

Single Master Demonstrations

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Demonstrations

- Scene-referred single master using ACES_RGB_AP0_integer and ACES_RGB_AP0
- Conversion for display occurs within LG 2018 OLED's 33-cubed 3D LookupTable and/or in GPU
- Display or scene-referred signal carried by a) floating point codec using HDMI, or b) Main10 HEVC
- PQ10,000; 2,000; 700; 350; 150
- Conversion to 1000nit/P3 occurs within Sony BVM-X310 using internal tone-map/gamut-map
- Conversion to 700nit/P3 within LG 2018 OLED using internal 33-cubed 3D LookupTable
- 150nit SDR also demonstrated (SDR derived from HDR, both scene and display-referred)

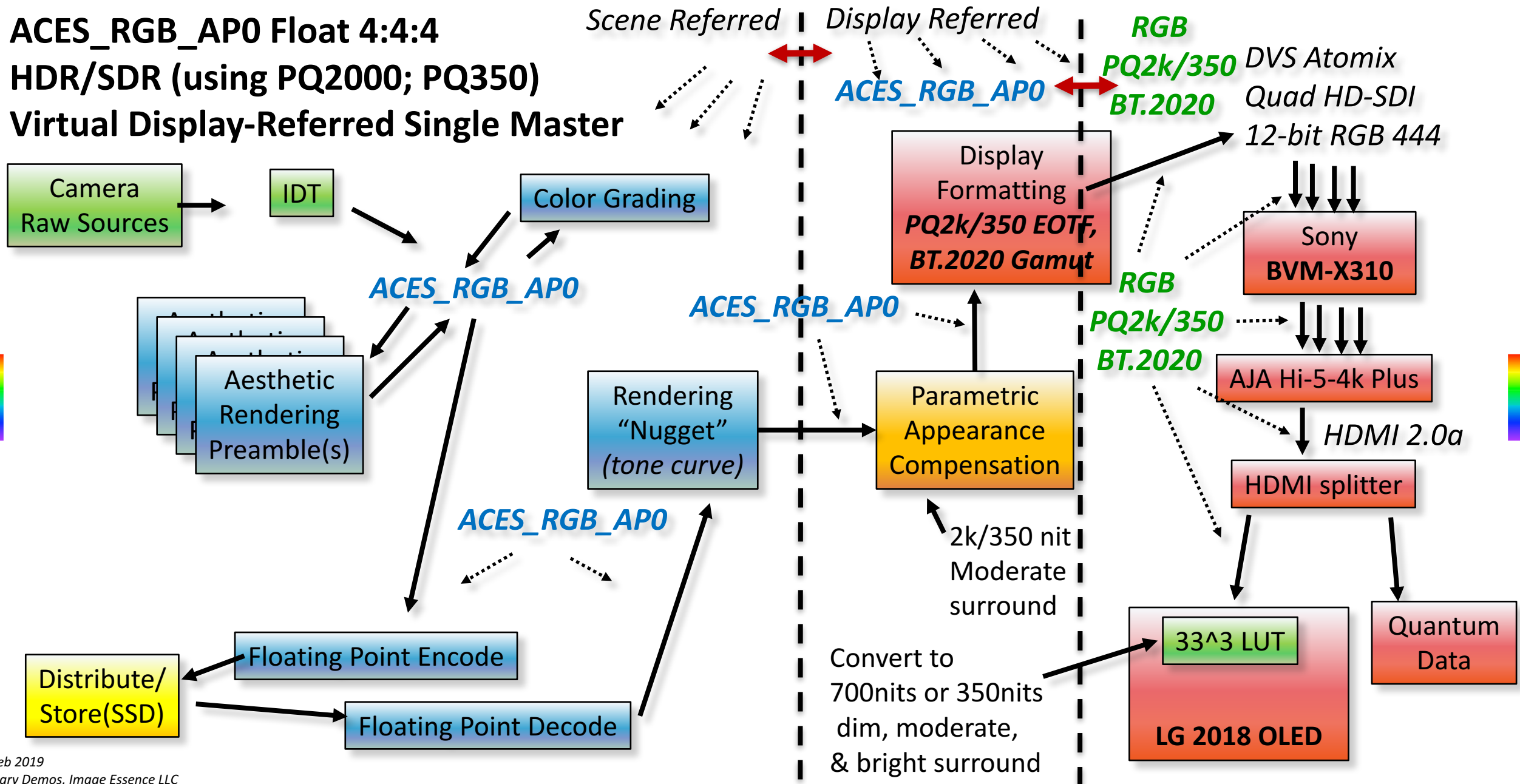
Primary Demonstration

Image Source	Benefit	Codec	Transport	 Input to 3DUT	3DLUT type
ACES_RGB_AP0	Gradeable	Floating Point	HDMI	PQ350/PQ2000 BT.2020 gamut	Soft-Clip @700
ACES_RGB_AP0_integer	Gradeable	HEVC	USB/Network	 ACES_RGB_integer (quasi-log from ACEScct) ACES AP0 gamut	Soft-Clip @700

