

# **IEEE USE CASE— CRITERIA FOR ADDRESSING ETHICAL CHALLENGES IN TRANSPARENCY, ACCOUNTABILITY, AND PRIVACY OF CONTACT TRACING—DRAFT**

## **CALL FOR GLOBAL CONSULTATION**

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Date: 14 October 2020

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# INTRODUCTION

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This report from The Institute of Electrical and Electronics Engineers Standards Association (IEEE SA) proposes a use case for ethical evaluation and verification criteria for contact tracing apps (CTA), contact tracing technology (CTT), and associated ecosystem technologies.

The criteria suite is largely focused on the evaluation and verification of ethical dimensions of transparency, accountability, and privacy (TAP) sometimes referred to collectively as “ethical” dimensions in this report, but are not intended to preclude other values in addition to TAP relevant to the evaluation of the ethical aspects of CTA/CTT systems. We have chosen to focus on these dimensions as they are relevant, applicable, and trackable.

These TAP criteria are intended to create a framework for the independent scrutiny of ethical properties, benchmarks, and potential certification of CTA/CTT. Our aim in creating this framework is to promote ethical integrity in the design, development, implementation, operation, maintenance, retirement, and regulatory processes within this emerging domain.

The benefits of independent scrutiny of ethical criteria for CTA/CTT include enhanced public trust, higher rates of participation and adoption, and more effective mitigation. Increased participation in CTA/CTT activities is expected to complement existing manual contact tracing and testing initiatives to better trace and notify citizens of proximity/contact risk. By so doing it can help minimize the cost to people’s health, safety, and livelihoods, while supporting a more expedient return of normal social life and economic activities.

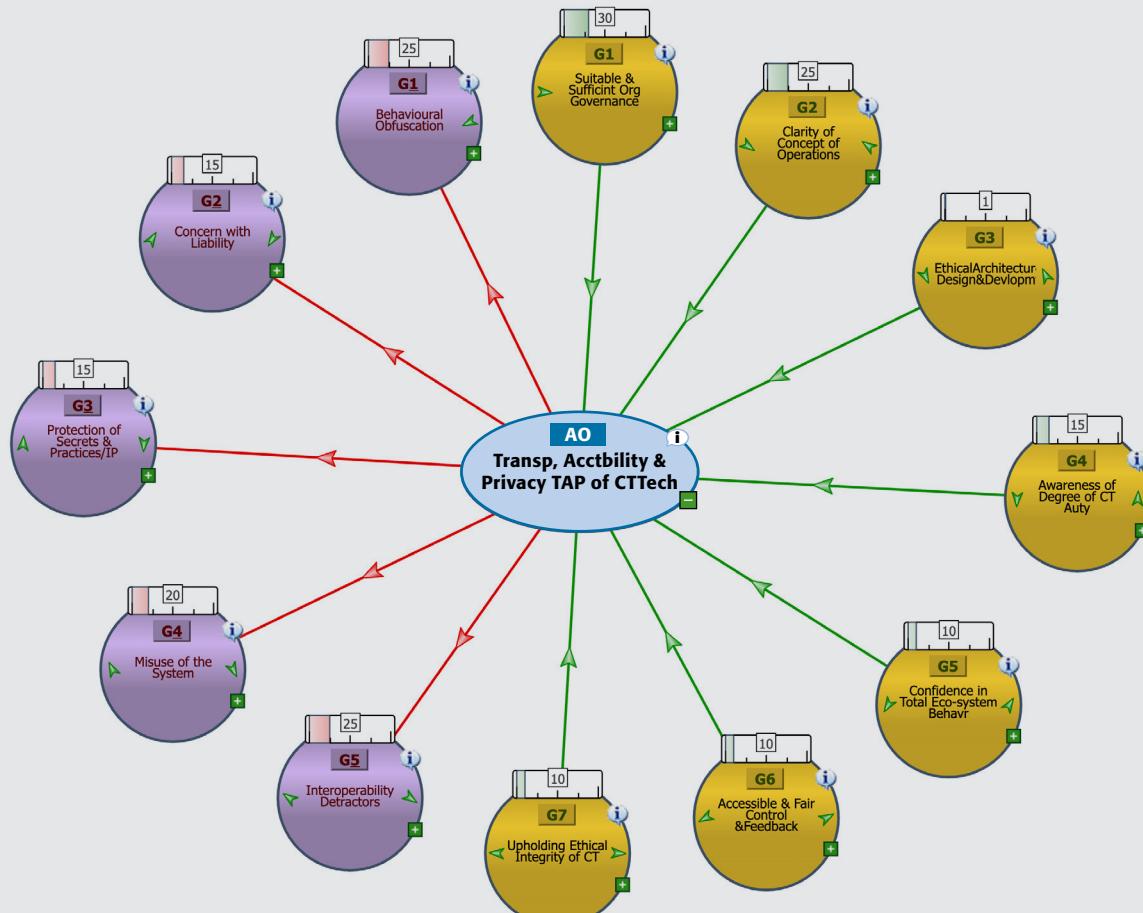
This report is solely concerned with setting satisfactory criteria for ethical implementation of CTA/CTT, and is not intended to be an assessment of the merits and/or efficacy of CTA/CTT systems *per se*.

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# INTRODUCTION

## ECPAIS PRINCIPAL FACETS OF CTA/CTT ETHICS



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# IEEE USE CASE

## AUTOMATED CONTACT TRACING

There are substantial public health benefits gained through successfully alerting individuals and relevant public health institutions of a person's exposure to a communicable disease. Proximity and contact tracing techniques have been applied to epidemiology for centuries, traditionally involving a manual process of interview and follow-up. This is time-consuming, difficult, and dangerous work. Manual processes are slow and open to incomplete information because they rely on individuals being willing and able to remember and report all contact possibilities.

The proliferation of mobile technologies offers the possibility of using smartphones to enable contact tracing processes digitally, and in a significantly faster automated manner. On 10 April 2020, the manufacturers of the two major smartphone operating systems announced they would be working on a joint Coronavirus tracing program, which aims to unify CTA/CTT mechanisms on their operating systems, and to set ground rules for contact tracing apps housed within their respective technology systems.

The creation of a technology alliance across separate commercial technology platforms to help tackle this global pandemic is a promising beginning. However, there remain many complex and nuanced issues within the CTA/CTT domain which may be culturally, situationally, and jurisdictionally bound. There is also the potential for conflicting interests among system stakeholders, as each pursues its respective agendas during the pandemic. A one-size-fits-all approach is unlikely to encourage adoption of CTA/CTT at rates that are sufficient to render the contact tracing data usable or the tools themselves effective.

In fact, the deployed systems must be both technically feasible as well as reasonable and proportionate from multi-faceted business, operational, legal, technical, social, and individual human end user perspectives in order to be accepted and adopted in sufficient numbers to achieve desired coverage and resultant benefits. The TAP framework is intended to support CTA/CTT evaluation and verification along these lines by involved stakeholders.

In this endeavor, we have initially focused on TAP as ethical vectors. Also, we have adopted a practical and pragmatic approach that "ethical systems" are characterized by "reasonableness" and "proportionality" from the perspective of individual humans. Reasonableness means that a sufficient percentage of the public in a given location will consider that the benefits of CTA/CTT for protecting the health of themselves and the public outweigh the ethical risks and potential harms to their privacy and autonomy. This is a narrower definition than is applied in traditional academic and philosophical studies of ethics. The choice of reasonableness and proportionality as a surrogate for ethics in measuring the performance of these systems was made in recognition of the need for objectively testable system parameters for reliable and predictable performance of the systems at the large scales needed to address human pandemic response across borders and cultures. What is reasonable and proportionate is, of course, contextual, which also affects the manner in which the ethical standards presented herein are configured and presented to each CTA/CTT scenario.

In order to meet these needs, flexible criteria underpinned by clear and broadly adoptable principles are required. As presented in the framework, these variables address broad ethical considerations that extend beyond academic considerations because the challenges that have been caused or revealed by the current pandemic are not traditional. In fact, historical neglect of multiple individual rights and benefits associated with deployments of technology have accumulated and are now attracting renewed attention and resources under an expanded concept of ethics, fundamentally having practical application.

This shift requires that academic and historical notions of ethics be coupled with popular notions of morality ethics and applied ethics and related expectations in populations. Toward that end, the notion of ethical in the context of these evaluation and verification criteria is intended to indicate a more general attention to human values as defined by humans for humans that is not adequately reflected in formal institutional rules, including those institutional rules applied to the organization and operation of CTA/CTT systems.

Of course, this challenge is pervasive in socio-technical systems (and other large-scale change management settings) and cannot be universally corrected solely through attention to technology in the CTA/CTT context. However, explicit recognition of the additional sorts of rights and benefits that individuals may expect from well-organized and operated CTA/CTT systems can help to accelerate adequate adoption by assuring end users that the system is transparent, accountable, and protects their privacy.

The incentive for adoption for individual humans is to have their expectations of transparency, accountability, and privacy (TAP) more powerfully represented in proximity/contact tracing circumstances. This includes both their need for physical health, as well as other needs such as accessible user interfaces (operational), privacy (social), data protection and security (legal), etc. The incentive for institutions is to be able to achieve their proximity and contact tracing system goals, while doing so using a comprehensive and informed criteria that can form industry norms.

## IEEE'S RESPONSE

In recent years, as the influence of emerging technologies upon society has become more apparent, IEEE SA has pioneered new ethical standards and ethical safety programs. One of these is The Ethics Certification Program for Autonomous and Intelligent Systems (ECPAIS), initiated during November 2018 with the aim of developing evaluation and certification criteria for ethical transparency, accountability, and algorithmic bias in autonomous and intelligent systems. The development of these three suites of ethical evaluation criteria was accomplished in December 2019.

ECPAIS employs a new expert and knowledge-driven method for quickly iterating the elements and variables of candidate solutions that tend to affect a system's overall claimed/achieved ethical qualities—such as strategies to address transparency, accountability, privacy, and algorithmic bias. Given the efficiency of this method compared to traditional standards development processes (enabling finalized results in a matter of months rather than years), the same techniques are being successfully applied to explore the CTA/CTT issues, and to foster interventions for them.

