

CONFIDENTIAL B

**MEDIATEK**

# MT6771 ISP Case Study



# ISP Tuning Case Study

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## 3DNR效果调试

### 1、确认3DNR功能是否打开

#### 通过预览界面看3DNR是否打开

下如下cmd，如果预览界面没有ink出来，则表示3DNR没有打开，如果预览界面有ink，则表示3DNR有打开

```
adb shell setprop debug.camera.3dnr.enable 1
adb shell setprop debug.camera.3dnr.level 1
adb shell setprop debug.nr3d.bm.enable 1
adb shell setprop debug.nr3d.bm.ink_en 1
adb shell setprop debug.nr3d.bm.ink_level_disp 0xffff
adb shell setprop debug.nr3d.bm.ink_sel 6
```

下如下cmd则关闭3DNR ink显示功能

```
adb shell setprop debug.camera.3dnr.enable 0
adb shell setprop debug.camera.3dnr.level 0
adb shell setprop debug.nr3d.bm.enable 0
adb shell setprop debug.nr3d.bm.ink_en 0
adb shell setprop debug.nr3d.bm.ink_level_disp 0xffff
adb shell setprop debug.nr3d.bm.ink_sel 6
```

通过log查看是否打开3DNR

3DNR的ISO threshold是在 camera\_custom\_3dnr.cpp

**#define VHDR\_NR3D\_OFF ISO\_THRESHOLD 400**

如下log中，红色框中的ISO没有达到400，则没有NR3D\_EN(1)的log显示，高于ISO 400，则会有 isp\_mgr\_nr3d: NR3D\_EN(1)的log显示

```
.504262 608 7427 D isp_mgr_nr3d: NR3D_EN(1), SL2E_EN(1), x,y,w,h(0,0,1440,1080), full x,y,w,h(0,0,1440,1080),vipi offset(0) w,h(1440
.578625 608 7343 D Task3APv: [run] Cam 2 : Req(#816)/Stt(#814)/i4Opt(0)/FlashOnOff(0) Lv(2)/ISO(3200)/RGB(992,512,816)
.606818 608 7427 D isp_mgr_nr3d: NR3D_EN(1), SL2E_EN(1), x,y,w,h(0,0,1440,1080), full x,y,w,h(0,0,1440,1080),vipi offset(0) w,h(1440
.681751 608 7343 D Task3APv: [run] Cam 2 : Req(#817)/Stt(#815)/i4Opt(0)/FlashOnOff(0) Lv(32)/ISO(2525)/RGB(987,512,833)
.705850 608 7427 D isp_mgr_nr3d: NR3D_EN(1), SL2E_EN(1), x,y,w,h(0,0,1440,1080), full x,y,w,h(0,0,1440,1080),vipi offset(0) w,h(1440
.779059 608 7343 D Task3APv: [run] Cam 2 : Req(#818)/Stt(#816)/i4Opt(0)/FlashOnOff(0) Lv(47)/ISO(2312)/RGB(985,512,836)
.813852 608 7427 D isp_mgr_nr3d: NR3D_EN(1), SL2E_EN(1), x,y,w,h(0,0,1440,1080), full x,y,w,h(0,0,1440,1080),vipi offset(0) w,h(1440
.878010 608 7343 D Task3APv: [run] Cam 2 : Req(#819)/Stt(#817)/i4Opt(0)/FlashOnOff(0) Lv(50)/ISO(535)/RGB(983,512,840)
.908579 608 7427 D isp_mgr_nr3d: NR3D_EN(1), SL2E_EN(1), x,y,w,h(0,0,1440,1080), full x,y,w,h(0,0,1440,1080),vipi offset(0) w,h(1440
.968023 608 7343 D Task3APv: [run] Cam 2 : Req(#820)/Stt(#818)/i4Opt(0)/FlashOnOff(0) Lv(80)/ISO(525)/RGB(981,512,844)
.003585 608 7427 D isp_mgr_nr3d: NR3D_EN(1), SL2E_EN(1), x,y,w,h(0,0,1440,1080), full x,y,w,h(0,0,1440,1080),vipi offset(0) w,h(1440
.048969 608 7343 D Task3APv: [run] Cam 2 : Req(#821)/Stt(#819)/i4Opt(0)/FlashOnOff(0) Lv(62)/ISO(434)/RGB(978,512,850)
.089248 608 7427 D isp_mgr_nr3d: NR3D_EN(1), SL2E_EN(1), x,y,w,h(0,0,1440,1080), full x,y,w,h(0,0,1440,1080),vipi offset(0) w,h(1440
.090976 608 7343 D Task3APv: [run] Cam 2 : Req(#822)/Stt(#820)/i4Opt(0)/FlashOnOff(0) Lv(65)/ISO(396)/RGB(976,512,858)
.119879 608 7427 D isp_mgr_nr3d: NR3D_EN(1), SL2E_EN(1), x,y,w,h(0,0,1440,1080), full x,y,w,h(0,0,1440,1080),vipi offset(0) w,h(1440
.133316 608 7343 D Task3APv: [run] Cam 2 : Req(#823)/Stt(#821)/i4Opt(0)/FlashOnOff(0) Lv(64) ISO(371)/RGB(972,512,866)
.173539 608 7343 D Task3APv: [run] Cam 2 : Req(#824)/Stt(#822)/i4Opt(0)/FlashOnOff(0) Lv(65) ISO(472)/RGB(967,512,876)
.213410 608 7343 D Task3APv: [run] Cam 2 : Req(#825)/Stt(#823)/i4Opt(0)/FlashOnOff(0) Lv(65) ISO(381)/RGB(962,512,888)
.252462 608 7343 D Task3APv: [run] Cam 2 : Req(#826)/Stt(#824)/i4Opt(0)/FlashOnOff(0) Lv(69) ISO(375)/RGB(958,512,899)
.298659 608 7343 D Task3APv: [run] Cam 2 : Req(#827)/Stt(#825)/i4Opt(0)/FlashOnOff(0) Lv(67) ISO(290)/RGB(953,512,911)
.336160 608 7343 D Task3APv: [run] Cam 2 : Req(#828)/Stt(#826)/i4Opt(0)/FlashOnOff(0) Lv(71) ISO(284)/RGB(947,512,921)
.365723 608 7343 D Task3APv: [run] Cam 2 : Req(#829)/Stt(#826)/i4Opt(0)/FlashOnOff(0) Lv(69) ISO(264)/RGB(939,512,934)
.400581 608 7343 D Task3APv: [run] Cam 2 : Req(#830)/Stt(#827)/i4Opt(0)/FlashOnOff(0) Lv(70) ISO(251)/RGB(932,512,946)
.438077 608 7343 D Task3APv: [run] Cam 2 : Req(#831)/Stt(#828)/i4Opt(0)/FlashOnOff(0) Lv(71) ISO(246)/RGB(925,512,957)
.471899 608 7343 D Task3APv: [run] Cam 2 : Req(#832)/Stt(#829)/i4Opt(0)/FlashOnOff(0) Lv(70) ISO(240)/RGB(919,512,968)
.506820 608 7343 D Task3APv: [run] Cam 2 : Req(#833)/Stt(#830)/i4Opt(0)/FlashOnOff(0) Lv(71) ISO(240)/RGB(912,512,979)
.534967 608 7343 D Task3APv: [run] Cam 2 : Req(#834)/Stt(#831)/i4Opt(0)/FlashOnOff(0) Lv(69) ISO(240)/RGB(905,512,989)
.574251 608 7343 D Task3APv: [run] Cam 2 : Req(#835)/Stt(#832)/i4Opt(0)/FlashOnOff(0) Lv(70) ISO(240)/RGB(898,512,999)
```