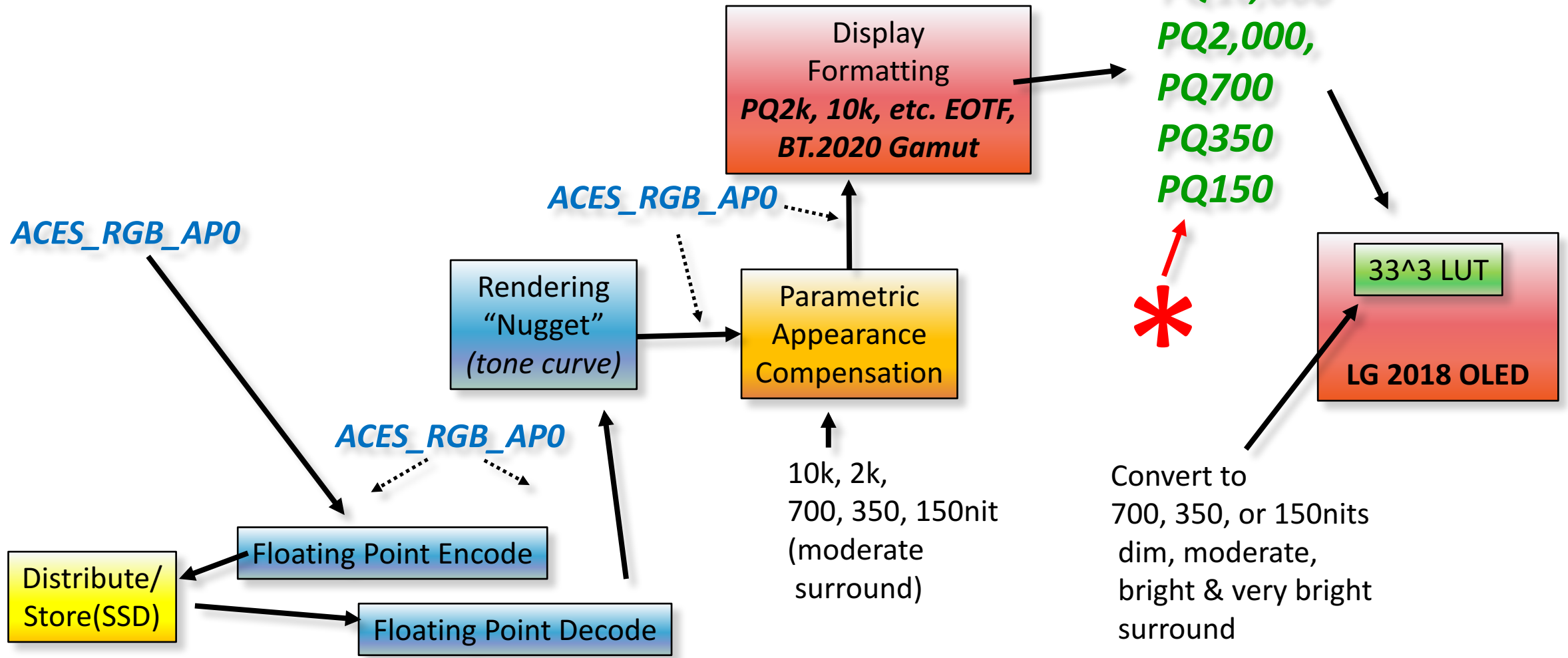
Also Available For Demonstration

Image Source	Benefit	Codec	Transport	Input to 3DUT	3DLUT type
ACES_RGB_AP0	Gradeable	Floating Point	HDMI	PQ700/150 P3	Hard-Clip @700
			HDMI	PQ150/350/700/2k/10k 2020	Soft-Clip @700
ACES_RGB_AP0_integer	Gradeable	HEVC	USB/Network	ACES_RGB_AP0_integer	Soft-Clip @700
PQ1000/2000 2020	Compatible	HEVC	USB/Network	PQ 2020	Soft-Clip @700
PQ10,000 2020	Larger Data Range	HEVC	USB/Network	PQ 2020	Soft-Clip @700

ACES_RGB_AP0 Float 4:4:4 HDR/SDR (using PQ2000; PQ350) Virtual Display-Referred Single Master



ACES_RGB_APO Float 4:4:4 PQ10,000; 2000; 700; 150nits