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## SCOPE AND LIMITATIONS

The proximity/contact tracing apps, tools, and associated technologies are a novel domain, built upon recently emerging technologies. The COVID-19 pandemic has created significant governmental and corporate demand for various recently emerging technologies, and combinations of technologies, to be organized and operated in novel ways and in unexpected settings, and with a requirement of being fulfilled and operational as quickly as possible.

As this technology is new, and situations relating to this crisis are evolving rapidly, we do not consider the requirements listed in this suite of criteria to be exhaustive or to cover every eventuality. Our goal is to deliver a set of helpful initial guidance to help stakeholders contain the detrimental global impacts of the pandemic by providing independently verifiable ethical qualities that support end-users' trust in CTA download and use. We believe that this suite of generic ethical evaluation and verification criteria will be helpful, beneficial, and applicable to the majority of implementations and jurisdictions and, as is the case with other standards efforts generally, broad application of these CTA/CTT criteria will itself help to proactively mitigate harms and to address avoidable vulnerabilities associated with the lack of CTA/CTT system congruency itself. The reasonableness and proportionality approach applied through the criteria provides flexibility and invites the most pervasive potential application of this material to evaluate global CTA/CTT systems.

## ISSUES AND CHALLENGES

The technical and statistical requirements and challenges of CTA/CTT are complex. Moreover, there are also social and operational/logistical issues to address. For example, it requires that an end-user has the requisite operating system (OS) versions and updates. This prerequisite to system functionality assumes that people have a device, that it is sufficiently sophisticated and modern, and that they feel confident enough with technology to perform the necessary installation and operations.

Individual compliance is a challenge, even in nations and organizations that mandate the use of CTA/CTT. Many technologies are able to be applied to a variety of purposes, CTA/CTT included. Ethical considerations depicted by this criteria include support of reasonable expectations that parties given access to data as part of CTA/CTT systems will not take actions with the data that exceed their original authorization and is proportionate. The intention is to prohibit or discourage using the data for other purposes, transferring the data to others, or holding data in a form/location susceptible to breach. For example, it might be possible to use CTA/CTT-related technologies to monitor people for purposes not related to pandemic-driven contact tracing per se.

There are many different CTA/CTT efforts being implemented around the world, and a major data breach or threats or actual overreach of scope of use of one could negatively impact public trust in all CTA/CTT implementations globally. Our team has investigated these, and incorporated opportunities for learning into the specified ethical foundational requirements, which are intended to help monitor and mitigate potential ethical harms. Some of the key challenges include:

- a. Threats to privacy and the fear of loss of confidentiality and subsequent stigma, discrimination, or abuse on grounds that are not currently protected.
  1. The organizational infrastructure of the system is not sufficient to protect end users.
- b. Undermined public trust that impedes the effectiveness of the implementations resulting in voluntary uptake is not equal to continued consent:
  1. A lack of complete information regarding the behavior and operations of the system.
- c. Digital exclusion of many children, elderly, and vulnerable people without (or with limited) smartphone access and/or user awareness, particularly where large uptake and consistent use are prerequisites for meaningful results from CTA/CTT systems.
  1. Lack of appropriate redress for deficits in CTA/CTT.
- d. Interoperation challenges across borders and state boundaries, and its further impact on rights and freedoms of individuals.



# A SOLUTION:

## ECPAIS CRITERIA RELEVANT TO CONTACT TRACING APPLICATION/TECHNOLOGY

To date, CTA/CTT systems have been launched under the separate auspices of nation states that possess the resources to do so. The COVID-19 pandemic is a global issue. As a result, a patchwork of approaches is being simultaneously launched with the urgency spurred by continuing mounting mortality rates. Humanity is building its defenses in the midst of attack.

While national response has been vigorous and impressive, little has been done at the human level to help assure that each separate initiative will achieve maximum risk mitigation with maximum leverage across borders and jurisdictions. In fact, with the launch of the various different regional, national, and private sector digital contact tracing applications and technologies, there is a significant and still growing need for interoperable, scalable, adoptable, and unifying criteria that assess the ability and success of a given CTA/CTT system to mitigate and solve these issues, and which also directs the attention of stakeholders in all such systems to practices being applied in other CTA/CTTs that could potentially improve the systems over which they exert influence.

In this way, the verification of ECPAIS criteria provides a framework for a minimally viable ethical CTA/CTT system that is still flexible enough to accommodate and encourage the sharing of practices among stakeholders in different systems, and the organic growth of best practices among those various groups, and the eventual emergence of enforceable standards for future CTA/CTT systems and other similar systems that can help to mitigate global level threats and vulnerabilities, such as pandemics.

### ETHICAL TRANSPARENCY, ACCOUNTABILITY, AND PRIVACY CONCERN IN CTA/CTT

In an effort to operationalize the sometimes-ambiguous concept of ethics so that it can inform CTT/CTA systems throughout their lifecycles, the panel convened by IEEE SA has identified and contextually defined ethical evaluation of transparency, accountability, and privacy (TAP) which are pertinent to providing some ethical evaluation of CTA/CTT system organization and operation:

- 1. Transparency:** Full disclosure, and comprehensibility to a person with appropriate education and experience, of inputs, process, outputs, and outcomes of activities in the ecosystem of CTA/CTT.
- 2. Accountability:** Holding organizations and people behind entities in the integrated system of CTA/CTT to account through the fulfillment of ethical obligations (as set forth in this report) for their roles and decisions that impact the inputs, process, outputs, and ecosystem outcomes.
- 3. Privacy:** Preserving the private sphere of life and public identity of an entity (individual, group, community) to be free from unacceptable intrusion or invasion, and upholding the entity's dignity.

It is hoped that TAP will be core to identifying unacceptable encroachment of rights and freedoms, including without limitation agency, autonomy, bias, and discrimination.

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The ECPAIS experience and associated tools and methodologies that have previously led to the development of verification and certification criteria in ethical transparency, accountability, and freedom from unacceptable algorithmic bias have been adopted to generate a fast track suite of relevant criteria for CTA/ CTT. The ECPAIS approach has evolved around a creative and agile knowledge management methodology that entails exploration of the issue/system of interest and model-based graphical capture and representation (called schema) of the principal concepts and factors that foster or inhibit the attainment of the desired aim such as transparency. Once the creative exploratory activity is deemed accomplished to the desired level of detail and clarity, the resultant schema is harvested for derivation of requirements and associated satisfaction parameters that constitute the suite of ethical evaluation, verification, and certification criteria pertinent to the aim of the exercise. This approach has proven to be far more efficient in the consensus-driven creative and agile creation of verification and certification criteria than the traditional narrative-based approach.

### THE SUITE OF CTA/CTT ETHICAL CRITERIA

The current suite of ethical evaluation criteria applied to CTA/CTT systematically developed by the panel at a rapid pace comprises a systemic cluster of impactful ethical transparency, accountability, and privacy considerations. Although the ethical evaluation and verification criteria themselves are intended to be deployed at an organizational or principal duty holder level, the panel was acutely aware of the impacts of one organization or element of the ecosystem to all stakeholders in the ecosystem, resulting in requirements which demand communication, cooperation, and collaboration between stakeholders fully conversant of the interplay of their respective relationship.

The ethical evaluation criteria pertain to two distinct categories of factors that influence the aim (TAP of CTA/CTT), i.e., those that are conducive to the attainment of the aim (drivers) and those that are detrimental (inhibitors):

#### Drivers of TAP of CTA/CTT

##### a. CTA System Operations

1. Confidence in the total ecosystem behavior
2. Awareness of CTA/CTT's degree of autonomy
3. Accessible and fair control and feedback

##### b. CTA System Design

1. Ethical architecture, design, development, and sunset
2. Clarity of CTA/CTT concepts of operations

##### c. Compliance/Legal

1. Suitable and sufficient CTA/CTT organizational governance and oversight
2. The upholding of ethical integrity

#### Inhibitors of TAP of CTA/CTT

##### a. CTA System Operations

1. Protection of secrets and practices
2. Misuse of CTA/CTT system
3. Interoperability detractors of CTA/CTT

##### b. CTA System Design

1. CTA/CTT behavioral obfuscation

##### c. Compliance/Legal

1. Concern with liability

In total there is a suite of twelve criteria classes identified by the panel. Each criteria class has been analyzed and creatively decomposed into its own set of pragmatic and objective driver and inhibitor predictors for enhanced clarity, objective evaluation, and assessment for conformity and certification purposes. The current suite of CTA/CTT ethical evaluation criteria and their supporting goals are depicted in Annex A.

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## **PHASED ETHICAL VERIFICATION CRITERIA DELIVERABLES**

In view of the urgency associated with the ethical verification aspects of rolling out pandemic mitigation technologies, the ECPAIS work on developing ethical evaluation, verification and certification criteria for CTA/CTT was conducted in two phases. We produced and published an initial report in July 2020 to share the interim outcome of the Phase I of the initiative, and now we provide this updated report to demonstrate the further work completed in Phase II that constitutes what we currently assume to be the final deliverable of this altruistic initiative.

## **CRITERIA TAILORING AND CUSTOMIZATION**

The model-based creative concept capture, representation, and harvesting adopted in all ECPAIS workstreams provides a systematic and integral basis for expeditious adaptation of the generic suite of CTA/CTT ethical evaluation and evaluation criteria toward the priorities and contextual requirements of a specific application ecosystem. This may prove relevant if not necessary for implementation of the current generic suite of CTA/CTT criteria in a given global context or ecosystem.

The IEEE SA offers these criteria for voluntary use to enable interoperability and common understanding of CTA/CTT results. It is recognized that there will be a need for customization and tailoring to fit specific national or local public health authority goals. As such, all requisite customization and tailoring of the current suite of ethical evaluation and verification criteria will be led by IEEE SA, the criteria development authority, as part of any use case implementation or requested pilot program.

