the same direction.

HANDLEAF_CNT	3940310	FM_STATUS	10	FM_GYRO	20215024	FM_ACCE_XYZ	94020	FM_G_SUM_LV	81850045
HANDLEAF_CNT	3950330	FM_STATUS	11	FM_GYRO	17594007	FM_ACCE_XYZ	96019	FM_G_SUM_LV	73280044
HANDLEAF_CNT	3960312	FM_STATUS	11	FM_GYRO	17729007	FM_ACCE_XYZ	96017	FM_G_SUM_LV	73670043
HANDLEAF_CNT	3970293	FM_STATUS	11	FM_GYRO	20367006	FM_ACCE_XYZ	95017	FM_G_SUM_LV	81760043
HANDLEAF_CNT	3980316	FM_STATUS	12	FM_GYRO	19687006	FM_ACCE_XYZ	96016	FM_G_SUM_LV	79710044

Left search

Saturation count

G-sum

Sat-count change ratio = (20367-17594)/20367*100 = 13.6%

G-sum change ratio = (8176-7328)/8176*100 = 10.37%

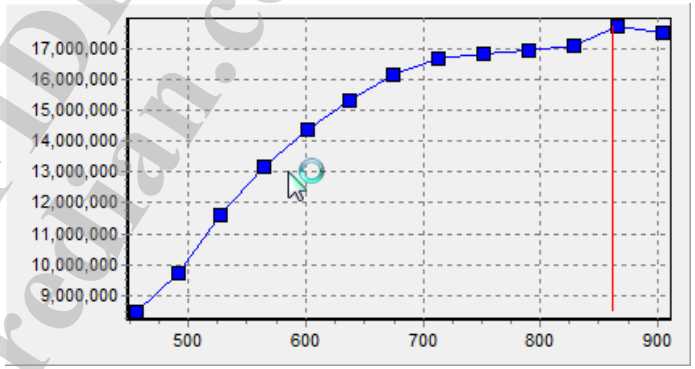
- **Step2:** NOT abnormal scene
  - Abnormal case: 一步之內sat-count change > [57] 且g-sum change > [56]
- **Step3:** HB PL condition
  - Case1: min(Sat-count) > [54] fs_pl_scnt_min_th 且 sat-count change ratio > [53] fs_pl_scnt_th
  - Case2: min(Sat-count) > [54] fs_pl_scnt_min_th 且 g-sum change ratio > [52] fs_pl_gsum_th