ACES_APO_integer

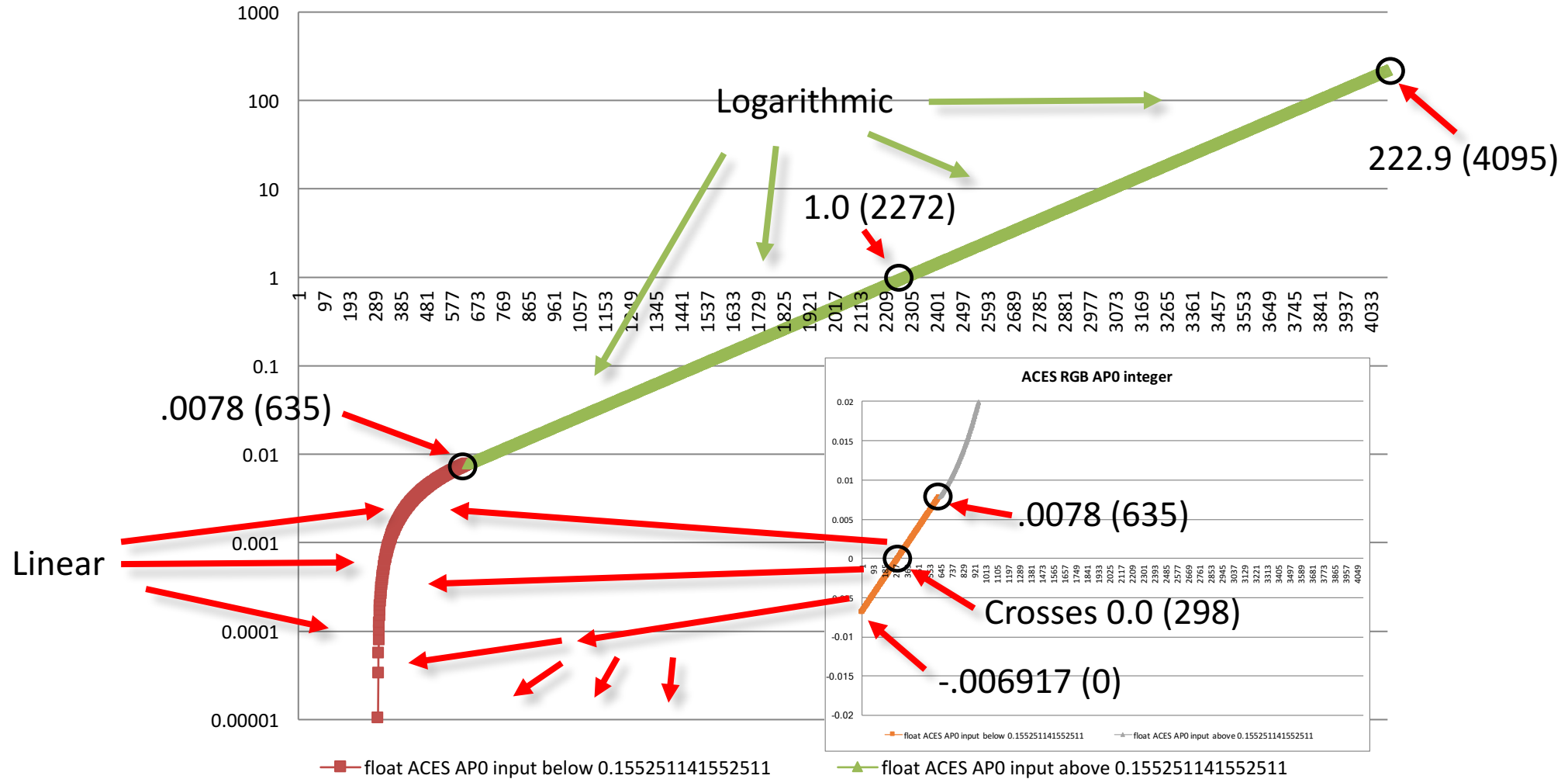
Developed in Adv Imaging Committee of ASC MITC, as proposed by Josh Pines:

```
/* convert to ACES_APO_INTEGER function as used in ACEScct as described in
ACES document S-2016-001 (for floating point), range 0.0 to 1.0 */
if (red <= 0.0078125f) { /* quasi-log slope-matched linear dark toe */
    red = MAX(0.0f, 10.5402377416545f * red + 0.0729055341958355f);
} else { /* > 0.0078125f */
    red = MIN(1.0f, (9.72f + log2f(red)) / 17.52f); /* logarithmic */
} /* then green, then blue, then scale up to 1023 or 4095 integer */
```

