

7 Aug 97
Revision 1.0

Detailed Scope of Activities

Institute of Electrical and Electronics Engineers Broadcast Technology Society, Audio-Video Techniques Committee G-2.1 Compression and Processing Subcommittee G-2.1.6

Purpose:

The Compression and Processing Subcommittee, G-2.1.6 has been commissioned by the Broadcast Technology Society, Audio-Video Techniques Committee G-2.1 of the IEEE to investigate and recommend methods of directly quantifying image sequence impairments resulting from compression and decompression cycles that are well correlated to results of subjective comparison. This work is needed since current practices employ the measurement of test signals which may not reflect actual picture quality when used with compression equipment. This document outlines the goals and scope of work to be undertaken by the subcommittee.

Goals of Subcommittee:

1. To prepare and recommend one or more documents for standardization defining the methods of measurement to assess the degree of picture impairment.
2. To identify and recommend test sequences which exercise video compression systems to provide a basis for performance metrics.
3. To correlate the results of quantitative picture measurements against those obtained by subjective viewing.

Activities and Scope of Work:

1. Background Information - The subcommittee will research the findings of professional societies, companies, government agencies, and individuals as they relate to the subject matter. The published results of NTIA/ITS research on video quality assessment are closely aligned with the intent of this study and will be given due consideration.
2. Liaison - The subcommittee will coordinate efforts with other standards activities including ATSC, EBU, EIA/TIA, IEC, IEEE, ITU, SCTE, SMPTE, and Committee-T1. Input will also be solicited from a computer graphic industry organization, TBD.
3. Collaboration - Collaboration of our work is planned with the Joint Rapporteurs Group ITU-T, study groups 9 and 12, and ANSI T1A1.5.

We will review this work to ensure that the needs of G-2.1.6 are being met.

4. Television System Standards - The efforts of the subcommittee will be initially targeted toward digital component standard definition television (ITU-R BT.601) intended for distribution of entertainment and educational programs to consumers. Where practical, the methods developed will be suitable for other applications including high definition television (HDTV), computer graphics and games, and teleconferencing.
5. Methods of Measurement - The methods selected will be suitable for quantitative measurements using computerized or automated techniques. Investigation will consider repeatability of measurements, for both in service and out of service tests. All measurements shall be based on component digital samples (ITU-R BT.601 for SDTV).
6. Types of Compression Systems and Impairments - The subcommittee will focus primarily on impairments relating to discrete cosine transform (DCT) based compression methods due to their popularity in the industry. To the extent possible, the test methods will be extensible to other compression systems such as wavelet transform, vector quantization, or object based compression systems.
7. Intended Users - Users of the anticipated standard will include program suppliers, broadcasters, equipment manufacturers, instrumentation manufacturers, researchers, common carriers, and educators.
8. Subjective Results - The test methods to be defined by this subcommittee will be cross correlated and calibrated against subjective viewing results. The committee will determine which viewing methods shall be used and the degree of correlation required.
9. Disturbances Not Included - The committee shall determine which parameters and their respective ranges to exclude from perceptual scoring of picture impairments such as minor shifts in timing or positioning.

Activities beyond the scope of this subcommittee:

1. No attempt will be made to establishment of performance specifications for various applications.
2. This subcommittee will focus on visible impairments of compression systems which may include data recovery defects. No attempt will be

made to correlate visible defects to data defects such as bit errors or jitter.

3. Audio quality assessment is beyond the scope of this subcommittee. Assessment of the relative delay of audio and video timing (lip-sync/event-sync) will be considered for further study.
4. The summation of intermediate measurements for cycles of concatenated compression/decompression cycles will not be considered.

Baseline Assumptions:

1. All out-of-service measurements will be defined as impairments to predefined test material. An in-service method is also desired but additional definition is needed.
2. Any combination of equipment can be addressed by the user as the "system under test". This could include individual segments, equipment, end-to-end measurements, or systems with multiple compression/decompression cycles.