# CONCLUSIONS

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Crisis scenarios necessitate swift action. Technological solutions may have promise, but alongside this come challenges and uncertainties that need to be addressed to ensure proper functionality, safety, dependability, and public acceptance. The operationalization of technology, including the coordination of processes and modes of deployment, demands an assessment of contextual and social framing to anticipate and proactively address such challenges. In the context of information technologies broadly deployed among the public, such as CTT/CTA technologies, this necessitates an analysis of potential social harm and verification of ethical transparency, accountability, and privacy of stakeholders.

The challenges faced by governmental and public enterprises in introducing CTA/CTT solutions as a COVID-19 mitigation are substantial. The inclusion of socio-technical perspectives and proactive ethical verification is necessary to enable trust and thus an optimal take-up and enhanced effectiveness of CTA/CTT for the benefit of the society.

Following the publication of the Phase I report and call for input from the global community to provide scrutiny from diverse expertise and social perspectives, the panel has sought to incorporate and/or address any concerns raised to improve the coverage, completeness, integrity, and value of the ethical evaluation and verification criteria. By providing the opportunity for the report and corresponding criteria to be reviewed and critiqued by the global community, it was hoped that this might mitigate potential cultural and/or value-based biases from influencing the ethical requirements framework.

# ACKNOWLEDGEMENTS & REFERENCES

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We have intentionally created the ethical evaluation and verification criteria with the impact of COVID-19 in mind, but also anticipating that there will be pandemics in the future. Our intent was to provide an evaluative framework for now and the future that will enable solutions that are ethical (with focus on TAP as leading indicators of systems which are human- rights and human values-centric), are diverse and inclusive, and which seek to protect all of humanity and not to harm it). This strategy is based on the recognition that mere technical feasibility is necessary, but is alone insufficient to assure the broad adoption needed for CTA/CTT success. Adoption is also driven by business, operational, legal, technical, and social reasonableness and proportionality in the views of respective stakeholders in the system. Our integration of these variables in this endeavor has –resulted in this set of ethical evaluation criteria applicable for CTA/CTT for reference by designers, developers and deployers, operators, and maintainers who are interested in securing adoption of their respective CTA/CTT systems as part of the solution to a wider health crisis. In the opinion of the EPCAIS CTA/CTT team, successful and ethical adoption may only be achieved through TAP, i.e., trustworthy and transparent practices, and by demonstrating integrity in accountability, while safeguarding human privacy, autonomy, agency, dignity, and efficacy both now and in the years to come.

A number of real-world use case studies may be initiated to verify and validate the scope, practicality, and value realization through the application of the CTA/CTT ethical evaluation and verification criteria and associated foundational requirements. For CTA/CTT systems to be successful, greater international cooperation and collaboration is needed. IEEE will work with organizations to initiate or conduct specific case studies relating to proximity and contact tracing applications, associated technologies, or the ecosystem constituents.

# ACKNOWLEDGEMENTS & REFERENCES

## FEEDBACK FROM FIRST REPORT

We have received a significant number of feedback comments in response to the publication of the Phase I report in July 2020. We undertake to respond to these individually to honor our call for consultation. Where appropriate, we have taken the received comments into account to improve this final consolidated report on the ethical concerns in connection with CTA/CTT.

We hereby express our sincere gratitude to all public and private enterprises, institutions, entities, and individuals that provided comments.

## REFERENCES

We share a representative set of references and sources that we have employed to inform our understanding of the CTA/CTT ecosystem, technology, developments and concerns globally.

“Apple and Google partner on COVID-19 contact tracing technology,” 10 April 2020, <https://www.apple.com/newsroom/2020/04/apple-and-google-partner-on-covid-19-contact-tracing-technology/>.

“Interoperability guidelines for approved contact tracing mobile applications in the EU,” eHealth Network, [https://ec.europa.eu/health/sites/health/files/ehealth/docs/contacttracing\\_mobileapps\\_guidelines\\_en.pdf](https://ec.europa.eu/health/sites/health/files/ehealth/docs/contacttracing_mobileapps_guidelines_en.pdf).

“More users needed: Lessons from Alberta’s coronavirus contact tracing app,” CBC News, 6 May 2020, <https://www.cbc.ca/news/technology/contact-tracing-apps-alberta-canada-1.5556933>.

“Alabama, North Dakota and South Carolina to Debut Apple and Google’s Covid-19 Contact Tracing,” 20 May 2020, [https://www.forbes.com/sites/rachelsandler/2020/05/20/alabama-north-dakota-and-south-carolina-to-debut-apple-and-googles-covid-19-contact-tracing/?utm\\_source=newsletter&utm\\_medium=email&utm\\_campaign=dailydozen&cdlid=5d1670831802c8c524c9b047#5d4649d61732](https://www.forbes.com/sites/rachelsandler/2020/05/20/alabama-north-dakota-and-south-carolina-to-debut-apple-and-googles-covid-19-contact-tracing/?utm_source=newsletter&utm_medium=email&utm_campaign=dailydozen&cdlid=5d1670831802c8c524c9b047#5d4649d61732).

“Digital Contact Tracing for Pandemic Response Ethics and Governance Guidance,” Edited by Jeffrey P. Kahn, PhD, MPH, Chair, Johns Hopkins Project on Ethics and Governance of Digital Contact Tracing Technologies, Johns Hopkins University Press, 2020.

“Covid Tracing Tracker,” MIT Technology Review, 7 May 2020, <https://www.technologyreview.com/2020/05/07/1000961/launching-mit-tr-covid-tracing-tracker/>.

“Italy launches Covid-19 contact tracing app amid privacy concerns,” Reuters, June 2020, <https://www.reuters.com/article/us-health-coronavirus-italy-app/italy-launches-covid-19-contact-tracing-app-amid-privacy-concerns-idUSKBN2383EW>.

# ACKNOWLEDGEMENTS & REFERENCES

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"Members of Congress to unveil bipartisan bill to regulate contact-tracing apps, fearing potential privacy abuses," Washington Post, June 2020, <https://www.washingtonpost.com/technology/2020/06/01/contact-tracing-congress-privacy/>.

"Norway to halt Covid-19 track and trace app on data protection concerns," Reuters, 15 June 2020, <https://www.reuters.com/article/us-health-coronavirus-norway-apps/norway-to-halt-covid-19-track-and-trace-app-on-data-protection-concerns-idUSKBN23M18T>.

Jessica Morley, Josh Cowls, Mariarosaria Taddeo, and Luciano Floridi, "Ethical guidelines for COVID-19 tracing apps," Nature, vol. 582, 4 June 2020, <https://media.nature.com/original/magazine-assets/d41586-020-01578-0/d41586-020-01578-0.pdf>.

"Covid-19 data is a public good. The US government must start treating it like one," MIT Technology Review, 17 July 2020, [https://www.technologyreview.com/2020/07/17/1005391/covid-coronavirus-hospitalizations-data-access-cdc/?truid=f2e4b5a734702c1b66fe7589417e9fe3&utm\\_source=coronavirus&utm\\_medium=email&utm\\_campaign=coronavirus.unpaid.engagement&utm\\_content=07-20-2020](https://www.technologyreview.com/2020/07/17/1005391/covid-coronavirus-hospitalizations-data-access-cdc/?truid=f2e4b5a734702c1b66fe7589417e9fe3&utm_source=coronavirus&utm_medium=email&utm_campaign=coronavirus.unpaid.engagement&utm_content=07-20-2020).

"In South Korea, Covid-19 comes with another risk: Online Bullies," New York Times, 19 Sept 2020, <https://www.nytimes.com/2020/09/19/world/asia/south-korea-covid-19-online-bullying.html>.

"Quebec won't use Covid-19 notification app for now," CBC, 29 August 2020, <https://www.cbc.ca/news/canada/montreal/federal-contact-tracing-app-quebec-1.5698725>.

"Virus-Tracing Apps are rife with problems. Governments are rushing to fix them," New York Times, 20 July 2020, <https://www.nytimes.com/2020/07/08/technology/virus-tracing-apps-privacy.html>.

<https://mycreopoint.com/estore/contact-tracing>.

(this is a live and evolving repository of CTA/CTT related sources and topics derived from media)

# PANEL CONTRIBUTORS

ECPAIS is proud to have enjoyed the support and insights from the following members (presented in alphabetical order) who have been instrumental in the development of this suite of certification criteria.

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In-Sight

The panel wishes to express their appreciation to the senior IEEE SA executives for their support to the realization and dissemination of this fast-track project that was conceived and executed as a spontaneous altruistic response to the global pandemic crisis. In this spirit, this initiative is aimed at empowering the duty holders to advance and successfully deploy technology for the benefit of humanity.

# ANNEX A—ETHICAL EVALUATION AND VERIFICATION

The ethical evaluation and verification criteria addressing transparency, accountability, and privacy concerns within the context of the COVID-19 related risk mitigation technologies are depicted in a tabular and hierarchical form. There are twelve classes of ethical evaluation criteria each decomposed into an average of eight objective predictors, each of which is defined in a number of relevant fields in the table in this annex. The fields and associated definitions are:

## 1. Ethical Concept and Reference

The ethical concept is the **original concept** and associated definition as identified during the creative expert sessions. The **reference** (Gx.x) relates to the numbering and level of each concept in the overall graphical representation (schema) hierarchy. The schema is comprised of a top objective referred to as Aim and two categories of factors/goals that exert influence on the Aim, those that are conducive to the attainment of the Aim and those that are detrimental. The factors that are conducive to the attainment of the Aim are referred to as Driver Goals, and the detrimental factors are considered Inhibitor Goals. A schema represents a hierarchy of Driver and Inhibitor goals that influence the Aim. The Driver goals are numbered with a G and a number. The Inhibitor goals are numbered with a G and an underlined number to distinguish from the Driver category. Thus the Driver and Inhibitor goals are numbered uniquely to indicate polarity as well as position in the hierarchy of concepts (e.g., G1.2 and G3.1.2 with underscore indicating a detrimental/inhibitor goal at second and third tier of decomposition respectively).