## 2、3DNR常调试参数

NR3D	
MDP TNR FLT CONFIG	
BLEND RATIO BLKY	8
BLEND RATIO DE	8
BLEND RATIO TXTF	8
BLEND RATIO MV	8
FLT STR MAX	28
MDP TNR FB INFO1	
Q NL	4
Q SP	20

FLT STR MAX: 越大, NR3D filter越强。  
Q NL: 把怀疑是noise的Pixel抓出来  
Denoise, 数值越大, NR3D越强。  
Q SP: 越小, NR3D越强。

## 三方应用调试size确认

### 1、MDP log cmd :

adb shell pkill camerahalservice

adb shell setprop log.tag.PQ VERBOSE

adb shell setprop debug.dp.dumpregister.enable 3

LOG:

红框为MDP IN size 绿框为MDP OUT size

```
MDP : [PQ][PQDSAdaptor] input sw[1280], sh[718], dw[1280], dh[720], gainH[0], gainM[0]
```

### 2、RRZ log:

红框为RRZ IN size 绿框为RRZ OUT size

```
LMVDrv : [p1TuningNotify]TG(2592,1940), RRZ In(2592,1940), RRZ crop x/y(2,240), RRZ crop w/h(2588,1458), RMX(1280,720), pixelMode(1)  
MtkCam/MappingMgr: [query] [Dev:2-Mod:NBC_ANR(11)] (Idx 384) (PF Preview, SM Preview, Bin 0, P2 2, FLASH 0, APP 3rd_party, FD 0, ZOOM 0,
```

### 3、RRZ OUT size对应excel中的P2

如：RRZ OUT是720P的时候，P2是2

```
LMVDrv : [p1TuningNotify]TG(2592,1940), RRZ In(2592,1940), RRZ crop x/y(2,240), RRZ crop w/h(2588,1458), RMX(1280,720), pixelMode(1)  
MtkCam/MappingMgr: [query] [Dev:2-Mod:NBC_ANR(11)] (Idx 384) (PF Preview, SM Preview, Bin 0, P2 2, FLASH 0, APP 3rd_party, FD 0, ZOOM 0,  
MDP : [PQ][PQDSAdaptor] input sw[1280], sh[718], dw[1280], dh[720], gainH[0], gainM[0]
```