固定支架touch日光灯失焦
点光源景失焦
夜景点光源失焦

沒有中点光源

固定支架touch日光灯失焦（1/2）

- **Problem**
  - 固定支架touch日光灯失焦



- **Analysis**
  - 失焦原因，没有落入点光源，从log看curGyro >Gyro TH，因此不会落入点光源，卡这个gyro是避免手抖造成误判，此案无gyro，用的是虚拟gyro，因此gyro值不可靠，拿到了异常值(CurGyro : 13)

```
[Speed] [Prepare]AFing0[CurrPos]454 [PreparePos]454, dirSel 0, dir 1
[ZEE] CurGyro:13 Gyro_TH:10
[Speed] AFing0[Idx] 0:[Pos] 456 [H]8459671 [H1]8459671 [H3]177870 [L] 0 [M] 0 [R] 0 [mThr]1015160 [sThr]676773 [LV]49 [PL] 0
[Speed] AFing0[Idx] 1:[Pos] 492 [H]9709302 [H1]9709302 [H3]192822 [L] 0 [M] 1 [R] 1 [mThr]1165116 [sThr]776744 [LV]49 [PL] 0
[Speed] AFing0[Idx] 2:[Pos] 528 [H]11599667 [H1]11599667 [H3]228719 [L] 0 [M] 2 [R] 2 [mThr]1391960 [sThr]927973 [LV]49 [PL] 0
[Speed] AFing0[Idx] 3:[Pos] 564 [H]13185283 [H1]13185283 [H3]252546 [L] 0 [M] 3 [R] 3 [mThr]1582233 [sThr]1054822 [LV]49 [PL] 0
[Speed] AFing0[Idx] 4:[Pos] 601 [H]14363213 [H1]14363213 [H3]266989 [L] 0 [M] 4 [R] 4 [mThr]1723585 [sThr]1149057 [LV]49 [PL] 0
[Speed] AFing0[Idx] 5:[Pos] 638 [H]15347243 [H1]15347243 [H3]287348 [L] 0 [M] 5 [R] 5 [mThr]1841669 [sThr]1227779 [LV]49 [PL] 0
[Speed] AFing0[Idx] 6:[Pos] 675 [H]16158176 [H1]16158176 [H3]301528 [L] 0 [M] 6 [R] 6 [mThr]1938981 [sThr]1292654 [LV]49 [PL] 0
[Speed] AFing0[Idx] 7:[Pos] 713 [H]16700680 [H1]16700680 [H3]307684 [L] 0 [M] 7 [R] 7 [mThr]2004081 [sThr]1336054 [LV]49 [PL] 0
[Speed] AFing0[Idx] 8:[Pos] 751 [H]16847094 [H1]16847094 [H3]305560 [L] 0 [M] 8 [R] 8 [mThr]2021651 [sThr]1347767 [LV]49 [PL] 0
[Speed] AFing0[Idx] 9:[Pos] 790 [H]16929417 [H1]16929417 [H3]304797 [L] 0 [M] 9 [R] 9 [mThr]2031530 [sThr]1354353 [LV]49 [PL] 0
[Speed] AFing0[Idx]10:[Pos] 828 [H]17114528 [H1]17114528 [H3]309647 [L] 0 [M]10 [R]10 [mThr]2053743 [sThr]1369162 [LV]49 [PL] 0
[Speed] AFing0[Idx]11:[Pos] 866 [H]17732874 [H1]17732874 [H3]322830 [L] 0 [M]11 [R]11 [mThr]2127944 [sThr]1418629 [LV]49 [PL] 0
[Speed] AFing0[Idx]12:[Pos] 904 [H]17518836 [H1]17518836 [H3]315708 [L] 0 [M]11 [R]12 [mThr]2127944 [sThr]1418629 [LV]49 [PL] 0
[Speed][DpComp][BlackFaceAF] ------ findPeak 875 pos (828,866,904) vlu (17114528,17732874,17518836)
[Speed][AdpComp][BlackFaceAF][ZEE] ------ adjusted Peak 861 pos (814,851,889) vlu (17114528,17732874,17518836) dpComp 0 fvExt 1
[Speed] AFing0 move to 861 (0)
AFing0 (Done)
```

固定支架touch日光灯失焦（2/2）

- **Solution**
  - 调整 // [2] name: ZE_Gyro_TH为100，
    {1,1,**100**,24,48,764},//i4ZoEffect[64]
    让curGyro <Gyro TH，从而落入点光源

点光源景 失焦(1/2)

- **Problem**
  - 点光源景 失焦 - scnt_min_th不满足条件

点光源景 失焦(2/2)