## 2. CTA/CTT Ethical Foundational Requirements

These are the **requirements** (duties and tasks expected from specific stakeholders) that arise from a concept in the schema as depicted in the left-hand column. Note that there may be more than one requirement arising from each concept (goal) in the schema. These are referred to as Ethical Foundational Requirements.

## 3. Normative/Instructive

The EFRs are classed as either **Normative** (mandatory) or **Instructive** (recommended) for the purposes of conformity assessment. The Normative EFRs are essential to the demonstration of conformity and potential certification whereas the Instructive labelled items are recommended good practice that are encouraged but not regarded as essential to the conformity assessment and potential certification.

## 4. Certification Level

Three main levels of assessment of compliance and conformity are established depending on the risks posed under the TAP framework and the impact of the CTA/CTT on health, welfare, safety, and ethical harm to stakeholders. The determination of the ethical risks is expected to take place at the start of a conformity assessment process that leads to the selection of the appropriate subset of criteria depicted in Annex A.

- 1) **Baseline (Low Impact=LI)**—A subset of EFRs is expected to be satisfied.
- 2) **Compliant (Medium Impact=MI)**—A larger subset of EFRs than LI is satisfied including compliance with legal requirements and professional codes of conduct.
- 3) **Critical (High Impact=HI)**—Any CTA/CTT product/service/system that presents a likelihood of harm to wellbeing, health, safety, security, welfare, and societal values/rights must satisfy all EFRs.

# ANNEX A—ETHICAL CRITERIA

## 5. Stakeholders

The EFRs for CTA/CTT are additionally noted against the specific group of duty holding stakeholders for the purposes of conformity assessment. The principal groups are:

- **Developer (D):** The entity (see note) that designs and develops a component (product) or system for general or specific purpose/application. This could be as a result of developer's own instigation or response to the market or a client requirement. The developer is responsible for the ethical evaluation of the generic or application-specific product or system and associated supply chains (both to which they contribute and from which they receive inputs for CTT/CTA products and services).
- **(System/Service) Integrator (I):** The entity that designs and assures a solution through integrating multiple components potentially from different developers, tests, installs, and commissions the whole system in readiness for delivery to an operator. The system delivery may take place over a number of stages. The integrator is usually the duty holder for total system verification and certification: safety, security, reliability, availability, sustainability, etc. For this, it may reasonably rely on the certification or proof of ethics from various developers or the supply chain.
- **(System/Service) Operator (O):** The entity that has a duty, competencies, and capabilities to deliver a service through operating a system delivered by an integrator.
- **Maintainer (M):** The entity tasked with conducting required monitoring, preventive or reactive servicing and maintenance, and required upgrades to keep the system operational at an agreed service level. Maintainer could also be charged with discontinuation of maintenance and disposal of the system.
- **Regulator (R):** The entity that enforces standards, laws, and regulations through imposing duties, including without limitation duties associated with accreditation/certification of conformity.

Note—An entity can be an individual, a single organization, or a group of collaborating individuals and organizations. The above labels for the four groups of duty holders are generic and can be mapped in terms of activities and influence against the life cycle but with overlapping activities. A single entity may assume multiple roles (i.e., a developer may also fulfill and complete system design, integration, and maintenance).

The Users are a stakeholder group that includes human beings that participate in a given CTT/CTA system, and the term is not intended to apply to organizations or institutions that use a CTT/CTA product as part of their contribution. Notably, this TAP framework does not impose duties or requirements on Users, except as specifically set forth in this report.

## 6. Required Evidence

The types and quantity of evidence items required to satisfy the stated requirements. A suitable and sufficient set (and preferably all) evidence items or equivalents are required to demonstrate conformity with a given requirement.

## 7. Evidence Measurement and Benchmark

This part of the framework covers the scale of measurement for the evidence items, including the required level of acceptability (the benchmark).

<sup>19</sup> IEEE USE CASE—CRITERIA FOR ADDRESSING ETHICAL CHALLENGES IN TRANSPARENCY, ACCOUNTABILITY, AND PRIVACY OF CTA/CTT

## ANNEX A—ETHICAL FOUNDATIONAL REQUIREMENTS FOR CTA/CTT

Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder		Required Evidence	Evidence Measurement and Benchmark
<p><b>G1—Suitable and Sufficient Organizational Governance</b></p> <p>This comprises the capability, maturity, intent, and actualization of the stakeholder organization in having the right motivation and resources, processes, etc., to achieve transparency, accountability, and privacy.</p> <p>This covers end-to-end entities and the retirement phase, the full life cycle aspects. This includes the degree of oversight on the governance.</p> <p>This goal is a separate and independent, holistic requirement applied and required to be evidenced in addition to the separate G1 subcategories below.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <p>a. Demonstrate that a suitable and sufficient organizational governance framework is in place reflecting capability, maturity, and processes to ensure legal responsibility and ethical accountability.</p>	N	MI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Organigram showing relevant lines of responsibility and accountability including the supply chain.</li> <li>b. Designated positions for risk management, data protection and regulatory compliance, data review board; legal compliance, security and systems access management, stakeholder management, and ethical profile management and evidence of coordination across all roles.</li> <li>c. Minimum assessment requirements comprising:           <ul style="list-style-type: none"> <li>1. Sector risks, including web-based global operation risks.</li> <li>2. Potential individual and societal harms/adverse impacts from [A/IS].</li> <li>3. End-user needs.</li> <li>4. Supply chain awareness and compliance with minimum assessment requirements</li> </ul> </li> <li>d. Implementation of local laws and requirements relevant above minimum assessment requirements.</li> <li>e. Overall legal compliance [dependent on cross-jurisdictional reach and sector-specific operations of (A/IS)].</li> <li>f. Engagement and participation in industry/regulatory initiatives.</li> </ul>	<p><b>Measurement:</b> Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement”.</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:           <ul style="list-style-type: none"> <li>5—Excellent</li> <li>4—Good</li> <li>3—Average</li> <li>2—Poor</li> <li>1—Unacceptable</li> </ul> </li> </ol>	

## ANNEX A—ETHICAL FOUNDATIONAL REQUIREMENTS FOR CTA/CTT

Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G1.1—CTA/CTT Transparency, Accountability, and Privacy Competency</b></p> <p>Capability to gauge the training, experience, and governance skills of key people within the organizations that comprise the ecosystem of the life cycle of CTA/CTT, to ensure that there is a program and supporting resources to ascertain those involved in the TAP of CTA/CTT are adequately trained, skilled, and experienced or competent.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Demonstrate the existence of a coherent set of rules, procedures, and tasks to ensure those involved in CTA/CTT <b>transparency</b> are adequately trained, skilled, and experienced (competent) in fulfilling their roles.</li> <li>b. Demonstrate the existence of a coherent set of rules, procedures, and tasks to ensure those involved in CTA/CTT <b>accountability</b> are adequately trained, skilled, and experienced (competent) in fulfilling their roles.</li> <li>c. Demonstrate the existence of a coherent set of rules, procedures, and tasks to ensure those involved in CTA/CTT <b>privacy</b> are adequately trained, skilled, and experienced (competent) in fulfilling their roles.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Record of training. Duty holder to show that a certain number of training sessions are organized to explain the governance of TAP of the company to its staff, at all levels.</li> <li>b. Log of attendees at both internal and external training sessions. The duty holder should demonstrate that those involved in TAP governance have actually attended such training sessions.</li> <li>c. Training/experience gaps. Periodic self-evaluation to be conducted by the duty holder to identify gaps in knowledge, experience, and further training requirements. This should inform both recruitment, talent acquisition, talent management, and training strategies.</li> <li>d. Details of how training is delivered, and adequate levels of understanding are achieved and benchmarked. Important: The content of the training sessions and how these are done. Learning process is enhanced when there are practical exercises during trainings.</li> <li>e. The organization should demonstrate not only that there are training sessions on TAP governance, but also that those are done following effective learning methods.</li> <li>f. The organization shall provide evidence of regular periodic testing of workers to confirm that appropriate competency has been achieved.</li> <li>g. The organization shall provide copies of HR records of workers' internal experience of TAP, and where appropriate and necessary, documents such as CVs/resumes of those TAP governance workers to demonstrate skills and experience gained prior to joining the organization, where TA workers have worked for the organization less than five (5) years.</li> </ul>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

## ANNEX A—ETHICAL FOUNDATIONAL REQUIREMENTS FOR CTA/CTT

Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G1.2—Internal Compliance Authority</b></p> <p>The existence, capability, and executive function of an internal ethics compliance resource (or resource team/department as required) to [service all?] organizations within the ecosystem of the life cycle of CTA/CTT. This may entail a resource collective that oversees all entities or separate resource(s) for each ecosystem entity.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Have internal compliance authority in place to address and provide verification of internal ethical compliance.</li> <li>b. Have internal compliance authority in place to address and provide assurance of external supply chain/component/service provider management and/or (if different) those within the ecosystem of the life cycle of the CTA/CTT.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records of resources allocated to ethical compliance in the organization.</li> <li>b. Records of active policies and procedures that demonstrate the function of an internal ethics compliance authority.</li> <li>c. Organigram that demonstrates executive sponsorship of, and responsibility for, an internal ethics compliance authority.</li> <li>d. Records to demonstrate the composition and capability of those who form the internal ethics compliance authority to fulfill its function.</li> <li>e. Records to demonstrate the active oversight and management of component/service providers in the organization's supply chain in line with ethical transparency, accountability, and privacy requirements of the CTA/CTT ecosystem.</li> <li>f. The existence and composition of an Ethical Advisory Board/Committee/Panel (or more than one of, howsoever configured) whether at corporate level or ecosystem or regulatory level comprising an independent and diverse group of advisers (both experts, and those with requisite skills and experience) which provides internal ethics compliance oversight to the organization and/or external ethics compliance oversight for all organizations within the ecosystem of the life cycle of the CTA/CTT.</li> <li>g. Minutes and/or records of meetings of the Ethical Advisory Board/Committee/Panel relevant to the CTA/CTT ecosystem.</li> </ul>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