如：RRZ OUT是1080P的时候，P2是1

```
LMVDrv : [p1TuningNotify]TG(2592,1940), RRZ In(2592,1940), RRZ crop x/y(2,240), RRZ crop w/h(2588,1458), RMX(2280,1080), pixelMode(1)  
MtkCam/MappingMgr: [query] [Dev:2-Mod:NBC_ANR(11)] (Idx 521) (PF Preview, SM Preview, Bin 0, P2 1, FLASH 0, APP 3rd_party, FD 0, ZOOM 0,  
MDP : [PQ][PQDSAdaptor] input sw[2280], sh[1078], dw[1280], dh[720], gainH[0], gainM[0]
```



#### 4、三方调试RRZ和MDP size分配

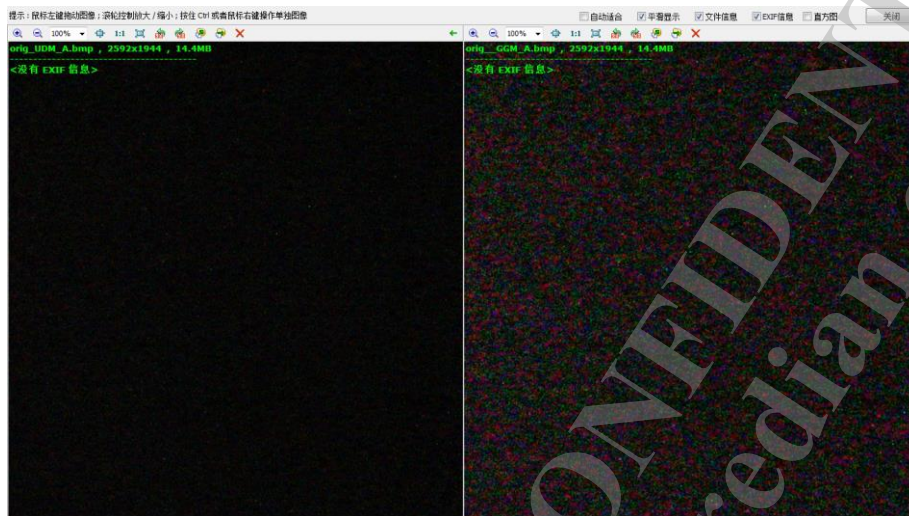
优先保证RRZ OUT的size尽量大，三方需求的size由MDP阶段来scale down得到，这样三方的quality较好