- **Analysis**
  - 从log看fail 的case没有中光源，中点光源会显示log“fs_pl”，从如下log可以看出scnt 不满足snt min_th，原因scnt< 400, //[54] fs_pl_scnt_min_th 时不做pl处理

```
D AfAlgo   : HBTrackM2 mov_taf_   1 Keep Move.
D AfAlgoC  : HBTrackM1 moving__   1 pd  14016 ( 60), Pos (cur,tar,des)=( 880, 597, 828), FV (fs,sc)=(   6492501,   6492501) s5,
D AfAlgo   : HBTrackM2 mov_taf_   2 Keep Move.
D AfAlgoC  : HBTrackM1 moving__   2 pd  14016 ( 60), Pos (cur,tar,des)=( 828, 597, 770), FV (fs,sc)=(   7135219,   7135219) s5,
D AfAlgoC  : HBTrackM1 moving__   3 pd  14486 ( 60), Pos (cur,tar,des)=( 770, 588, 718), FV (fs,sc)=(   8357256,   8357256) s5,
D AfAlgoC  : HBTrackM1 moving__   4 pd  14486 ( 60), Pos (cur,tar,des)=( 718, 588, 667), FV (fs,sc)=(  10486709,  10486709) s5,
D AfAlgoC  : HBTrackM1 moving__   5 pd  13453 ( 60), Pos (cur,tar,des)=( 667, 498, 616), FV (fs,sc)=(  13420233,  13420233) s5,
D AfAlgoC  : HBTrackM1 moving__   6 pd  13453 ( 60), Pos (cur,tar,des)=( 616, 498, 567), FV (fs,sc)=(  17865794,  17865794) s5,
D AfAlgoC  : HBTrackM1 moving__   7 pd   9597 ( 60), Pos (cur,tar,des)=( 567, 473, 518), FV (fs,sc)=(  25459783,  25459783) s5,
D AfAlgoC  : HBTrackM1 moving__   8 pd   9597 ( 60), Pos (cur,tar,des)=( 518, 473, 473), FV (fs,sc)=(  23991274,  23991274) s5,
D AfAlgoC  : HBTrackM1 moving__   9 pd   2898 ( 60),                                                                        s5,
D AfAlgo   : HBTrackM2 mov_done  10 step converge (0
D AfAlgoC  : HBTrackM1 moving__  10 pd   2898 ( 60),                                                                        s6,[mov_fs__] moving
D AfAlgo   : HBTrackM2 fs__init   1 Dir 1 (508 -> 5
D AfAlgoC  : HBTrackM1 fs______   1 pd   2898 (                                                                             , s1,
D AfAlgoC  : HBTrackM1 fs______   2 pd                                                                                      , s1,
D AfAlgoC  : HBTrackM1 fs______   3 pd   2898 ( 60), Pos (cur,tar,des)=( 531, 550,     ), FV (fs,sc)=(  20247610,  20247610), s1,
D AfAlgoC  : HBTrackM1 fs______   4 pd   2898 ( 60), Pos (cur,tar,des)=( 550, 569,     ), FV (fs,sc)=(  23314357,  23314357), s1,
D AfAlgo   : PDAF_pl: 4 SCnt 238
D AfAlgoC  : HBTrackM1 fs______   5 pd   2898 ( 60), Pos (cur,tar,des)=( 569, 588,     ), FV (fs,sc)=(  26544630,  26544630), s1,
D AfAlgo   : PDAF_pl: 5 SCnt 238
D AfAlgoC  : HBTrackM1 fs______   6 pd   2898 ( 60), Pos (cur,tar,des)=( 588, 607,     ), FV (fs,sc)=(  28350602,  28350602), s1,
D AfAlgo   : PDAF_pl: 6 SCnt 238
D AfAlgoC  : HBTrackM1 fs______   7 pd   2898 ( 60), Pos (cur,tar,des)=( 607, 598,     ), FV (fs,sc)=(  28090853,  28090853), s10,[fs__fit2] fit
D AfAlgoC  : HBTrackM1 fs__pre_   1 Pos (cur,tar,des)=( 598, 589, 589)
D AfAlgoC  : [Speed] AFing0 move to 589 (0)
D AfAlgoC  : AFing0 (Done)
```