## ANNEX A—ETHICAL FOUNDATIONAL REQUIREMENTS FOR CTA/CTT

Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G1.3—Culture of Transparency, Accountability, and Privacy (TAP)</b></p> <p>An organizational culture that is supportive of, and conducive to, cultivating a quality of TAP for all entities within the ecosystem of the life cycle of CTA/CTT.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Ensure that there is a good quality and regular program of training and wider organization awareness of what ethical transparency, accountability, and privacy is and what best practice looks like.</li> <li>b. Ensure that all workers within the organization are provided an opportunity to reflect on what best practice ethical transparency, accountability, and privacy looks like with respect to their job position and the role of the organization in the wider ecosystem.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Details of the past training/awareness program deployed across the organization and details of the future training/awareness program to be deployed across the organization. Provide details of regularity of training/awareness events, and intervals of lapsed time between such events. This may include details of direct training programs as well as details of less direct methods of corporate culture influence, including (but not limited to organization) thought leadership messaging across organization, discussions/town halls with organization leaders presenting their thoughts on best practice and ethical TAP for the organization and bringing in external speakers and expertise to assist with cultural change management.</li> <li>b. Details of how workers are given the opportunity to attend training, do group work, and personal reflective practice in the context of their job position to enhance their understanding of TAP relevance to them, the organization, and those in the wider ecosystem of the organization.</li> </ul>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

## ANNEX A—ETHICAL FOUNDATIONAL REQUIREMENTS FOR CTA/CTT

Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G1.4—Risk Management and Execution Capability</b></p> <p>Having the experience, foresight, and capacity to understand and manage ethical risks and the execution of mitigating risks identified. With respect to privacy, ability to proactively assess risk to User privacy and freedoms and install mitigation plans.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Have the appropriate level of experience and capability at the organization's disposal to foresee, evaluate, manage, and mitigate ethical transparency, accountability, and privacy risks.</li> <li>b. Have appropriate ethical risk management and mitigation strategies, and processes and procedures in place.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Copy of the organization's risk management plan, highlighting how it manages ethical risk.</li> <li>b. Copy of the ethical risk assessment the organization might take.</li> <li>c. A flow chart showing the execution path in the event that an ethical risk was identified.</li> <li>d. Copies of any other processes and procedures to demonstrate the organization's capability (whether drawn from within the organization or from outside expertise outside the organization) to foresee ethical risk, evaluate ethical risk once identified, manage and/or address that ethical risk, and mitigate ethical transparency, accountability, and privacy risks. For example, the organization may have a program of User engagement or social acceptability/preferability testing that would feed into risk evaluation, management, and mitigation plans.</li> </ul>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

## ANNEX A—ETHICAL FOUNDATIONAL REQUIREMENTS FOR CTA/CTT

Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G1.5—Willingness and Ability to Effective Handling of Feedback</b></p> <p>Having the experience, foresight, and capacity to understand and manage ethical risks and the execution of mitigating risks identified. With respect to privacy, ability to proactively assess risk to User privacy and freedoms and install mitigation plans.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Have a CTA/CTT User feedback mechanism that enables Users to appropriately raise concerns that may have implications concerning transparency, accountability, and/or privacy.</li> <li>b. Have a process to screen, prioritize, and address CTA/CTT user feedback.</li> <li>c. Have a process to communicate with the CTA/CTT user regarding their feedback.</li> <li>d. Have an internal mechanism within the organization that implements both preventative and corrective measures identified following user feedback.</li> <li>e. Have protocols to receive and address feedback between ecosystem organizations.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Flowchart of the intake system of CTA/CTT user feedback. For example, ability to receive feedback through communities of place or interest forming a group to raise queries, concerns, issues, and to find resolution at a number of points during the CTA/CTT life cycle.</li> <li>b. A dashboard/call-log showing the intake of user feedback and how that user feedback was screened, prioritized, and addressed in practice, including status.</li> <li>c. Where possible, the dashboard should be made transparent and published where appropriate and would not subject the organization to being gamed to all users and/or potential users.</li> <li>d. Copy of the process and procedures in place to coordinate and deal with other organizations in the ecosystem, including the Regulator (where applicable).</li> <li>e. Where possible, organizations should be able to evidence a feedback mechanism that takes into account ethical TAP issues and vulnerabilities raised from other ecosystem organizations both within the jurisdiction and outside the jurisdiction of the CTA/CTT application for that organization.</li> <li>f. Jurisdiction can be between whole country and whole country, or between state/county to state/ county depending on the boundaries of the CTA/CTT. This is particularly important for interoperability.</li> <li>g. Copy of the process map demonstrating how CTA/CTT users are communicated with post feedback. For example, the user is informed of the status of their feedback: in progress, resolved, not resolved, file closed.</li> <li>h. A sample of the communication sent out to users post feedback.</li> </ul>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

## ANNEX A—ETHICAL FOUNDATIONAL REQUIREMENTS FOR CTA/CTT

Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G1.1—Evidence of Misdemeanors</b></p> <p>Any evidence or records of past/current noted unethical or unlawful behavior by an organization or its management that may warrant concern for other activities. Particular attention to concerns of User freedom and autonomy.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <p>a. Have in place a log or centralized record of all complaints and or cases (whether upheld or not) made against the organization and its senior management.</p>	N	MI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <p>a. There is an expectation that the organization and its management will be open and transparent about all complaints and cases concerning unethical and/or unlawful behavior made against them, and that so far as reasonably possible (with the exception of documentation not permitted to be disclosed by reason of contempt of court, legal privilege, or confidentiality), all records pertaining to such complaints and cases that are not legally considered confidential would be provided in evidence, and these should be up-to-date and in conformity with the organization's retention policy.</p>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

## ANNEX A—ETHICAL FOUNDATIONAL REQUIREMENTS FOR CTA/CTT

Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G1.2—Laws Undermining TAP for Users</b></p> <p>Any laws that may warrant concern for citizen freedom and autonomy relating to CTT/CTA participation. This includes a review of existing legislation to ensure appropriate safeguards on the freedoms of citizens.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Have risk register of any and all laws impacting on CTA and CTT provision and use within the CTA/CTT ecosystem.</li> <li>b. Have a process and procedure for conducting a CTA/CTT risk impact assessment.</li> <li>c. Have prior to the deployment and/or subsequent update of the CTA/CTT have conducted a risk impact assessment, evaluating appropriate safeguards on the freedoms and rights of citizens/end users, (including <i>inter alia</i> data protection, public health/pandemic safeguards, equality, ethical and societal impact concerning the organization's provision and/or the end users' use of the CTA/CTT which could have an impact on TAP or other human rights, freedoms, or on autonomy.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Provide a copy of the risk register detailing any and all laws currently impacting (and on the regulatory horizon to impact on) CTA and CTT provision and use within the CTA/CTT ecosystem.</li> <li>b. Provide a copy of the process and procedure for conducting a CTA/CTT risk impact assessment.</li> <li>c. Provide a copy of the CTA/CTT risk impact assessment conducted prior to the deployment and/or subsequent update of the CTA/CTT evaluating appropriate safeguards on the freedoms and rights of [citizens/users], (including <i>inter alia</i> data protection, consumer protection, e-commerce, e-privacy, public health/pandemic safeguards, equality, ethical and societal implications concerning the organization's provision and/or the end users' use of the CTA/CTT which could have an impact on TAP or other human rights, freedoms, or on autonomy.</li> </ul>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

## ANNEX A—ETHICAL FOUNDATIONAL REQUIREMENTS FOR CTA/CTT

Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G2—Clarity of Concept of Operations</b></p> <p>Detailed description of the total level of performance, capabilities, and behavioral features of a CTA/CTT service or system.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Demonstrate a system design overview that is open, accessible, and takes user needs into account and well documented. A summary of the design shall be made accessible to the public.</li> <li>b. Specify the concepts of operation for development, trials, and contexts of use that would assume and include the operational environment.</li> <li>c. Where possible, simulate the concepts and contexts of operations as modeled, and validate these in advance of the design efforts.</li> <li>d. Modeling of interactions (e.g., UML), and examples of various parameters and environments shall be carried out to further clarify the concept of operation.</li> </ul>	<p>N</p>	<p>HI</p>	<p>Developer, Integrator, Operator, Maintainer</p>	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Abstract overview of the system, context of operation, and the original concepts of product/system deployment in the operating environment including:           <ul style="list-style-type: none"> <li>1. Design specifications.</li> <li>2. Operational scenarios specification.</li> <li>3. Functional design specification.</li> <li>4. Operational manuals and guidelines.</li> </ul> </li> <li>5. What data may be recorded, for what purpose, how it is being stored, and where it is being transmitted, including location data and files accessed.</li> <li>6. Do the stakeholders have the appropriate understanding of the total level of performance, capabilities, and behavioral features of a CTA/CTT service or system?</li> <li>7. Does the evidence demonstrate version/change control?</li> </ul>	<p><b>Measurement:</b> Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement”.</li> <li>2. Clarity of ConOp finding: On 1–5 scale (based on aggregate of satisfying sub level goals) such as:           <ul style="list-style-type: none"> <li>5—Excellent</li> <li>4—Good</li> <li>3—Average</li> <li>2—Poor</li> <li>1—Unacceptable</li> </ul> </li> </ol>

## ANNEX A—ETHICAL FOUNDATIONAL REQUIREMENTS FOR CTA/CTT

Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder			Required Evidence		Evidence Measurement and Benchmark
<p><b>G2.1—Understanding the Overall CTA/CTT System Design</b></p> <p>Technologies that help to provide a dashboard of insights into the behaviors and outputs of a CTA/CTT system. Monitoring is necessary during design, deployment, and operations, and should be contextually adjusted as necessary.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Incorporate design features that either provide an API or generate a systems dashboard that allows access to information on pertinent various system behavioral predictors.</li> <li>b. Ensure the system behavior predictors are highly correlated with the concept of operation and the environment of application.</li> <li>c. The behavioral aspects of the system under observation shall have desirable performance levels and be capable of generating alarms and advisory messages to the operators based on identified system constraints.</li> <li>d. Take onboard user feedback and establish an effective channel for addressing and responding to the stakeholders' feedback/complaints.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer	The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context: <ul style="list-style-type: none"> <li>a. Design documentation indicating monitoring capabilities and functions</li> <li>b. Rationale for the relevance of monitored parameters, specification of performance, and alarm levels</li> <li>c. Demonstrate the existence of a feedback and complaints channel for stakeholders, with corresponding correction and prevention resolution/plan.</li> <li>d. Evidence that the stakeholders have the appropriate understanding of the behaviors and outputs of a CTA/CTT service or system?</li> <li>e. Evidence offered to demonstrate version/change control?</li> </ul>		<b>Measurement:</b> Multi-level on 1–5 scale such as:  5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable		