RRZ\_480P\_MDP\_480P

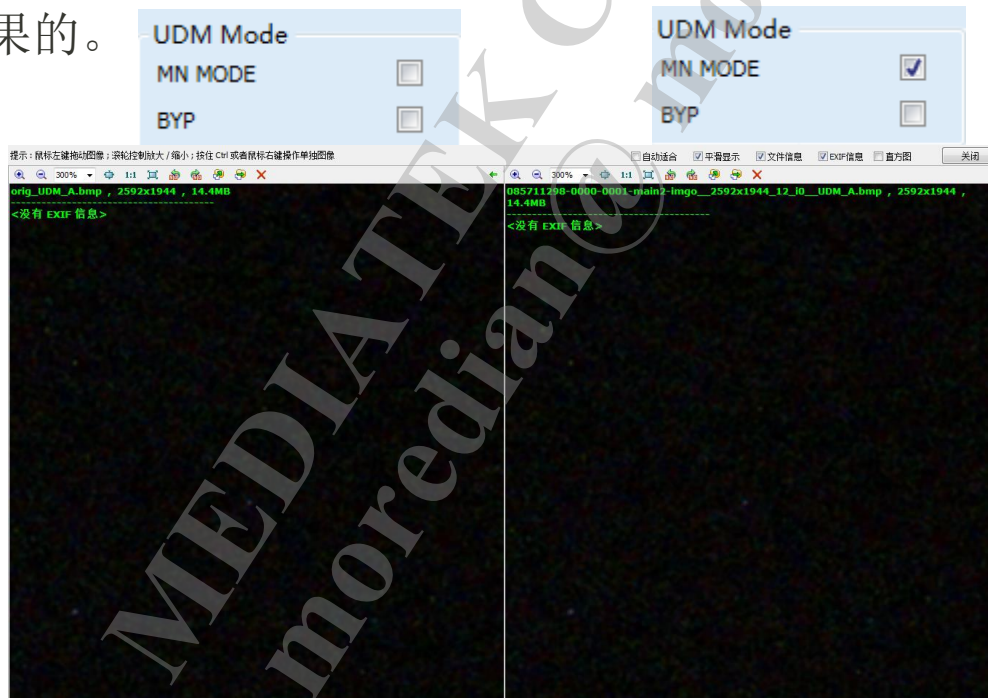
RRZ\_1080P\_MDP\_480P



## 1、模拟发现UDM和gamma阶段输出都有彩噪点



2、尝试检查UDM参数，勾选上MN MODE，UDM阶段输出无变化，且此时调整UDM的EE也是有效果的。





### 3、修改CCM参数，只提取一个channel的数据，解决MONO sensor彩噪问题

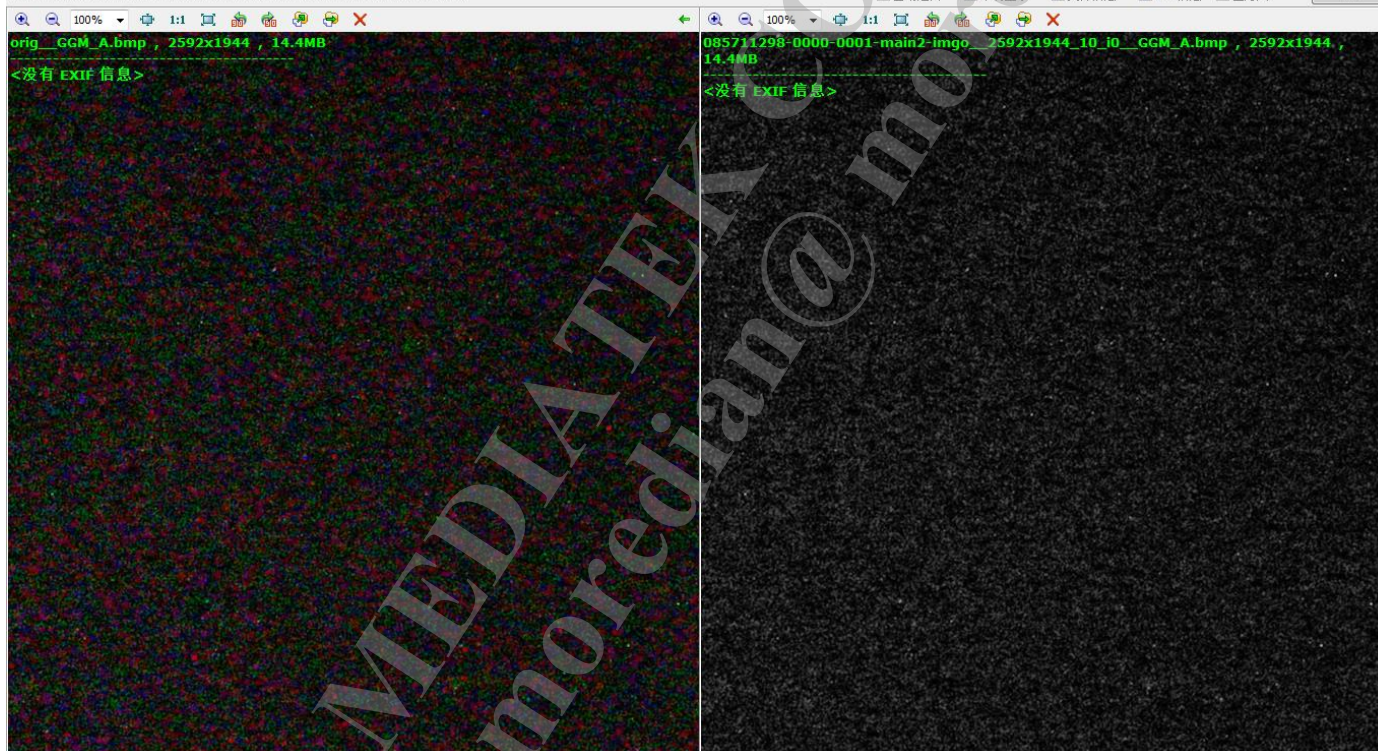
before

G2G FW SCCM	
CNV	