当过曝点小于minth时就会打印出如下这个log

- **Solution**
  - 减小snt min_th400, ——改为200 //[54] fs_pl_scnt_min_th

夜景点光源失焦

Issue： 夜景点光源景失焦——没有中点光源，从DP看sat cnt chang raito不满足条件

如何从DP计算sat cnt chang ratio？

公式： FM_STATUS = 11,FM_GYRO后三位是gyro值，最前面3位是sat_cnt

Sat-cnt change ratio=(max – min)/max = (402-331)/402 = 17.6%

FM_STATUS	11	FM_GYRO	4022009
FM_STATUS	11	FM_GYRO	3881005
FM_STATUS	11	FM_GYRO	3312004
FM_STATUS	11	FM_GYRO	3475005
FM_STATUS	12	FM_GYRO	3874005
FM_STATUS	7	FM_GYRO	3110005

Solution： 調整成15%可以改善，200——改为150， //[53] fs_pl_scnt_th，满足条件的景直接推入点光源

非点光源景误中点光源

误中点光源

非点光源景误中点光源(1/2)

- Problem
  - 非点光源景误中点光源
- Analysis
  - log中有fs_pl,说明有hit到点光源，从log看是scnt 满足条件中PL条件导致误判失焦

```
D AfAlgo   : HBTrackM2 mov_taf_   1 Keep Move.
D AfAlgoC  : HBTrackM1 moving__   1 pd  17109 ( 60), Pos (cur,tar,des)=( 964, 619, 938), FV (fs,sc)=(   4076343,   4076343) s5,
D AfAlgo   : HBTrackM2 mov_taf_   2 Keep Move.
D AfAlgoC  : HBTrackM1 moving__   2 pd  17109 ( 60), Pos (cur,tar,des)=( 938, 619, 886), FV (fs,sc)=(   4340374,   4340374) s5,
D AfAlgoC  : HBTrackM1 moving__   3 pd  15519 ( 60), Pos (cur,tar,des)=( 886, 651, 834), FV (fs,sc)=(   4926471,   4926471) s5,
D AfAlgoC  : HBTrackM1 moving__   4 pd  15519 ( 60), Pos (cur,tar,des)=( 834, 651, 776), FV (fs,sc)=(   5624498,   5624498) s5,
                                  5 pd  15166 ( 60), Pos (cur,tar,des)=( 776, 580, 724), FV (fs,sc)=(   6586050,   6586050) s5,
                                    ( 60), Pos (cur,tar,des)=( 724, 580, 673), FV (fs,sc)=(   8063897,   8063897) s5,
                                    ( 60), Pos (cur,tar,des)=( 673, 580, 622), FV (fs,sc)=(  10760523,  10760523) s5,
                                    ( 60), Pos (cur,tar,des)=( 622, 580, 573), FV (fs,sc)=(  14760523,  14760523) s5,
                                    ( 60), Pos (cur,tar,des)=( 573, 580, 529), FV (fs,sc)=(  19760523,  19760523) s5,
                                    ( 60), Pos (cur,tar,des)=( 529, 580, 501), FV (fs,sc)=(  24760523,  24760523) s5,
                                  12 pd  631 ( 60), Pos (cur,tar,des)=( 501, 450, 477), FV (fs,sc)=(  24760523,  24760523) s5,
                                  13 pd  528 (  0), Pos (cur,tar,des)=( 477, 450, 453), FV (fs,sc)=(  24760523,  24760523) s5,
                                  14 st converge (3 < 9)
                                  14 pd  528 (  0), Pos (cur,tar,des)=( 453, 450, 453), FV (fs,sc)=(  27753167,  27753167) s6,[mov_fs__] moving d
                                     1 D  1 (453 -> 544) predict 0 update 0.
D AfAlgoC  : HBTrackM1 fs_______  1 pd  528 (  0), Pos (cur,tar,des)=( 453, 457,     ), FV (fs,sc)=(  28270521,  28270521), s1,
D AfAlgoC  : HBTrackM1 fs_______  2 pd  528 (  0), Pos (cur,tar,des)=( 457, 476,     ), FV (fs,sc)=(  28231178,  28231178), s1,
D AfAlgoC  : HBTrackM1 fs_______  3 pd  528 (  0), Pos (cur,tar,des)=( 476, 457,     ), FV (fs,sc)=(  27178045,  27178045), s1,
D AfAlgoC  : HBTrackM1 fs_______  4 pd  528 (  0), Pos (cur,tar,des)=( 457, 438,     ), FV (fs,sc)=(  28264577,  28264577), s1,
D AfAlgo   : PDAF_pl: 4 GSum (121476/1301647) TH 100, SCnt (303/910) TH 150, res 1
D AfAlgo   : HBTrackM1 fs__pl__   5 fineSearch on PL push lens to 543. 49
D AfAlgoC  : HBTrackM1 fs_______  5 pd  528 (  0), Pos (cur,tar,des)=( 438, 490,     ), FV (fs,sc)=(  27678040,  27678040), s10,[fs__fit2] fit p
D AfAlgoC  : HBTrackM1 fs__pre_   1 Pos (cur,tar,des)=( 490, 543, 543)
D AfAlgoC  : [Speed] AFing0 move 543 (0)
D AfAlgoC  : AFing0 (Done)
```

