

MEDIATEK

CONFIDENTIAL B

P40 LCE-NR Link Introduction & Usage



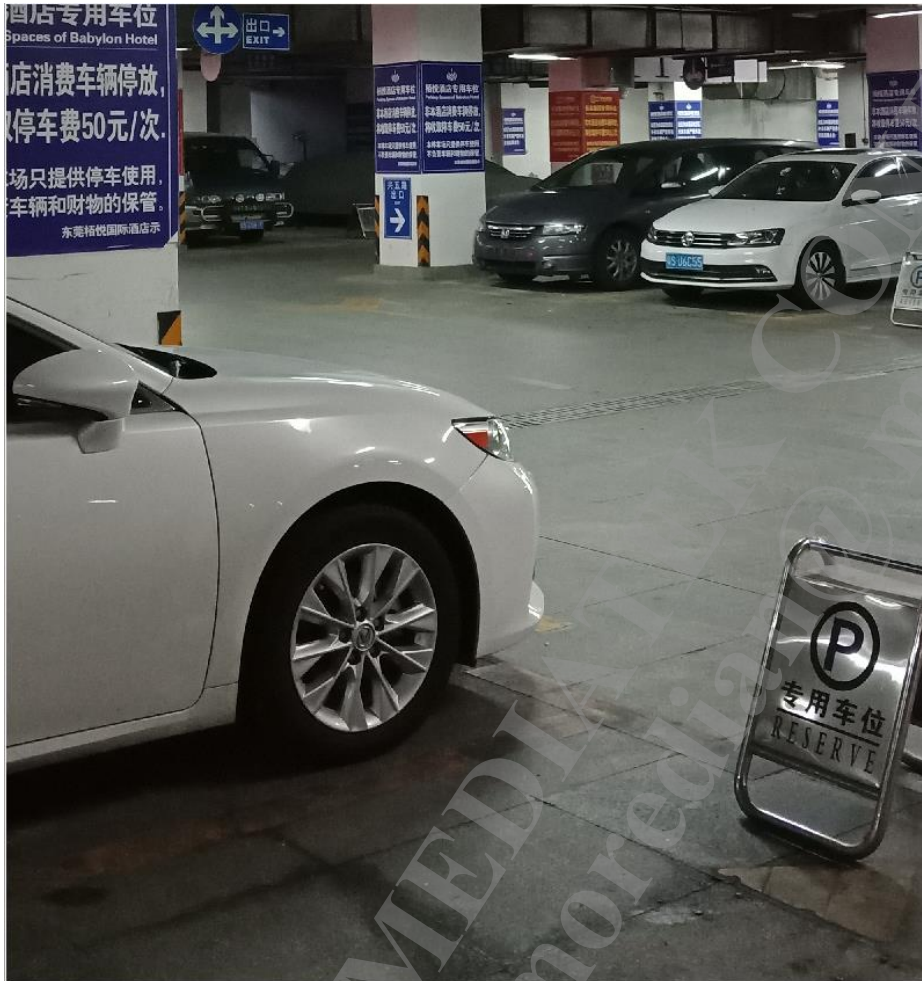
Outline

- **Motivation**
- **LCE-NR Link Flow**
- **Tuning Register Introduction**

Motivation

Noise boosted by LCE

- Noise boosted when using strong LCE to enhance brightness