CNV 00	988
CNV 01	-542
CNV 02	66
CNV 10	-78
CNV 11	646
CNV 12	-56
CNV 20	-1
CNV 21	-237
CNV 22	750

after

G2G FW SCCM	
CNV	
CNV 00	0
CNV 01	512
CNV 02	0
CNV 10	0
CNV 11	512
CNV 12	0
CNV 20	0
CNV 21	512
CNV 22	0

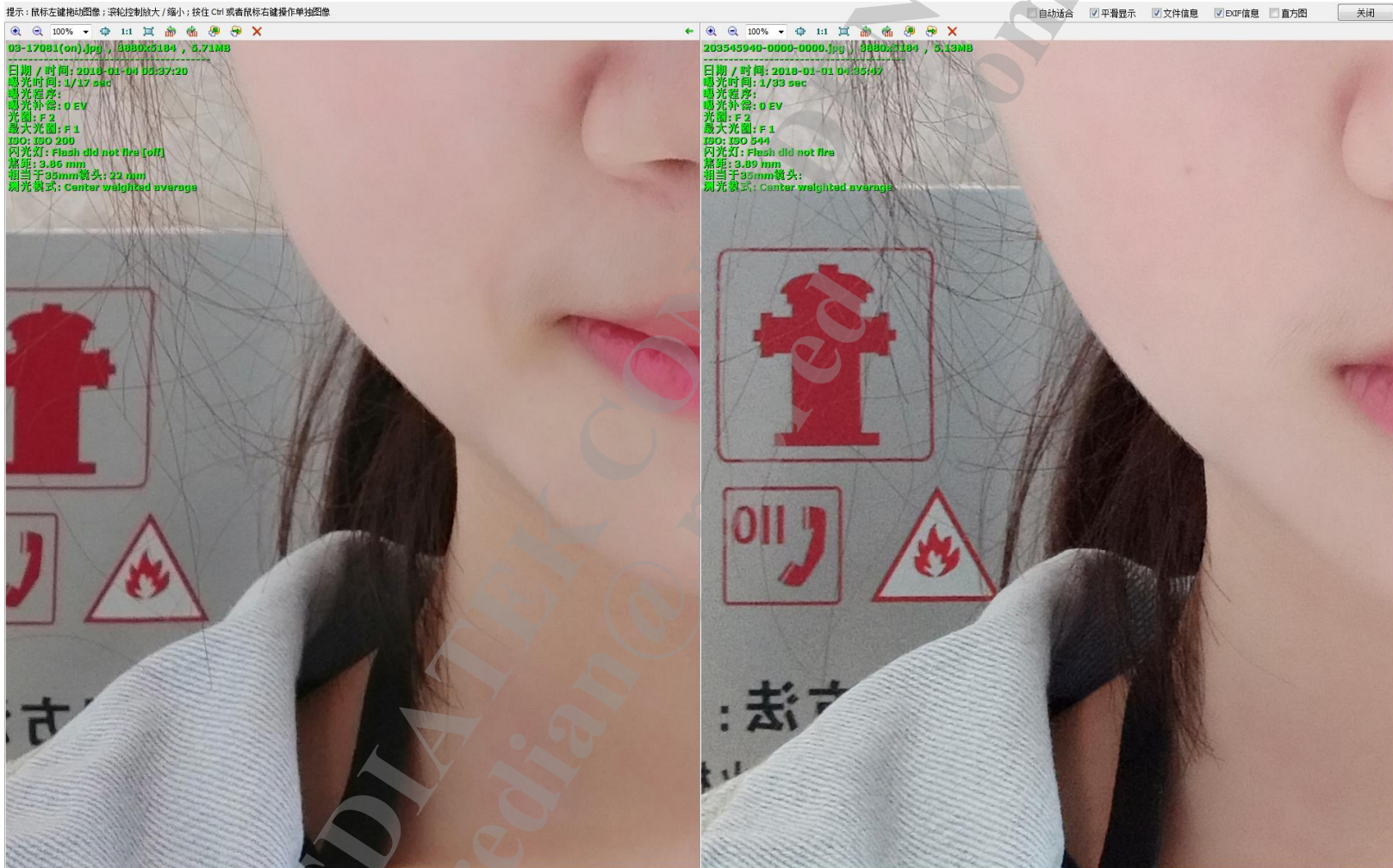
提示：鼠标左键拖动图像；滚轮控制放大/缩小；按住 Ctrl 或者鼠标右键操作单独图像



