

## **HDRTV production technology and its role in solving the problems of contrast differences during the live broadcast to cover major events**

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### **Abstract:**

HDRTV imaging overcomes the limitations of conventional imaging by performing a series of operations on color data with much higher accuracy, improving viewing conditions. Traditional SDR (Standard Dynamic Range) video can display up to 16 million colors using the industry standard BT.709 color gamut. For 8-bit displays, originally designed for CRT TVs while newer displays can now support much wider 10-bit color spaces including BT.2020 for SDR and BT.2100 for HDR, capable of displaying over a billion colors. HDR content is already being offered by major broadcasting platforms as it provides more realism and depth to a cinematic viewing experience and when it comes to live events (live broadcasts) especially sporting events, HDR technology brings the movement to life between the stadium, players, fans and the outdoor scene where HDR can be embedded. With UHD 4k content A major consideration when implementing HDR is how to ensure compatibility with older SDR (Standard Dynamic Range) devices. Backward compatibility is important in broadcast environments where providers need to ensure content can be viewed on older SDR TVs and most TVs will support The big screens on the market today have at least one consumer HDR format including HDR10, HDR10+, Dolby Vision, HLG, and PQ The student follows the descriptive approach to obtain information for high-contrast television technology and benefit from that information in its application within the Egyptian television to reach the level of an image that works to attract the viewer and return leadership to the Egyptian television.

**Statement of the problem:** The problem lies in the remoteness of the viewer and the lack of follow-up to Egyptian television, due to its lack of use and knowledge of the latest technologies in the various stages of production of the television image.

This appears clearly in the live coverage of major events such as the activities of the Presidency of the Republic, football matches, and concerts, especially in high-contrast shooting conditions or with high lighting differences.

**Significance:** The importance of the study lies in the fact that it is among the studies that deal with the development of television technology and the challenges of obtaining a high-quality image in addition to high definition, in order to reach a television image that is closer to seeing the human eye through HDRTV technology,

**Objectives:** The research aims to: 1 - Shedding light on HDRTV technology in order to benefit from it in reaching an image that is as close as possible to the vision of the human eye. 2 - The director of photography takes advantage of modern technology to reduce the differences between the lighting areas in the direct coverage, which contributes to a higher quality of the television image.

**Hypothesis:** The first hypothesis: The director of photography suffers during the live broadcast of large television events, especially at high-contrast times such as noon, and his inability to control the high contrast degrees, so he needs a technology that is able to reduce these differences, and therefore the need for high-contrast television technology, HDRTV, came.

The second hypothesis: that the combination of the technology that television has reached now, which is UHD TV, and HDRTV, which helps the director of photography to increase the contrast areas and increase the color spaces, which means a better quality image than the current one.

**Methodology:** The researcher follows the descriptive analytical approach as required. The study used the descriptive approach to obtain information about HDRTV

**Results:** 1 - It is now possible to reproduce brighter images and lower black levels thus allowing for a significant increase in the overall dynamic range or contrast ratio of an image. 2 - The combination of UHD and HDR technology leads to a smooth transition to a larger image depth, the use of larger pixel sampling, and the transition from using an 8-bit depth to a 10-bit depth, which means 64 times more color representation. 3 - A key consideration when implementing HDR is how to ensure compatibility with older SDR (Standard Dynamic Range) devices and is important in broadcast environments where service providers need to ensure that content can be viewed on older SDR TVs. 4 - There are several formats for HDRTV implementation including HDR10, HDR10 +, Dolby Vision, HLG and PQ but only these two standards are defined for all live

TV production applications. 5 - For HDR TV international program production and exchange, the specification (PQ) or HLG ... should be used separately in transfer functions from one system or another and not mixed. 6 - Dynamic metadata means that the contrast brightness and color information can change with each frame of the video, while static metadata the lighting is adjusted with the change of each scene and not a frame and it is closest to the logic and therefore metadata is preferred with HDR video

**Recommendations:** 1. Paying attention to the quality of the television image and making it a priority for the National Media Authority in the Arab Republic of Egypt to re-attract the viewer to Egyptian television. 2. Moving quickly from HDTV to HDRTV in all stages of production, especially in production and live broadcasting within Egyptian media institutions. 3. Interest in producing HDR content on different production sites and platforms within the Arab Republic of Egypt 4. Adopting the HLG Hybrid Log-Gamma format during the transition from HDTV to HDRTV due to its compatibility with old SD systems. 5. The director of television photography must keep abreast of technological developments because of their effectiveness in promoting the creative thought of designing the television image.

### **Keywords :**

HDRTV –SDR - HLG Hybrid Log-Gamma - Static metadata - Dynamic metadata

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### **Paper History :**

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