ISO1800, weak LCE



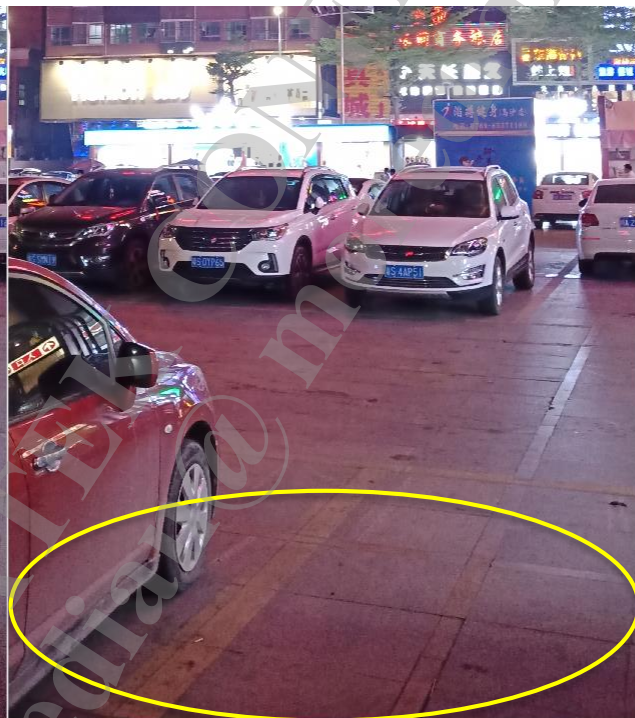
ISO1661, strong LCE

Noise enhanced by LCE

- LCE-NR Link: apply different NR strength depending on LCE strength



LCE on



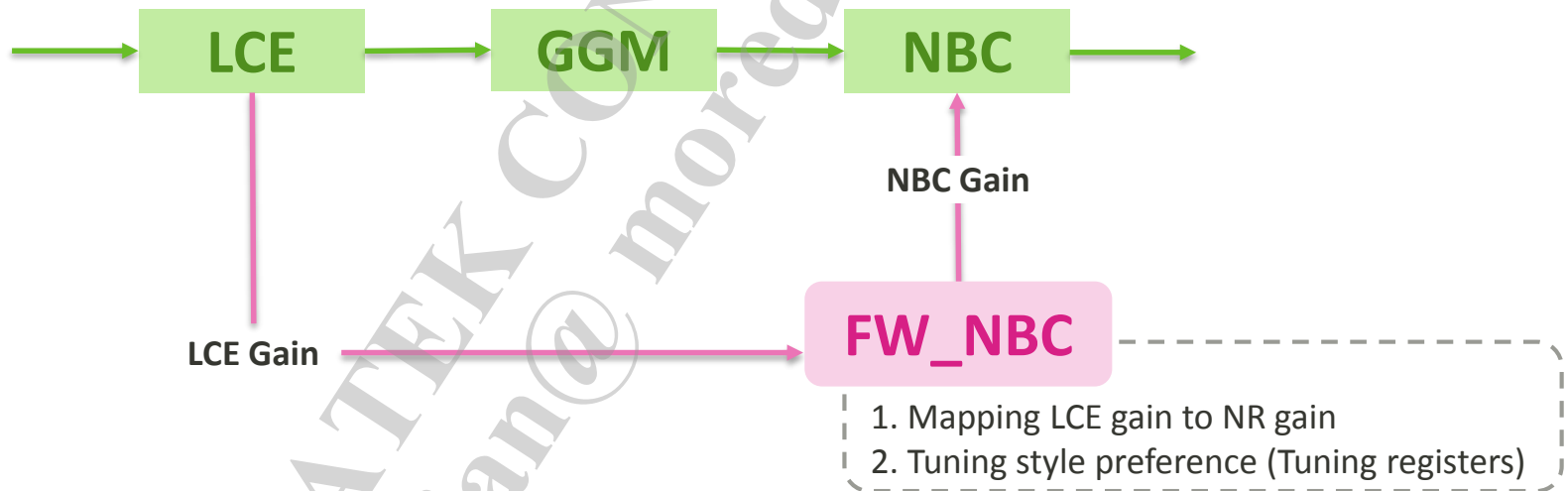
LCE-NR Link



LCE off

LCE-NR Link Flow

LCE-NR Link ISP Flow Chart