# 人脸脏，脖子及背景脏

对比机

调试机器





# 1、修改后，皮肤及背景噪点小了，但是头发也变糊了

Blending Control	
Y L0 HF W	18
Y L1 HF W	19
Y L2 HF W	20
Y L3 HF W	21

before

Blending Control	
Y L0 HF W	13
Y L1 HF W	13
Y L2 HF W	13
Y L3 HF W	13

after

对比机



## 2、增加UDM及EE模块的EE，增强头发清晰度

UDM

H1 GN	8
H2 GN	7
H3 GN	6

H1 GN	10
H2 GN	9
H3 GN	8

EE

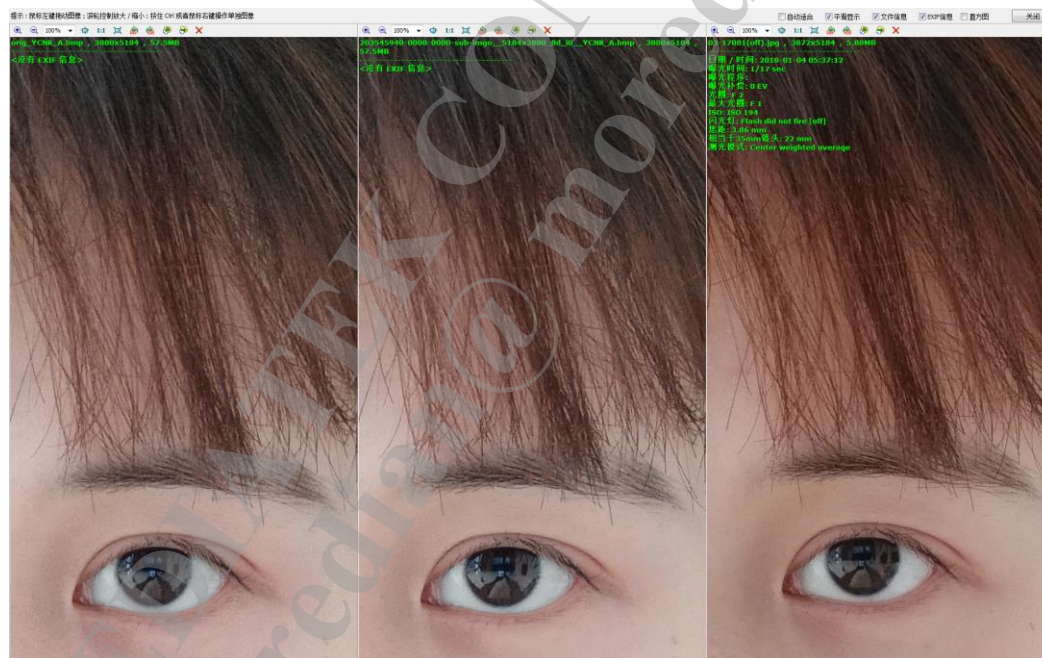
H1 GN	12
H2 GN	11
H3 GN	10
HP CORE TH	8

H1 GN	14
H2 GN	13
H3 GN	12
HP CORE TH	0

before

after

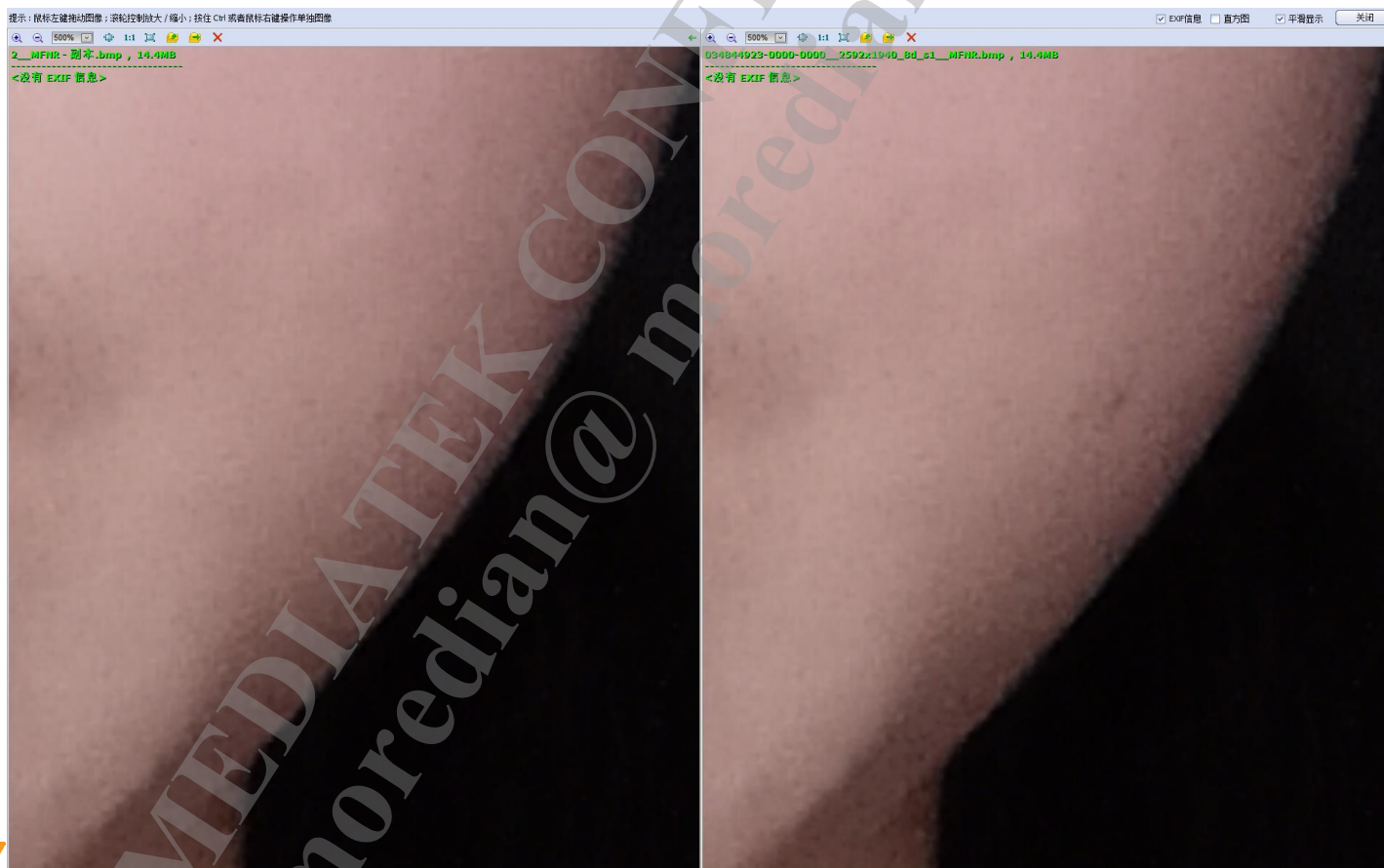
对比机



## 人脸过度不smooth

* Slow Transition	
ST LB	2
ST UB	9
ST OFST RESP	255
ST SL RESP	16
ST OFST CE	100
ST SL CE	16