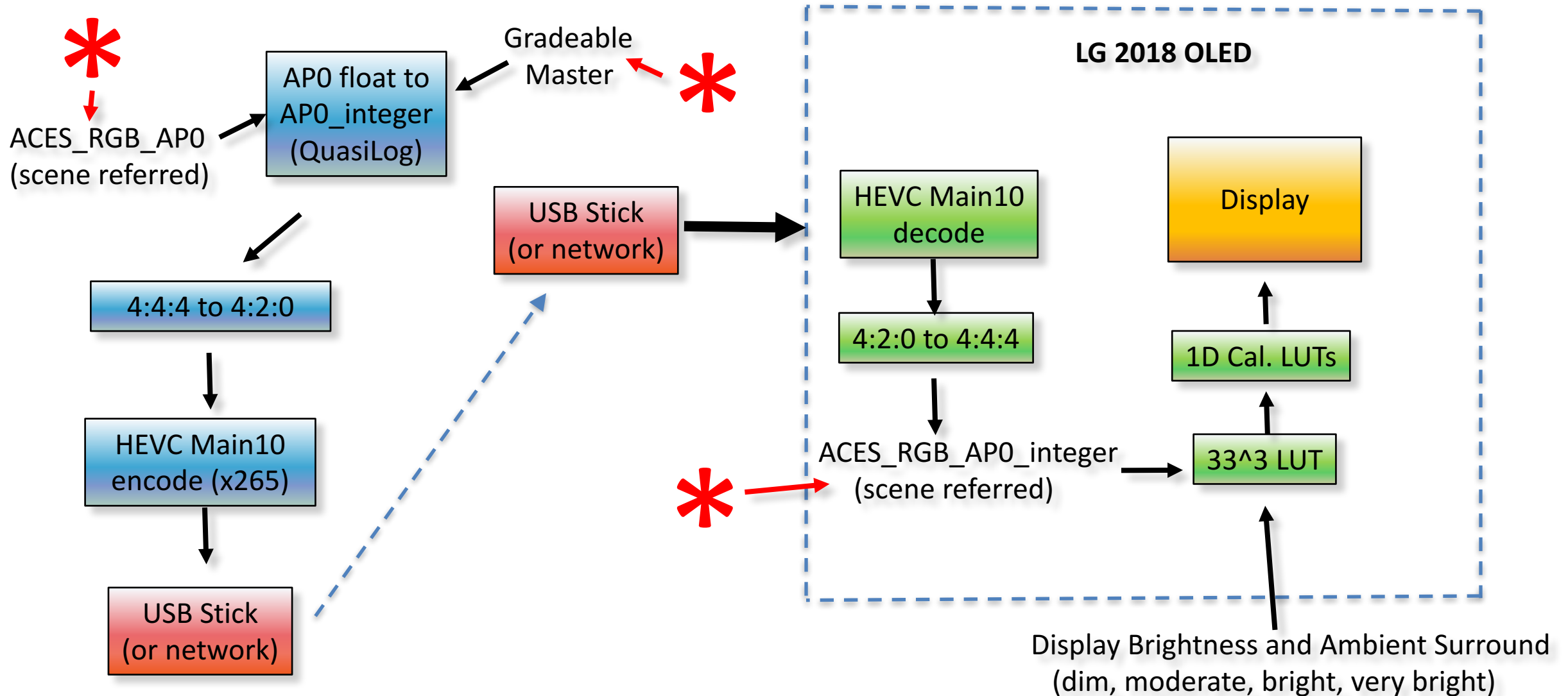
```
/* convert from ACES_APO_INTEGER function as used in ACEScct as described in
ACES document S-2016-001 (for floating point), range 0.0 to 1.0 */
/* first divide integer by 1023.0 or 4095.0 */
if (red <= 0.155251141552511f) {
    red = (red - 0.0729055341958355f) / 10.5402377416545f; /* linear */
} else { /* > 0.155251141552511f */
    red = powf(2.0f, red * 17.52f - 9.72f); /* anti-log (exponent) */
} /* then green, then blue */
```