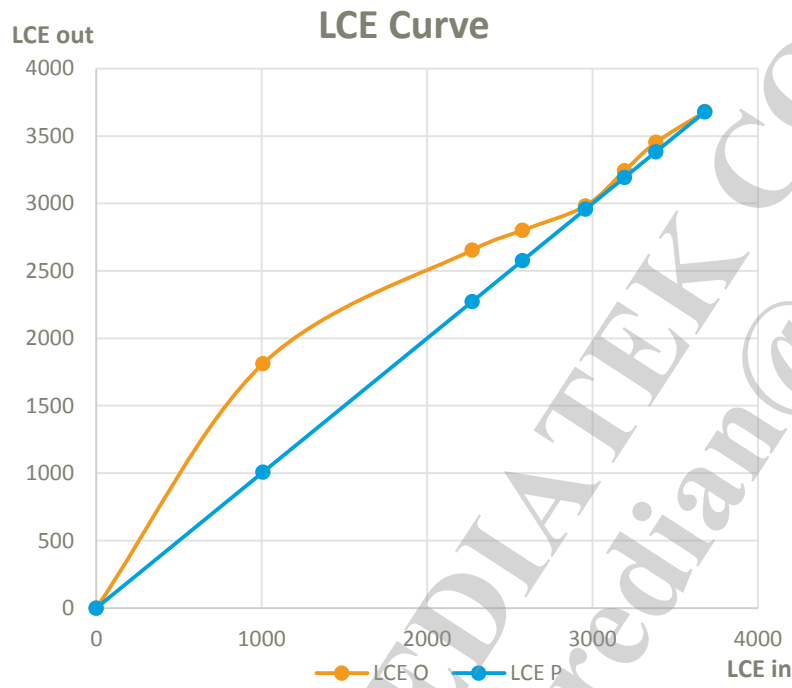
Example 1

LCE P		LCE O	
P0	0	O0	0
P1	1008	O1	1812
P2	2273	O2	2655
P3	2577	O3	2801
P4	2958	O4	2983
P5	3194	O5	3244
P6	3383	O6	3453
P7	3680	O7	3681

- ITUNE ANR/ ITUNE LTM ANR

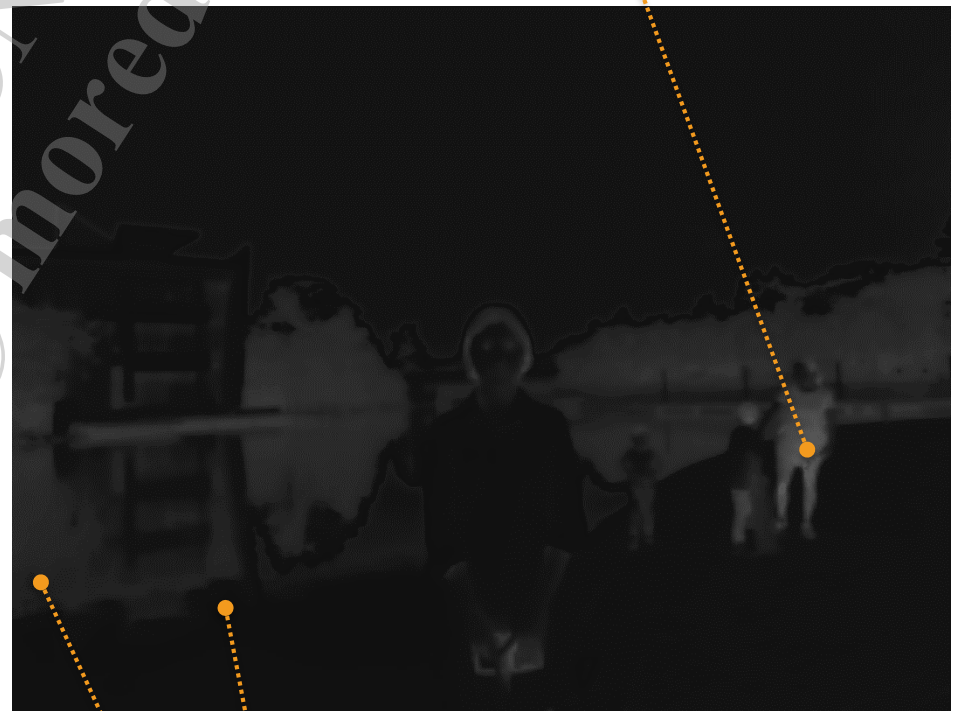
-> dump LCE-NR Link strength ink (anr_LTMnr.bmp)