* Slow Transition	
ST LB	2
ST UB	9
ST OFST RESP	100
ST SL RESP	16
ST OFST CE	100
ST SL CE	16



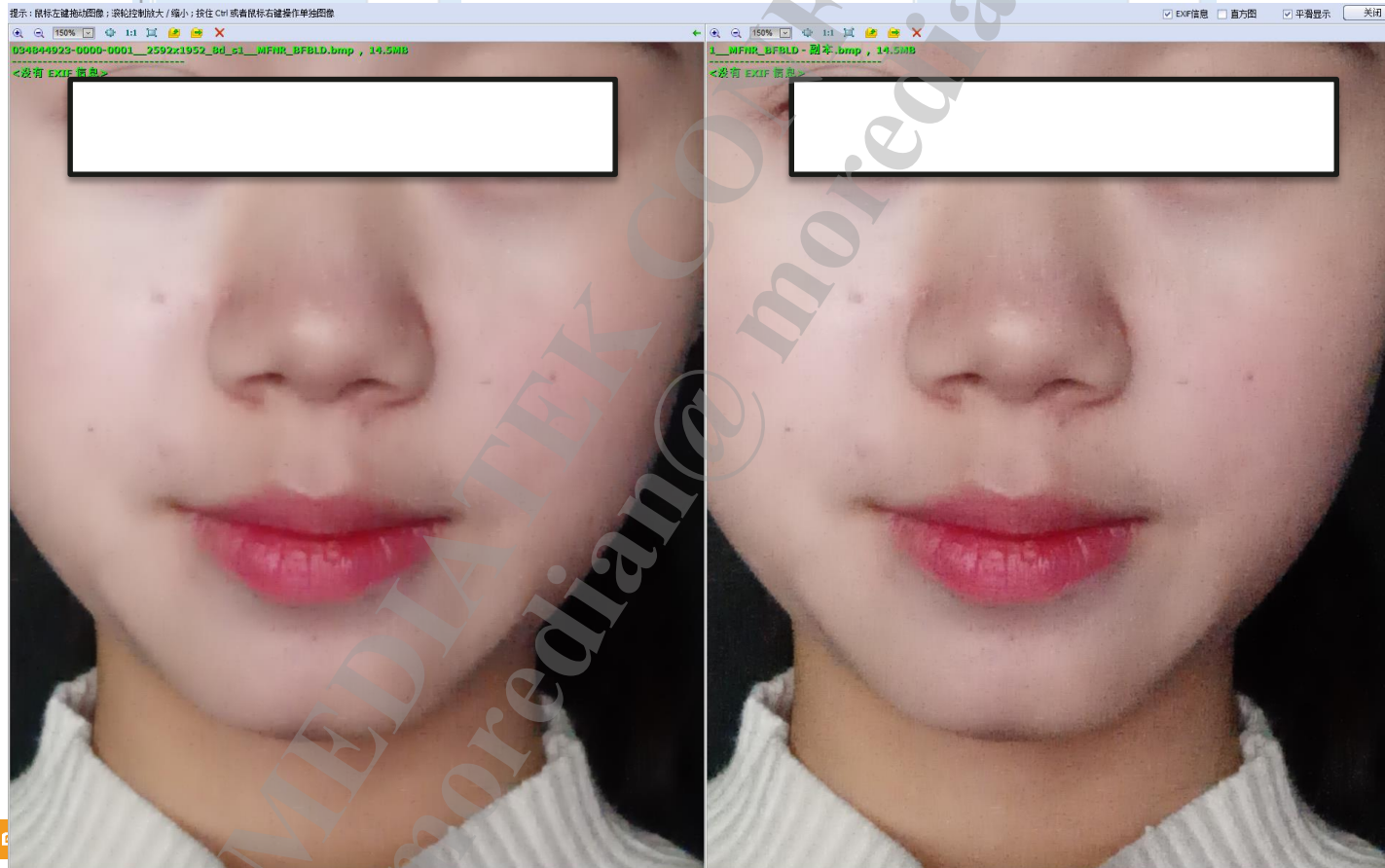


# Bfblend STD调整

YNR Strength	
L0 IDX	<input type="checkbox"/>
L1 IDX	<input checked="" type="checkbox"/>
L2 IDX	2
L3 IDX	3
L0 std	99
L1 std	76
L2 std	60
L3 std	37