-.006917	->	0, 0
0.0	->	299, 74
0.18	->	1694, 424
1.0	->	2272, 568
8.0	->	2974, 743
64.0	->	3673, 918
222.9	->	4095, 1023

ACES RGB AP0 integer (Quasi-Log based on ACEScct)



Scene-Referred Single Master Direct To Display(s)



Interoperable Display-Referred Single Master Using PQ/2020 HDR (Appearance Compensated Within Display)

PQ/2020 2k/10k nit/moderate surround
(virtual reference display-referred)

4:4:4 to 4:2:0

HEVC Main10
encode (x265)

USB Stick
(or network)

USB Stick
(or network)

HEVC Main10
decode

4:2:0 to 4:4:4

PQ/2020
(display referred)

Display

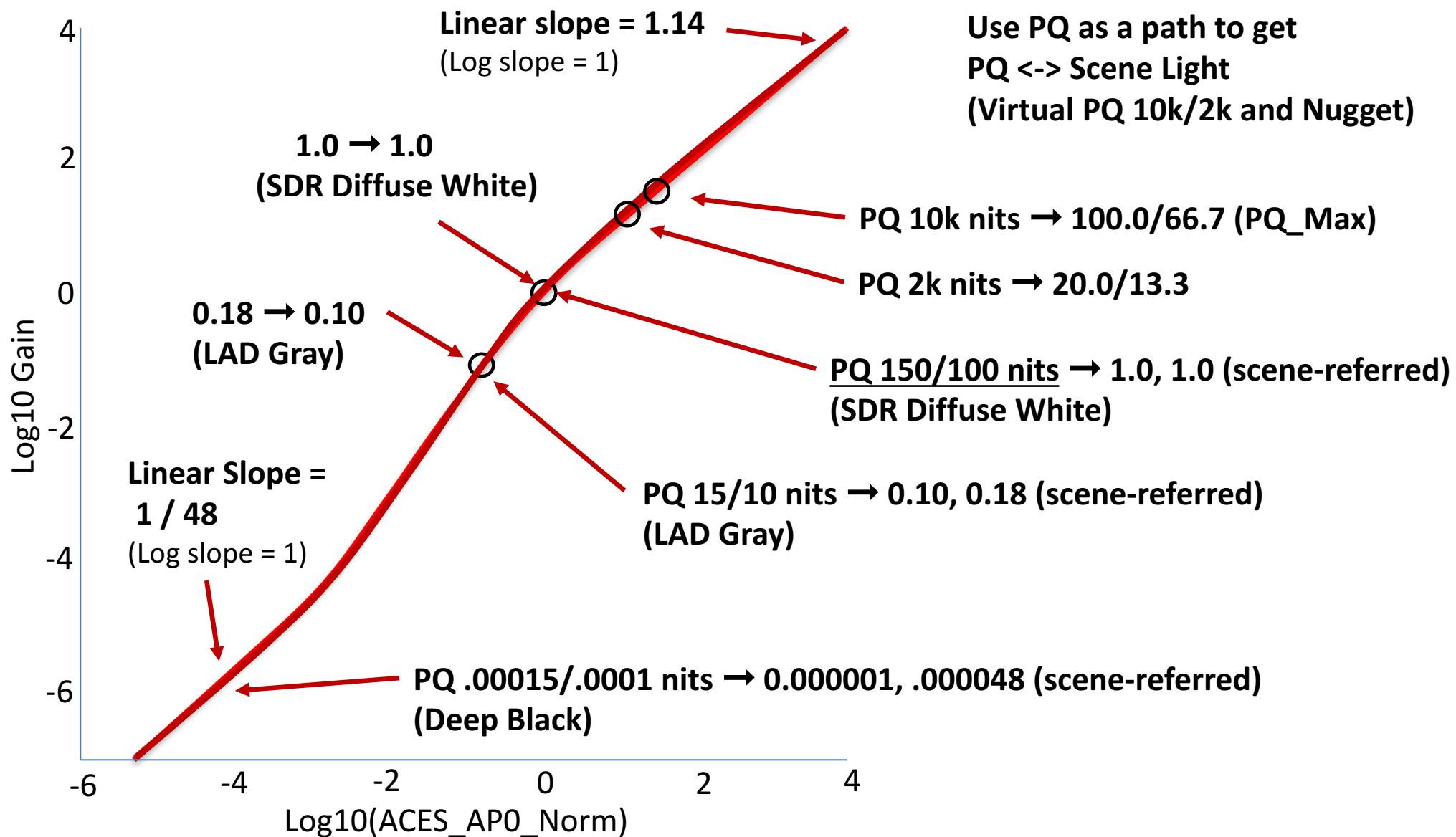
1D Cal. LUTs

33^3 LUT

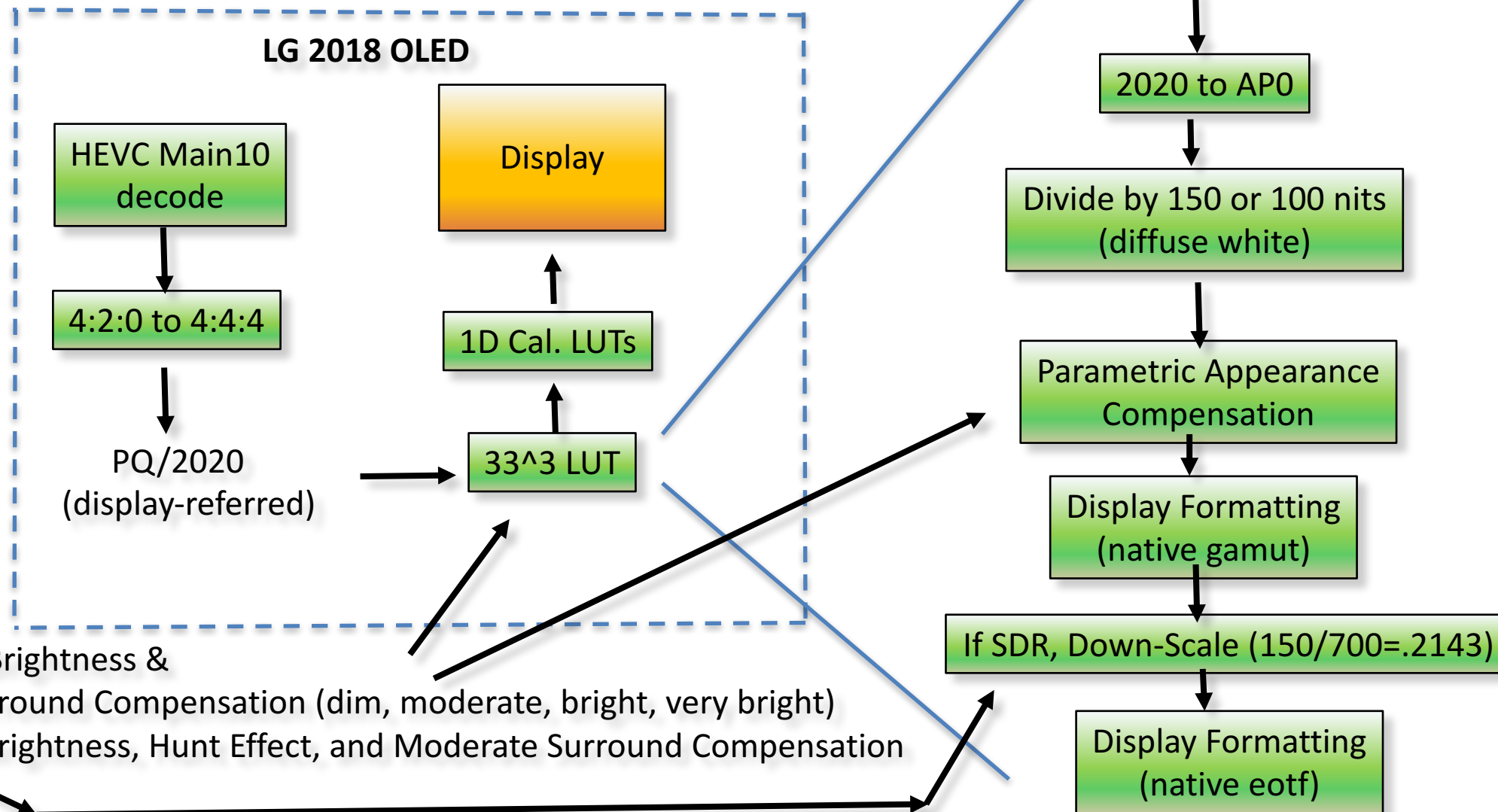
LG 2018 OLED

HDR 700nit Brightness &
Ambient Surround Compensation (dim, moderate, bright, very bright)
SDR 150nit Brightness, Hunt Effect, and Moderate Surround Compensation

Log Log "Nugget" Tone Curve (invertible)



PQ/2020 HDR Signal, 3DLUT Appearance Compensated for Surround and Brightness (including SDR)



Review of Demonstrations

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Many Thanks For Everyone's Generous Support!

AMPAS ACES Project 2010-2014

JKP Alps/D800E/D810/Sony F55

ASC MITC

JKP Europe/Cosmo/D800E/D810

LG OLED 55 C8PUA

JKP Charts

Sony BVM X310

Don Eklund Sony NYC/Sony F65

Nvidia RTX

NASA/IMAX Sony F65

R&S DVS Atomix HDMI/BoB

Bob Primes Canon 5DmkII

TeledyneLecroy/Quantumdata

NASA Red EPIC