- NBC Gain : LCE NR Strength \div 16



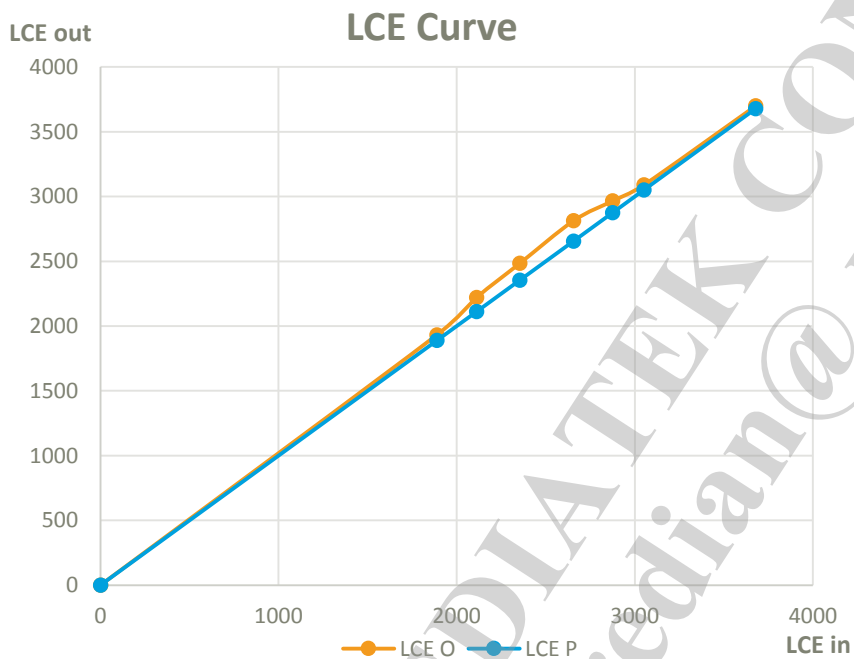
84 --> NBC Gain:

