Annex A

Criteria for consideration of project proposals to be overseen by the IEEE-SA Consumer Technology Society Group (CTSoc)

March 14, 2025

Please supply information about the following 6 criteria (no less than a few sentences, no more than 10 lines for each of the 6 criteria. The bullet points illustrate the information that is sought).

1. Market potential:

- Describe the applicability of the project to a set of markets (Which markets / industry / verticals are addressed)?
  Any markets that use cameras for pictorial imaging or videography for human consumption will benefit from this standard. In descending popularity:
  - **camera phone**
  - **laptop cameras and webcams**
  - **point and shoot digital cameras**
  - **interchangeable lens, and SLR**
  - **cinema and video cameras**
- How many vendors and users will benefit from the project?
  Any vendors that produce camera systems where the images are processed to be viewed by humans (hundreds), and their users (billions), will benefit from this project.
- Which geographic markets are addressed? (e.g. regional, national, continental, international)
  International

- List potential difficulties that may be known upfront.
  1) **There may be cultural preferences for certain types of processing that vary between regions, and we may not have subjects for evaluation within those regions, leading to the metric being biased towards the regions where we have subjects.**
  2) **There may be different preferences between lay-people and imaging experts, so if we do not properly represent laypeople within the subjects for evaluation, this could lead to a bias towards the preferences of imaging experts that could differ from the opinions of laypeople**
  3) **HDR processing may require multiple image stacks (bracketed by exposure) which are not available in many image databases**
  4) **Being able to determine a quality metric from images captured out in the real world is difficult.**
  5) **Being able to produce a test target that is adequately representative of real-world scenes is a challenge**

2. Technical feasibility

- Provide evidence of technical feasibility for the project What level of technical details will be provided to ensure that independent implementations are feasible from the standard?
  The 1858 project has been active since 2006, and produced the first version of the standard in 2016, and the second version in 2023. CPIQ metrics are adopted by multiple camera testing vendors.

- Are you aware of the different system components that will be needed to implement the technology developed in the project?
  1) **Image signal processing (ISP's) are the most relevant system component to this phase of standard development.**
  2) **The sharpening, HDR, and noise reduction processing blocks within the ISP are the most relevant sub-components to this phase of development.**
  3) **The Lens and Image Sensor are the components that feed into the image signal processing.**

- Are you aware of similar testing, modeling or simulation tools or work that could be used to demonstrate the technical feasibility of the technology developed in the project?

  Many ISP vendors have "virtual" versions of their proprietary ISPs that can run similar routines without actually requiring ISP chips. There are also some open source ISPs such as "openISP", "xkISP", "imagemagick", and "Stanford ISET"

3. Readiness for standardization

- Was the project discussed in a study group under one of the societies, were feedbacks taken in account?

  Since the publication of "CPIQv2" also known as 1858-2023, An unofficial group of individuals have been discussing this project and refining the plan for the project.

- Describe intermediate deliverables, their timeline and expected completion date

  1) **Spring 2024 -** Submit PAR
  2) **Summer 2024 -** Project Accepted by IEEE
  3) **Summer 2024 -** Finalize test plan
  4) **Fall 2024 -** Establish work partners for developing application & executing test plan
  5) **Spring 2025 -** Complete web/mobile app for perceptual testing / collecting subjective data
  6) **Fall 2025 -** Complete data collection
  7) **Winter 2025 -** Perform analysis and develop metrics
  8) **Spring / Summer 2026** - Submit draft to IEEE for editorial / publication
  9) **Fall 2026** - Final standard publication

- When is the market for that project expected to mature? (e.g. 5 years, 10 years, 15 years timeframe)

2 years

- Describe dependencies on other technologies or factors that may impact the standardization timeline.
  1) **Ability to get a set of images & video for study**
  2) **Ability to process these images using a variety of methods**
  3) **Ability to develop the web application for perceptual testing**
  4) **Ability to get a sufficient pool of test subjects to use the application**
  5) **Ability to develop an objective test method that can be used in a controlled environment**
  6) **Ability to perform the data analysis to correlate objective with subjective and develop a metric**

4. Distinct identity

- Provide a short gap analysis:
  - Describe and provide evidence of substantial technical merits when compared to other standards.

    Not aware of other standards that have addressed our desire to evaluate realism of processed images.

  - Describe potential relation with other SDO specifications and how duplication and overlap will be avoided.

    ISO TC42/WG18 standards are related to this.

- Is the project a distinct continuation of a previous project, and is compatibility required?

  This is a continuation of IEEE 1858-2016 and 1858-2023. The "realism" metrics we intend to develop should supplement the "quality loss" metrics of the older standards. No compatibility is required.

- Are coordination and communication with other SDO/Societies/projects planned?

  IEEE has a liason relationship with the ISO TC42/WG18 standards committee.

5. Adequate participation

Ensure that adequate participation will occur for the length of the project:

- For Entity project:
  - List at least three companies willing to become voting members in the project
    - **1858-2023 had participation from Apkudo Inc., Imatest LLC, Cisco Systems, Inc., Microsoft Corporation, US Food and Drug Administration (FDA), Senses Global Labs, AMD, T-Mobile, NVIDIA**
  - List the countries and ensure that at least two/three different countries are represented to ensure diversity and international coverage

        - **The voting group for 1858-2023 included US, Australian, Chinese representation in the voting members.**
- For individual project:
    - At least 10 individuals willing to become voting members in the project
        - **For the new standard, we wish to switch from Entity to Individual in order to decrease the barrier to entry for participants in the project. 14 indivuduals have expressed interest in participating with the development of the new standard, and would likely be interested in becoming voting members.**
    - From at least 3 different product types, verticals or industries
        - **Currently active individuals come from Academia, Camera system manufacturers, government research, test systems**

6. Candidate Working Group Chair

- Include the name and company affiliation of the individual who would like to become the Working Group Chair.
  Henry Koren, Imatest LLC

- Please detail that individual's experience in standards development, noting any experience and leadership roles within IEEE. [Note: The Working Group Chair may be asked to complete the IEEE SA Standards Working Group Chair Fundamentals training modules at https://standards.ieee.org/about/training/index.html]

  Henry has been the working group chair of IEEE P1858 since 2017, and has completed the necessary training.

- Is there potential endorsement of the candidate by other interested participants?

  Henry was elected as working group chair in 2017