## ANNEX A—ETHICAL FOUNDATIONAL REQUIREMENTS FOR CTA/CTT

Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder			Required Evidence		Evidence Measurement and Benchmark
<p><b>G2.2—Stakeholder Specific Information</b>            (Information at appropriate and adequate levels of details and scope, with suitable curation applied as to help meet the specific needs of a class of stakeholders.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Incorporate design features that either provide an API or generate a systems dashboard that allows access to information on pertinent various system behavior predictors.</li> <li>b. Ensure the system behavior predictors are highly correlated with the concept of operation and the environment of application.</li> <li>c. The behavioral aspects of the system under observation shall have desirable performance levels and be capable of generating alarms and advisory messages to the operators based on identified system constraints.</li> <li>d. Take onboard user feedback and establish an effective channel for addressing and responding to the stakeholders' feedback/complaints.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer	The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:	<ul style="list-style-type: none"> <li>a. Design documentation indicating monitoring capabilities and functions</li> <li>b. Do the stakeholders have the appropriate understanding of the total level of performance, capabilities, and behavioral features of a CTA/CTT service or system?</li> <li>c. Rationale for the relevance of monitored parameters, specification of performance and alarm levels.</li> <li>d. Demonstrate the existence of a feedback and complaints channel for stakeholders, with corrective and preventive resolution/action plan.</li> <li>e. Does the evidence demonstrate version/change control?</li> </ul>	<b>Measurement:</b>	Multi-level on 1–5 scale such as:	

## ANNEX A—ETHICAL FOUNDATIONAL REQUIREMENTS FOR CTA/CTT

Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder			Required Evidence		Evidence Measurement and Benchmark
<p><b>G2.3—TAP of CTA/CTT Federated Exchange and Learning</b></p> <p>An end-user or stakeholder should be aware of all data flows in the ecosystem, if and when outputs from one system/model may be passed to another for further processing, if and when a partner in the ecosystem may perform a function on their data, and what such a function may entail. The qualities of the security of those other models should be accounted for with full disclosure given, to better enable an informed decision. This includes system architecture options for centralized and distributed variants.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Demonstrate a clear and understandable process for sub-system processing, learning, and transactions.</li> <li>b. Demonstrate security and appropriate channels and processes for disclosure to relevant stakeholders.</li> </ul>	<p>N</p>	<p>HI</p>	<p>Developer, Integrator, Operator, Maintainer</p>	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Design records for federated learning including clear depiction of sub-systems and support systems. All records must demonstrate version control/configuration management.</li> <li>b. Security tests and verification of the federated learning and transactions at sub-system or support. All data flows, functions, and qualities must be traceable to a security or verification test.</li> </ul>		<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>		

## ANNEX A—ETHICAL FOUNDATIONAL REQUIREMENTS FOR CTA/CTT

Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G2.4—Understanding of All CTA/CTT Operational Environments</b>            People are mobile, and environments change. The system needs to be aware of its environment of operation, and to transparently outline for the end user how those factors may influence commercial, technical, and jurisdictional concerns, and how that may alter the function of the CTA and its ecosystem. This could include interoperability between different jurisdictions or places without a formal jurisdiction, or a disputed jurisdiction.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <p>a. Systems should make note of their operating environment, any changes to this, and any potential TAP-affecting situations this may create. This should then be clearly communicated to the users.</p>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. User manual with operating environment clearly mentioned and mention of legal risks.</li> <li>b. Terms and Conditions document.</li> <li>c. Presence of information related to desired operating environment.</li> <li>d. Stating the responsibility in absence and presence of operating environment.</li> </ul>	<p><b>Measurement:</b>            Multi-level on 1–5 scale such as:</p> <p>5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable</p>

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<p><b>G2.5—Understandability of CTA/CTT System Presentations</b></p> <p>Clarity, completeness and understandability, appropriateness of presentation of CTA/CTT system behavior within the context of operation. Clear and simple language should be used, ideally, in the user's language of preference. Also, diagram/graphic form information should be considered for communication.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Specify and model the CTA/CTT behavior and, where possible, run simulations to verify assumptions and expected performance in advance of deployment.</li> <li>b. Select approaches to specification, modeling, simulation, and verification that are comprehensible for each stakeholder group e.g., a user manual/guide suited to each group with contextual information.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Documented behavioral models and simulation outcomes for validation and any corrective/preventive actions.</li> <li>b. Verification tests against various stakeholder groups for understanding and comprehensibility of the CTA/CTT behavioral profile.</li> <li>c. Traceability of design specifications through test/simulation performance and CTA/CTT behavior and vice versa.</li> </ul>	<p><b>Measurement:</b>            Multi-level on 1–5 scale such as:</p> <p>5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable</p>

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<p><b>G2.6—Requirements and Incentives for Disclosure</b>  Incentives from insurance companies, regulators, pressure groups, and stakeholder organizations for disclosing the particulars of how a CTA/CTT functions.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <p>a. Proactively explore the stakeholder expectations and existing incentives for disclosure of CTA/CTT algorithmic behaviors.</p>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records of proactive search for disclosure incentives.</li> <li>b. Adaptation and implementation of the disclosure incentives.</li> <li>c. Cases of disclosure according to stakeholder requests.</li> <li>d. Retention policy is documented and implemented.</li> </ul>	<p><b>Measurement:</b>  Five discrete levels with appropriate labels</p> <ol style="list-style-type: none"> <li>1. Fully Incentivized</li> <li>2. Well Incentivized</li> <li>3. Incentivized</li> <li>4. Insufficiently Incentivized</li> <li>5. Not Incentivized</li> </ol>	

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder			Required Evidence		Evidence Measurement and Benchmark
<p><b>G2.7—Finality of CTA/CTT Service Termination</b></p> <p>CTA/CTT systems must not leave any modification to a user's system, data, profile, or configuration which persists after service has ended, or the app is deleted. Transparent communication with the end user that service and its components have been terminated is also required. Choice as to whether to donate your information for research beyond service termination should be a key point raised here.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Demonstrate that at the termination of a session for delivery of a given CTA/CTT embedded service, all session connections and data are terminated and not kept for reuse.</li> <li>b. The client/user configuration shall also be restored to original state.</li> <li>c. Take into account the possibility that third parties may resurrect/emulate shut down elements of a legacy system.</li> <li>d. Notify if any software or backdoors have been pre-installed or pre-configured before the user received a device.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Design specifications to demonstrate the finality of session terminations. Traceability of design specifications through test and output, and vice versa.</li> <li>b. The design documentation should show an uninstaller/removal of a user/app from the system, optionally including its automated removal upon mission completion.</li> <li>c. Illustrative session logs demonstrating the completion of a service delivery does not entail continuity of connection between the server and the client, and that no data is being retained once an account is deactivated or a program or app is uninstalled.</li> <li>d. Notifications for any software or backdoors that may have been pre-installed or pre-configured before the user received a device.</li> </ul>		<p><b>Measurement:</b> Five discrete levels with appropriate labels</p> <ol style="list-style-type: none"> <li>1. Fully Terminated</li> <li>2. Well Terminated</li> <li>3. Terminated</li> <li>4. Insufficiently Terminated</li> <li>5. Not Terminated</li> </ol>		

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<p><b>G2.8—CTA/CTT Risk Scoring and Social Scoring</b></p> <p>CTA/CTT systems must make it clear to stakeholders if and how their behavior is being logged for purposes of a scoring system and with what specific intent. They must also be informed if, as, and when such a score updates, along with the reasoning behind a change in scoring.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Make it clear to stakeholders if their behavior is being logged for purposes of a credit or scoring system, or extrajudicial decision against a person's ability to access something.</li> <li>b. They must also be informed if, as, and when such a scoring mechanism updates to make a new impression.</li> <li>c. They must be able to download, retain, and share this information if desired.</li> </ul>	<p>N</p>	<p>HI</p>	<p>Developer, Integrator, Operator, Maintainer, Regulator</p>	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Evidence of immediate and full disclosure of scoring mechanisms to end users.</li> <li>b. Examples of in-situ notification such as signs or decals where such technologies may be deployed</li> <li>c. Immediate feedback if the scoring changes, along with the reasons why corrective and preventive action/plan if needed.</li> <li>d. Methods to challenge the assertion, to correct mistakes, and to send information to the individual concerned or an attorney.</li> <li>e. Transparent and thoroughly explained disclosure of any sanctions against or demonetization of content.</li> <li>f. Records indicating protection against seizure or scanning of data stored on cloud servers for illegal activity without authorization such as a subpoena.</li> </ul>		<p><b>Measurement:</b> Multi-level on 1-5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>						