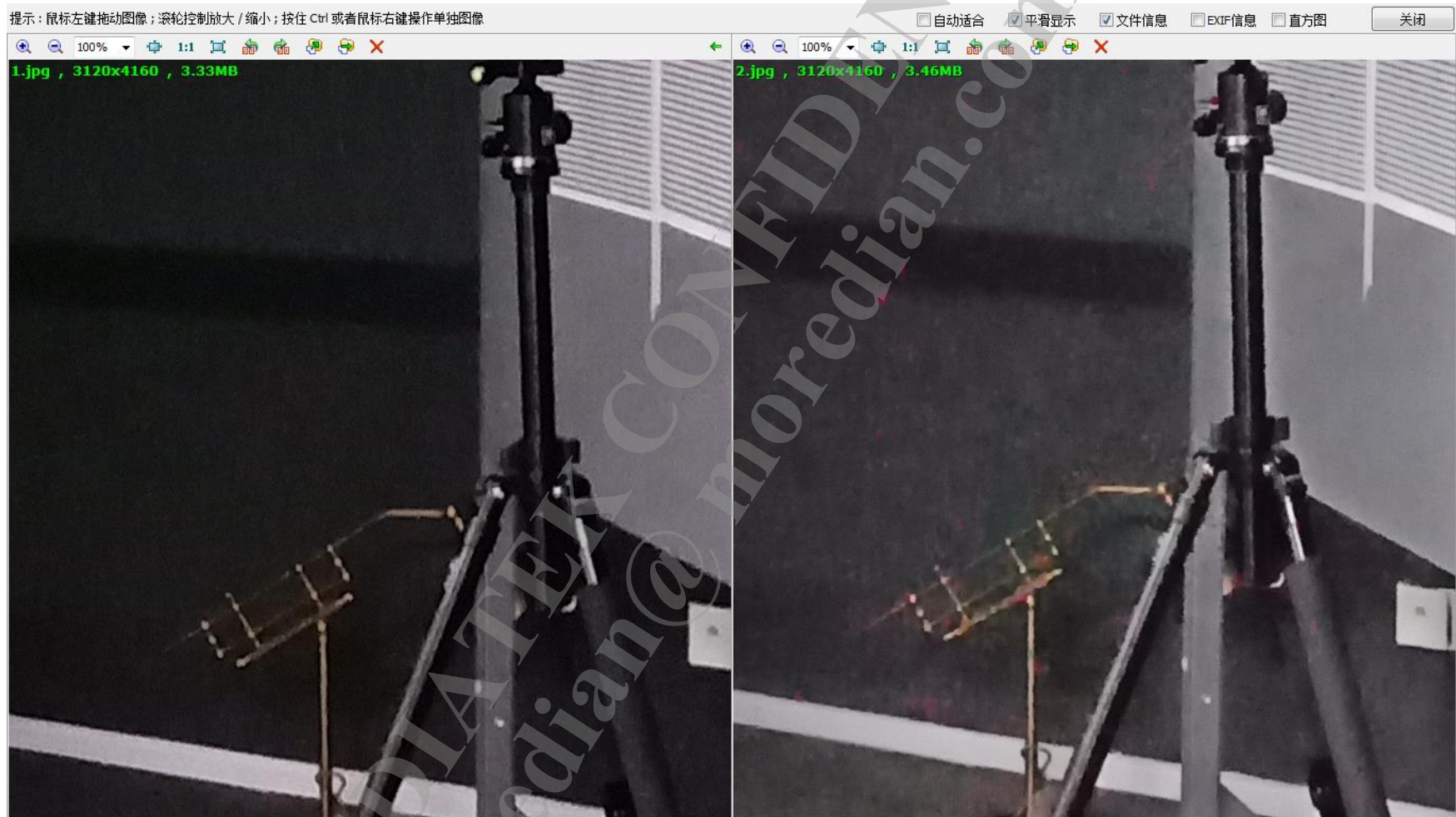
YNR Strength	
L0 IDX	<input type="checkbox"/>
L1 IDX	<input checked="" type="checkbox"/>
L2 IDX	2
L3 IDX	3
L0 std	55
L1 std	59
L2 std	51
L3 std	25

Blending Control	
Y L0 HF W	0
Y L1 HF W	0
Y L2 HF W	0
Y L3 HF W	0



对比机

调试机



# 使用PTC去彩点

before

after

NBC

CNR Strength	
PTC1	2
PTC2	4
PTC3	6
PTC4	8

Activity Map	
ACT BLD BASE C	48

CNR Strength	
PTC1	6
PTC2	12
PTC3	18
PTC4	24

Chroma Blend	
ACT BLD BASE C	64

NBC2

SCALE MODE	0
------------	---

PTC Strength [U+V]	
PTC1	2
PTC2	3
PTC3	4
PTC4	6

Chroma Blend	
ACT BLD BASE C	48

SCALE MODE	3
------------	---

PTC Strength [U+V]	
PTC1	5
PTC2	10
PTC3	15
PTC4	20

Chroma Blend	
ACT BLD BASE C	64

# 使用PTC去彩点

before

after