3, //[58] fs_pl_sample_count
采样点数是3，第4帧才会判断是否中PL

Gsum Change diff

Scnt Change diff

Scnt Change threshold（随采样点多少会调整）
150 means 15%

Max Gsum

Max Scnt

非点光源景误中点光源(2/2)

- Solution
  - 1.调大sat cnt chg ratio，同时确认是否对点光源景有影响，
  - 2.调大sat 的 min th

某场景点光源大概率失焦

失焦(CAF)

某场景点光源大概率失焦(1/2)

- **Problem**
  - 某场景点光源大概率失焦
- **Analysis**
  - 从log看hunting原因是caf对焦不准。

    Pos 822——|curpos——target pos|>thr， pd触发对焦——fs timeout触发caf——caf对焦失败pos821，重复这一过程，造成hunting+失焦+对焦幅度大

```
539 15248 D AfAlgoC : [Speed] AFing0 move to 822 (0)
539 15248 D AfAlgoC : AFing0 (Done)
539 15248 D AfAlgoC : [HB] DafIO in PD: mode 2 p1Num 0 dafdac 521 dafconf 60 PD value 18387
539 15248 D AfAlgoC : HBTrackS3 scene 1, trig 0, chg(0 1000 0000) stb(1 1111 1111) ————————|curpos——target pos|>thr，pd 触发对焦
539 15248 D AfAlgoC : [Speed] [Prepare]AFing0[CurrPos]822 [PreparePos]-1, dirSel 0, dir -1
539 15248 D AfAlgo  : HBTrackM2 mov_taf_   1 Keep Move.
539 15248 D AfAlgoC : HBTrackM1 moving__   1 pd  17323 ( 60), Pos (cur,tar,des)=( 822, 538, 773), FV (fs,sc)=(   8795227,   8795227) s5,
539 15248 D AfAlgo  : HBTrackM2 mov_taf_   2 Keep Move.
539 15248 D AfAlgoC : HBTrackM1 moving__   2 pd  16967 ( 60), Pos (cur,tar,des)=( 773, 544, 724), FV (fs,sc)=(   8620015,   8620015) s5,
539 15248 D AfAlgoC : HBTrackM1 moving__   3 pd  16967 ( 60), Pos (cur,tar,des)=( 724, 544, 675), FV (fs,sc)=(   8344359,   8344359) s5,
539 15248 D AfAlgoC : HBTrackM1 fs_____  13 pd    449 (100), Pos (cur,tar,des)=( 608, 624,     ), FV (fs,sc)=(   6866181,   6866181), s3,

539 15248 D AfAlgoC : [Speed] [Prepare]AFing0[CurrPos]608 [PreparePos]-1, dirSel 0, dir -1
539 15248 D AfAlgoC : [Speed] [Prepare]AFing0[CurrPos]608 [PreparePos]608, dirSel 0, dir -1
539 15248 D AfAlgoC : [Speed] AFing0[Idx] 0:[Pos] 591 [H]6326426 [H1]6326426 [H3]154527 [L] 0 [M] 0 [R] 0 [mThr]759171 [sThr]506114 [LV]62