$$84 \div 16 = 5.25$$



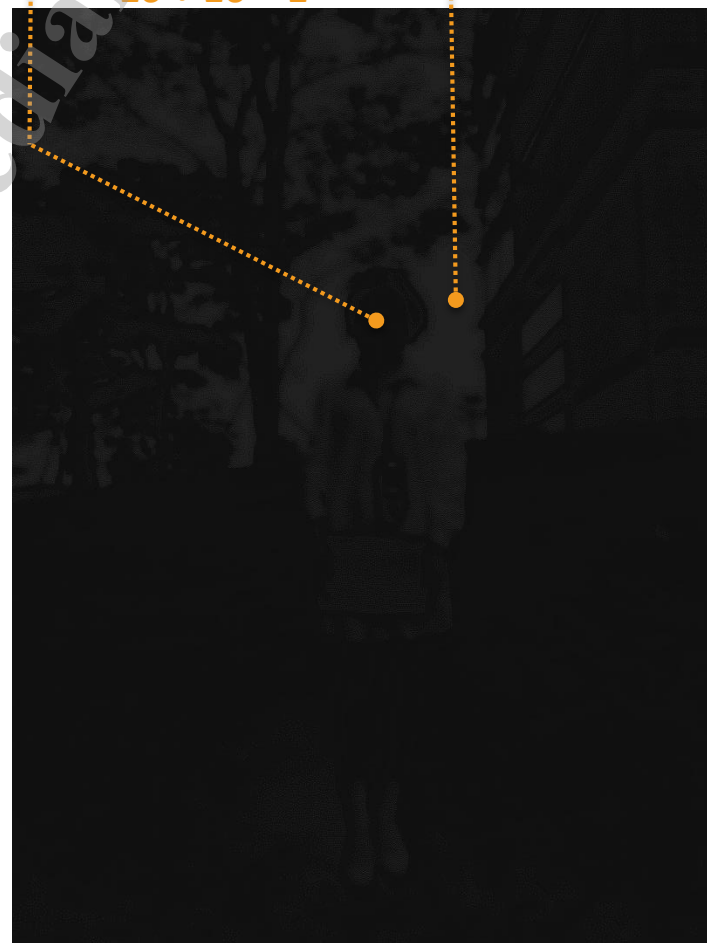
Example 2

LCE P		LCE O	
P0	0	O0	0
P1	1888	O1	1931
P2	2112	O2	2221
P3	2354	O3	2484
P4	2656	O4	2813
P5	2875	O5	2966
P6	3050	O6	3089
P7	3678	O7	3699



16 --> NBC Gain:
 $16 \div 16 = 1$

33 --> NBC Gain:
 $33 \div 16 = 2.06$



Tuning Register Introduction

LCE-NR Link Tuning UI

LCE-NR Link strength

LCE-NR Link Luma strength

NBC	NBCBlend	FW-NBC Link	FWNBC
Link Control			
ENABLE <input type="checkbox"/>			
Link Strength			
LCE LINK STR		16	
Y0 LINK GAIN		16	
Y1 LINK GAIN		16	
Y2 LINK GAIN		16	
Y3 LINK GAIN		16	
Y4 LINK GAIN		16	
Y5 LINK GAIN		16	

LCE LINK STR

- NR Link strength of LCE curve

LCE LINK STR: 16

A close-up photograph of a dental crown margin. The crown is made of a dark, metallic material, and the margin is a lighter, silver-colored metal. The text "LCE LINK STR: 16" is overlaid in blue at the top left.

LCE LINK STR: 32

A close-up photograph of a dental crown margin, similar to the first image but with a different LCE LINK STR value. The text "LCE LINK STR: 32" is overlaid in blue at the top left.

Link Off

A close-up photograph of a dental crown margin, similar to the previous images but with the "Link Off" setting. The text "Link Off" is overlaid in orange at the top left.

LCE LINK STR: 64

A close-up photograph of a dental crown margin, similar to the previous images but with a different LCE LINK STR value. The text "LCE LINK STR: 64" is overlaid in blue at the top left.

Y# LINK GAIN

Y0 LINK GAIN	16
Y1 LINK GAIN	16
Y2 LINK GAIN	16
Y3 LINK GAIN	16
Y4 LINK GAIN	16
Y5 LINK GAIN	16

- NR Link strength gain for brightness Y#



Link off

Link on/ Y1 LINK GAIN: 8

Link on/ Y1 LINK GAIN: 16

Y# LINK GAIN

- ITUNE ANR/ ITUNE LTM ANR

-> dump luma ink

Register	Y0	Y1	Y2	Y3	Y4	Y5
Pixel Value	64	96	128	160	192	224



Y# LINK GAIN

Y1 LINK GAIN: 8

Y1 LINK GAIN: 16

33

--> NBC Gain:
 $33 \div 16 = 2.06$

86

--> NBC Gain:
 $86 \div 16 = 5.375$

42

--> NBC Gain:
 $42 \div 16 = 2.625$

86

--> NBC Gain:
 $86 \div 16 = 5.375$

LCE-NR Link Tuning Register Map

Register	Range	Description
LCE LINK STR	0-1024	NR Link strength
Y0 LINK GAIN	0-255	NR Link strength gain for brightness Y0 (mapping to LCE P1)
Y1 LINK GAIN	0-255	NR Link strength gain for brightness Y1 (mapping to LCE P2)
Y2 LINK GAIN	0-255	NR Link strength gain for brightness Y2 (mapping to LCE P3)
Y3 LINK GAIN	0-255	NR Link strength gain for brightness Y3 (mapping to LCE P4)
Y4 LINK GAIN	0-255	NR Link strength gain for brightness Y4 (mapping to LCE P5)
Y5 LINK GAIN	0-255	NR Link strength gain for brightness Y5 (mapping to LCE P6)

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