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<p><b>G2.1—Non-Disclosure of CTA/CTT Total Functionality</b></p> <p>Aspects of undocumented functionality or behaviors are not fully disclosed to the pertinent stakeholders. This includes deliberate versus unintentional non-disclosure, as well as a failure to perceive adequate disclosure.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Demonstrate that all aspects of functionality pertinent to an algorithmic system and its services are specified, documented, and disclosed as appropriate to the needs and privileges of the stakeholders in different environments of deployment and implementation.</li> <li>b. Undocumented features/Easter eggs in sensitive systems must be adequately documented and potentially disclosed to avoid exploits for security purposes.</li> </ul>	<p>N</p>	<p>HI</p>	<p>Developer, Integrator, Operator, Maintainer, Regulator</p>	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Documented system and algorithmic design functions that are traceable to test, performance, and vice versa.</li> <li>b. Logs of stakeholder requests for disclosure and the response.</li> <li>c. Records of operational monitoring demonstrating alignment with the disclosed functionality in the relevant operational contexts.</li> </ul>		<p><b>Measurement:</b> Multi-level on 1-5 scale such as:</p> <table> <tr> <td>5—Excellent</td> </tr> <tr> <td>4—Good</td> </tr> <tr> <td>3—Average</td> </tr> <tr> <td>2—Poor</td> </tr> <tr> <td>1—Unacceptable</td> </tr> </table>	5—Excellent	4—Good	3—Average	2—Poor	1—Unacceptable	
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<p><b>G2.2—Algorithmic Obfuscation in CTA/CTT</b></p> <p>A situation where a CTA/CTT may have been designed with a hidden agenda, secret process, or ulterior motive in mind, unknown to the end-user or other stakeholders, or possibly even the developing organization itself.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Ensure that users understand whether a system (or associated embedded application, such as an interactive advertisement) may have been designed with dark patterns that are intended to mislead a user.</li> <li>b. A system must not generate insincere emotions or misapprehension in the user, to guide them to a desired path.</li> <li>c. It should not have been designed to cause addiction in people susceptible to it or stream certain people into certain paths of interaction without their explicit awareness.</li> </ul>	<p>N</p> <p>I</p> <p>N</p>	<p>HI</p> <p>HI</p> <p>HI</p>	<p>Developer, Integrator, Operator, Maintainer, Regulator</p> <p>Developer, Integrator, Operator, Maintainer, Regulator</p> <p>Developer, Integrator, Operator, Maintainer, Regulator</p>	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records and specifications relating to mechanisms in place to ensure end-user clarity as to any dark patterns intended to or inadvertently mislead:           <ul style="list-style-type: none"> <li>1. Cause false alarm or false duress or false time-limitations.</li> <li>2. To stream Users into a given course or cohort.</li> <li>3. To guide to a certain course of action that benefits the system owner but is not more beneficial to the user than other possibilities.</li> </ul> </li> </ul>		<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5. Fully Transparent 4. Particularly Transparent 3. Transparent 2. Insufficiently Transparent 1. Not Transparent</p>		

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<p><b>G2.3—Exploitation of CTA/CTT Privileged Access</b></p> <p>Dashboards and privileged access mechanisms may provide opportunities for malicious actors, government powers, or foreign states to discover vulnerabilities in the system, or attributes of its end users. The exploitation of vulnerabilities could be a major concern over privacy and potential for adoption of the CTA/CTT, as well as the entire class of such systems internationally.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <p>a. Prevent privileged access to systems and dashboards that may provide opportunities for malicious actors to discover vulnerabilities in the system or its end users.</p>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records indicating that the organizations are aware that permitting third parties access to test systems may reveal opportunities for disruption of algorithmic processes.</li> <li>b. Such auditors should be carefully vetted and allowed specific unique logins whereby usage may be tracked and rescinded when no longer required.</li> <li>c. Document and system control processes are implemented.</li> </ul>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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<p><b>G3—Ethical Architecture, Design &amp; Dev for CTA/CTT</b>            (Upholding a holistic approach to ethical design and development at all levels of the organization, empowering staff to review the activities and focus of peers and provide feedback. Due regard to all attributes and aspects of the architecture, design, and development that could be invasive to ethical TAP e.g., holistic, consultative and providing for feedback and fulfill the ethical TAP requirements for CTA/CTT.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Demonstrate that appropriate and good faith efforts are put in place to include TAP ethical criteria/behavior as part of the CTA/CTT and related processes.</li> <li>b. Mapping algorithmic CTA/CTT ethical architecture to respective organizational ethical policies and values.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Ethical Issues Register.</li> <li>b. Tailored Organizational Ethical Policy Statement.</li> <li>c. Documents explaining the risk management and strategic response actions in case of malfunctions.</li> <li>d. Section on app or related web resources explaining Algorithmic/ Information System ethical profile that demonstrates the human operator's relation to algorithmic decision making.</li> <li>e. The capabilities for end-users to challenge algorithmic or human-made decisions or impressions if needed.</li> <li>f. Audit reports.</li> <li>g. External studies/reports (if any).</li> <li>h. Interviews with employees/agents/ business partners/supply chain operators, and (where relevant) clients.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p>5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable</p>

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<p><b>G3.1—User Centric Architecture</b>            (User friendly architecture to enable wide choice in the use of mobile devices. The service should also be free at the point of access and adaptable to the means that the majority in the population have access to. The architecture should be accessible persons of disability and provide interaction through text, audio and other tactile features and in the language of the end user.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization shall conduct or license market research and document its findings regarding public use of mobile devices (including make and model) and their specification (including memory and battery capacity) pertaining to the ongoing end user use of the CTA/CTT system.</li> <li>b. The organization shall ensure that nothing in the CTA/CTT architecture results in the exclusion or inaccessibility of the CTA/CTT system to end users, including (but not limited to) price of access to the system or the device itself; user interface; control and adaptation of accessibility features.</li> <li>c. The organization shall ensure that CTA/CTT architecture facilitates communication with the end user, (whether through text, audio and/ or other tactile features) and in the language of the end user.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. A copy of the market research and its findings.</li> <li>b. Notes from team/project meetings where the CTA/CTT architecture was decided upon.</li> <li>c. Statement from senior management justifying choice of CTA/CTT architecture and providing reasons, backed up by further evidence, as to how and why the architecture is user friendly and accessible.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:               <ul style="list-style-type: none"> <li>5—Excellent</li> <li>4—Good</li> <li>3—Average</li> <li>2—Poor</li> <li>1—Unacceptable</li> </ul> </li> </ol>

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<p><b>G3.2—Justifiable Acquisition &amp; Storage of Data</b>            (Being able to transparently and accountably justify the reasons behind the approach to collection, collation, curation, and storage of manual and automated user data within the CTA/CTT ecosystem. The architecture shall empower users to anonymize their IDs as tags. Desirable to hold the encrypted manual and automated data on the local device and secure servers within the internal or a national infrastructure or in suitable and safe jurisdictions in accordance with safe harbor practices.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization shall have clearly documented grounds for processing (including but not limited to collecting, collating, curating, and storing) all data within the CTA/CTT system.</li> <li>b. The organization shall ensure the grounds for processing of data within the CTA/CTT system are transparent and are made known to the end user (and all in the CTA/CTT ecosystem).</li> <li>c. The organization shall provide the functionality within the CTA/CTT architecture to enable the end user to anonymize their IDs.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator			<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Copies of data risk and impact assessments.</li> <li>b. Infographic illustrating the customer journey using the CTT/CTA system</li> <li>c. Infographic showing the data acquisition and processing journey.</li> <li>d. A copy of the privacy policy detailing all the ground for data processing.</li> <li>e. A statement detailing how and when the privacy policy is made known to the end user (and all in the CTA/CTT ecosystem), including publication, website and date, and/or communication via email/SMS/notification or otherwise.</li> <li>f. Functionality specification detailing how an end user can anonymize their ID.</li> </ul>		<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:            5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable</li> </ol>

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	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization shall ensure that there are technical and organizational measures in place within the CTA/CTT architecture to ensure that all processing on servers (including storage) of any and all data pertaining to the CTA/CTT system is secure and is conducted in a manner which is within the reasonable expectation of the end user in accordance with laws of the jurisdiction local to the end user.</li> <li>b. The organization shall ensure that all data is stored on secure servers within the jurisdiction of the end user, or processed and/or held in a jurisdiction which is deemed to have comparable protections in law (and therefore achieves adequacy status) as that of the jurisdiction of the end user.</li> </ul>	<p>N</p> <p>I</p>	<p>HI</p> <p>HI</p>	<p>Developer, Integrator, Operator, Maintainer, Regulator</p> <p>Developer, Integrator, Operator, Maintainer, Regulator</p>				

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<p><b>G3.3—Relevant Rights of Access</b>            (Personalized vs non-personalized data, encryption and anonymization. Also, who in the CTA/CTT ecosystem such as supply chain stakeholders and how can access the data including appropriate handoff procedures between the manual and automated access and processing. Also access to the server and front-end devices, pseudo anonymized data. Also, duration of data sharing and validity. The ephemeral IDs being shared without consent.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization shall take appropriate technical and organizational measures to ensure that rights of access to, within, across the supply chain, and from the CTA/CTT ecosystem are controlled, transparent and accounted for in accordance with relevant roles and responsibilities.</li> <li>b. The organization shall keep a log of all rights of access to the CTA/CTT ecosystem, along with details as to the justification for the access and its relevance/importance.</li> <li>c. The organization shall keep a log of all actual access to the CTA/CTT system within its control.</li> <li>d. The organization shall have in place appropriate risk control mechanisms concerning rights of access to the CTA/CTT ecosystem.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator			<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Infographic of all data flows across the entire CTA/CTT ecosystem, including details of when and where data is personal, anonymous and/or pseudonymous.</li> <li>b. A copy of the rights of access log.</li> <li>c. A copy of the log of actual access obtained to the organization's CTA/CTT system elements within its control.</li> <li>d. A copy of the policies and procedures detailing the risk control mechanisms and how rights of access risks are managed.</li> <li>e. A copy of the re-identification risk assessment, including percentage likelihood of it occurring within the CTA/CTT ecosystem.</li> <li>f. A copy of the functionality specification detailing the encryption methodologies and strategies.</li> <li>g. A copy of the template for digital handshakes or ID logs, and when over the preceding 12 months these have been provided.</li> </ul>		<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:               <ul style="list-style-type: none"> <li>5—Excellent</li> <li>4—Good</li> <li>3—Average</li> <li>2—Poor</li> <li>1—Unacceptable</li> </ul> </li> </ol>