539 15248 D AfAlgoC : [Speed] AFing0[Idx] 1:[Pos] 559 [H]5781251 [H1]5781251 [H3]130222 [L] 1 [M] 0 [R] 0 [mThr]759171 [sThr]506114 [LV]62
539 15248 D AfAlgoC : [Speed] AFing0[Idx] 2:[Pos] 527 [H]5114747 [H1]5114747 [H3]116615 [L] 2 [M] 0 [R] 0 [mThr]759171 [sThr]506114 [LV]62
539 15248 D AfAlgoC : [Speed] [Dirchg]AFing0[DirchgPos]511
539 15248 D AfAlgoC : [Speed] AFing0[Idx] 0:[Pos] 527 [H]4913206 [H1]4913206 [H3]115707 [L] 0 [M] 0 [R] 0 [mThr]589584 [sThr]393056 [LV]62
539 15248 D AfAlgoC : [Speed] AFing0[Idx] 1:[Pos] 559 [H]5007971 [H1]5007971 [H3]129291 [L] 0 [M] 1 [R] 1 [mThr]600956 [sThr]400637 [LV]62
539 15248 D AfAlgoC : [Speed] AFing0[Idx] 2:[Pos] 591 [H]5179801 [H1]5179801 [H3]130470 [L] 0 [M] 2 [R] 2 [mThr]621576 [sThr]414384 [LV]62
539 15248 D AfAlgoC : [Speed] AFing0[Idx] 3:[Pos] 623 [H]5830617 [H1]5830617 [H3]140779 [L] 0 [M] 3 [R] 3 [mThr]699674 [sThr]466449 [LV]62
539 15248 D AfAlgoC : [Speed] AFing0[Idx] 4:[Pos] 656 [H]5646027 [H1]5646027 [H3]140530 [L] 0 [M] 3 [R] 4 [mThr]699674 [sThr]466449 [LV]62
539 15248 D AfAlgoC : [Speed] AFing0[Idx] 5:[Pos] 689 [H]5634380 [H1]5634380 [H3]133933 [L] 0 [M] 3 [R] 5 [mThr]699674 [sThr]466449 [LV]62
539 15248 D AfAlgoC : [Speed] AFing0[Idx] 6:[Pos] 722 [H]5775750 [H1]5775750 [H3]133173 [L] 0 [M] 3 [R] 5 [mThr]699674 [sThr]466449 [LV]62
539 15248 D AfAlgoC : [Speed] AFing0[Idx] 7:[Pos] 755 [H]6016153 [H1]6016153 [H3]129187 [L] 0 [M] 7 [R] 7 [mThr]721938 [sThr]481292 [LV]62
539 15248 D AfAlgoC : [Speed] AFing0[Idx] 8:[Pos] 788 [H]6176681 [H1]6176681 [H3]136686 [L] 0 [M] 8 [R] 8 [mThr]741201 [sThr]494134 [LV]62
539 15248 D AfAlgoC : [Speed] AFing0[Idx] 9:[Pos] 821 [H]6319591 [H1]6319591 [H3]140131 [L] 0 [M] 9 [R] 9 [mThr]758350 [sThr]505567 [LV]62
539 15248 D AfAlgoC : [Speed] AFing0 move to 821 (0)——caf 对焦不准
```

某场景点光源大概率失焦(2/2)

- **Solution**
  - 让此景走PD点光源
  - 因为PD能力足够找到接近范围，所以在 PD fine search 把点光源判定出來
  - 修改参数:

    48805, ——改为300 //[54] fs_pl_scnt_min_th

everyday genius