### CONTENTS

Report ITU-R BT.2408-7
Policy on Intellectual Property Right (IPR)
 1 Introduction
 2 Reference levels and signal format
 2.1 HDR Reference White
 2.2 Signal levels for line-up in production
 2.3 Bit depth
 2.4 Signal range
 2.5 Colour representation
 3 Monitoring
 3.1 Display of PQ signals
 3.1.1 Mapping to displays with limited luminance range
 3.2 Display of HLG signals
 3.2.1 Display of HLG signals on SDR screens
 4 Image brightness
 4.1 Comfortable brightness of static images
 4.2 Tolerance to programme brightness shifts
 5 Integrating standard dynamic range and high dynamic range production
 5.1 Inclusion of standard dynamic range content in high dynamic range
 5.1.1 Display referred mapping
 5.1.2 Display referred mapping of SDR into PQ
 5.1.3 Display referred mapping of SDR into HLG
 5.1.4 Scene referred mapping
 5.1.5 Comparing scene-light and display-light direct-mapping
 5.2 HDR to SDR down-mapping
 5.3 Handling negative values in format conversion
 5.4 Adjustments to BT.709 cameras
 5.5 Use of 8-bit content
 5.6 Mapping of SDR graphics
 6 Conversion between PQ and HLG
 6.1 Transcoding concepts
 6.2 Conversion concepts using a reference condition at 1 000 cd/m2
 6.3 Cameras using a common OOTF at a reference peak luminance of 1 000 cd/m2
 6.4 Handling PQ signals with greater than 1 000 cd/m2 peak luminance
 6.5 Possible colour differences when converting from PQ to HLG
 7 Transitioning from SDR BT.709 to HDR BT.2100 production
 7.1 HDR focused production
 7.2 SDR focused production
 7.2.1 PQ production with SDR shading
 7.2.2 HLG production with SDR shading
UHD and HD resolution HDR camera outputs
HDR slow-motion
HDR to SDR down-mapping
 7.3 SDR-HDR and HDR-SDR format conversion
 7.3.1 PQ conversion
 7.3.2 HLG conversion
 7.3.3 The displayed “look” of content following format conversion
 7.3.4 Signal range considerations for HDR to SDR conversion
 7.4 SDR-HDR-SDR “Round-Tripping”
 7.5 Hardware colour matrix compensation
 7.6 Signal line-up
 7.7 Camera painting
 8 Conversion practices for camera and display RGB colorimetry
Annex 1 Study to evaluate levels for PQ content
Annex 2 Analysis of reference levels
 A2.1 Introduction
 A2.2 Analysis of reference levels
 A2.3 Diffuse white elements in live HLG encoded broadcast content
 A2.4 Diffuse white in an HDR dataset of 1 000 cd/m2 PQ encoded images
 A2.5 Discussion
 A2.6 Conclusions
Annex 3 Two studies of skin tones, using a reflectance database and using real subjects
 A3.1 Study 1: using a skin tone database and an ideal model of a camera
 A3.2 Study 2: using human subjects and a RAW recording camera
 A3.3 Conclusions
Annex 4 Study of facial skin tones in broadcast content
 A4.1 Facial skin tones in SDR news and information programmes in studio
 A4.2 Comparison of facial skin tones in HLG HDR and SDR content in a music programme
 A4.3 Conclusion
Annex 5 Displaying PQ – calculating the EETF
Annex 6 Comparison of the native looks of HDR and SDR production
 A6.1 Differences in chromaticity and saturation
 A6.2 Quantifying the total colour differences
 A6.3 Comparison with the reference colour pattern data
Annex 7 Calculating the normalized primary matrix
 A7.1 Conversion of normalized linear colour signals to Recommendation ITU‑R BT.2100
 A7.2 Conversion of BT.2100 to arbitrary linear colour signals for display systems
Annex 8 4K/8K UHD HDR and HD SDR simul-production and simulcast practice in China
 A8.1 Background
 A8.2 Basic workflows and principles
 A8.3 Introduction of related work and research
 A8.4 Mapping for conversion between HDR and SDR
 A8.5 Parameter settings
 A8.6 Converter performance consistency (LUTs usage)
 A8.7 Signal range
 A8.8 Consistency of international exchange
 A8.9 Conclusions
Annex 9 HDR and SDR monitors in close proximity
 A9.1 Approach used by BBC
 A9.2 Approach used by NBCUniversal
Annex 10 NBCUniversal single-master HDR-SDR workflow
Annex 11 Conversion between 203 cd/m2 and 100 cd/m2 (BT.2035) SDR signal formats
Glossary