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	<ul style="list-style-type: none"> <li>e. The organization shall maintain records of when and where in the data flows, data is personalized, pseudonymized, and anonymized, any by what methods.</li> <li>f. The organization shall conduct a re-identification risk assessment and ascertain the percentage likelihood of re-identification across the CTA/CTT ecosystem.</li> <li>g. The organization shall ensure that communications between device(s) and the CTA/CTT system are encrypted and not intercepted, compromised or undermined.</li> <li>h. The organization shall ensure that the end user is fully aware and has consented to the sharing with the organization and other third parties (where appropriate) of any digital handshakes or IDs generated between one device and another to indicate a proximity event and/or which acts as a proxy for a social engagement.</li> <li>i. The end user shall be permitted to see a log of all digital handshakes of IDs shared with respect to their device</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator				

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<p><b>G3.4—Legitimate &amp; Purposeful Processing of Data</b>            (Processing data in such a way that is compliant with local regulations e.g., GDPR following various constraints imposed for personal data and its protection. Data could also be processed and profiled so inferring more characteristics and attributes such as gender, ethnicity, etc. The interoperability also brings about questions about local versus global data in view of mobility. The purpose of data processing shall be lawfully legitimated through a social contract.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Demonstrate compliance with any and all applicable regulations which relate to the lawful use, storage, transmission, etc. of data.</li> <li>b. Collect only data that is strictly required, for specific purposes germane exclusively to the specified activities of the CTA/CTT.</li> <li>c. Make provision for any Federated Learning activities, including system version changes after federated learning integration or updates.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Demonstration of awareness of data protection and privacy regulations that pertain to company activities.</li> <li>b. Description of data required for CTA/CTT activities, and a specific reasoning behind why it is required.</li> <li>c. Demonstrated schematics of data flows.</li> <li>d. Technology that tracks the flows of data and/or models for Federated Learning or other forms of transfer learning.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:            5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable         </li> </ol>

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G3.5—Sunset</b>            (The architecture's approach to data/functional validity and sunset, automated update, deletion across the ecosystem at the front end and back ends. The use of manual and automated data in planning, research, and subsidiary purposes shall become an optional opt-in feature.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Make provision for the full and complete decommissioning of the CTA/CTT technology when no longer required.</li> <li>b. Such decommissioning should be possible without the direct input of the end-user in deleting or uninstalling their client-side application.</li> <li>c. Decommissioning should be done with significant advance warning and opportunities for feedback from end users.</li> <li>d. Any provision for retaining research data on end-user activities for future pandemics should be explicitly opt-in with a detailed reasoning provided on what would be collected and for what specific purposes it may be used for.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Create a plan for decommissioning prior to the deployment of the CTA/CTT.</li> <li>b. Demonstrate communications planned to inform users of changes, and any choices that they may have, and opportunities to provide feedback.</li> <li>c. A data deletion plan, where relevant.</li> <li>d. A data archival plan, where relevant.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:               <ul style="list-style-type: none"> <li>5—Excellent</li> <li>4—Good</li> <li>3—Average</li> <li>2—Poor</li> <li>1—Unacceptable</li> </ul> </li> </ol>

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<p><b>G3.1—Variation in Intensity of Pandemic’s Impact</b>            (The degree of impact on a given locality may vary extensively and that may influence the time available to put in place ethical architecture, design, and development. Also, urgency to respond is a determining factor, getting technologies online and abortive mothballing that may cause complications in restarting the CTA program. The availability of the expert resources to support and maintain the ethical architecture is also a concern in such urgencies. The privacy of data not safeguarded due to lack of adherence or deliberately usurping proper protocols under emergency is a system state to be avoided.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Organizations shall undertake to follow all mandated ethical and safety guidelines and protocols in spite of any perceived urgency.</li> <li>b. Organizations shall not allow pressure from authority to influence them into cutting corners in order to more quickly fulfill a pressing need relating to CTA/CTT implementation.</li> </ul>	I	MI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Evidence of management commitment to following ethical procedures and protocols in a proper way no matter the pressures, which has been communicated to all staff, such as via a company memo.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:            5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable         </li> </ol>

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<p><b>G3.2—Complacency and Premature Shutdown</b>            (Local concern regarding a pandemic may be low and this may lead to complacency regarding the need for the CTA despite the remaining potential for a flare up or the creation of interoperability issues with other locations. Also, complacency by local authorities in making the CTA available.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Demonstrate the capability to rapidly redeploy any human or system resources which have been wound down or mothballed in case of a resurgence in requirement.</li> <li>b. Demonstrate that due consideration has been made toward the needs of those in other jurisdictions or geographies, and how they might be affected by any shutdown or reduction in capacity.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Demonstrate a plan for potential re-commissioning prior to any decommissioning process.</li> <li>b. A listing of any resources which will be kept warm for a time, as well as budgets allocated to facilitate this.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p>5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable</p>

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<p><b>G3.3—Overreaction</b>            (Changes in the risk model and/or statistical aberrations leading to misdiagnosis of a flare up, bias, or unnecessary predictive/hyper notification that undermine autonomy, transparency, and privacy of a group of citizens. If the state was an actor in the changes to risk model, this could also result in cocooning citizens undermining group privacy or autonomy.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Demonstrate very clear reasons for any change to the models of infection likelihood or similar epidemiological models prior to any update of them.</li> <li>b. Describe any such update to all stakeholders and explicate the specific reasons for them clearly.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. A clear breakdown of all risk models and assumptions prior to deployment.</li> <li>b. Explication of further models as may be developed and refined, with a versioning system to delineate between them.</li> <li>c. Evidence of communication to users/stakeholders (or advance drafts) detailing the model update, why the update is being made, the basis behind it, and how they may be affected.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:               <ul style="list-style-type: none"> <li>5—Excellent</li> <li>4—Good</li> <li>3—Average</li> <li>2—Poor</li> <li>1—Unacceptable</li> </ul> </li> </ol>

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G4—Awareness of Degree of CTA/CTT Autonomy</b></p> <p>An end user must be made aware of what automated processes may occur during the processes of a CTA app and its associated infrastructure. They must also be aware of what processes are governed or influenced by human agency, as well as the ability to contact a human overseer for clarity or clarification, if such support is available.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Full disclosure of end-to-end processes including hand-offs between A/IS and humans.</li> <li>b. Infoline sufficiently staffed so users can be connected with a human within a reasonable timeframe.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Easily accessible information in language of end user, listing full details for the entire end-to-end life cycle of the CTA in question and helpdesk contact info if needed</li> <li>b. Accessible information also includes clear and detailed information on the CTA download site and links to informational sites of all entities.</li> <li>c. Accessible information on user interface, e.g., disability requirements—mobile technology for sight impairment.</li> <li>d. Description of the machine learning engineering process from endpoint to model should be provided for technical review of the CTA.</li> <li>e. A lay person's interpretable description of the data gathered, processed, and description of processing behavior of the CTA should be available.</li> </ul>	<p><b>Measurement:</b> Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:           <ul style="list-style-type: none"> <li>5—Excellent</li> <li>4—Good</li> <li>3—Average</li> <li>2—Poor</li> <li>1—Unacceptable</li> </ul> </li> </ol>

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<p><b>G4.1—Understanding the Overall CTA/CTT System Design</b></p> <p>Technologies that help to provide a dashboard of insights into the behaviors and outputs of a CTA/CTT system. Monitoring is necessary during design, deployment, and operations, and should be contextually adjusted as necessary.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Recognition of environmental settings that do not support CTA or compromises CTA information captured.</li> <li>b. Full disclosure of accuracy and evaluation of technical and ethical bias (ethical in that users have the tool to be able to download CTA and technical bias in that it measures what it is to measure—e.g., true exposure versus proximity to potential exposure).</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Training plan or records to prove sufficient training modules to support operators in understanding limitations and retraining for operators when systems have been meaningfully adapted or changed in order to support public disclosure of information.</li> <li>b. Accessible reports of measurement accuracy, missing data, dropping connection, penetration levels.</li> </ul>		<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>		

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<p><b>G4.2—External Feedback from Users</b>   This relates to independent testimony supplied by the user community regarding their personal interaction with the system.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Automated feedback system in app.</li> <li>b. Source for feedback at point of download.</li> <li>c. Automated call line for user feedback.</li> <li>d. Automated extraction of customer service email and voice mail, third-party vendor privacy policy disclosed.</li> <li>e. Appropriate regularized mechanisms for feedback response including what adaptations made as a result of user feedback.</li> </ul>	N	HI	Operator, Maintainer,	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Documentation of processes for intake, response of feedback, corrective and preventive action/ action plan if applicable.</li> <li>b. Report on response rate to user feedback.</li> <li>c. Evidence of the quality of response to user insights, issues, and recommendations.</li> <li>d. Periodic (management) review and analysis of customer feedback, responses, statistics, trends, and resulting recommendations to demonstrate continuous improvement, reporting to panel review.</li> </ul>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G4.3—Review of Evidence and Redress of Deficits in CTA/CTT</b></p> <p>Review by technical experts (or peer systems) in the community, which review evidence of the system behavior and make comments on it. This could also be an autonomous system or process that detects abnormal/adjusted behavior. The actualization/implementation of system improvements is included within this scope.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Arrange for a panel of experts representing diversity.           <ul style="list-style-type: none"> <li>1. Across professional disciplines that are part of CTA ecosystem.</li> <li>2. Of citizen population of CTA audience.</li> </ul> </li> <li>b. Panel shall review all relevant evidence and report outcomes.</li> <li>c. Panel report abstract available for public review.</li> <li>d. Access to all relevant reports/documentation for panel to review</li> <li>e. Plan to implement the review panel report's recommendations</li> <li>f. Optionally include automated system which performs ecosystem check that is then reviewed by panel of experts.</li> </ul>	N	HI	Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Proof of panel review is met with a CTT providing firm issues the following information in an accessible format:           <ul style="list-style-type: none"> <li>1. Policies and procedures of the panel review body.</li> <li>2. Terms of appointment, membership, and responsibility of the panel review body.</li> <li>3. Public-facing decision letter outlining panel's determination of fulfillment of requirements.</li> <li>4. Notice of submission of a protected (under NDA) decision letter to the CTA development team.</li> </ul> </li> <li>b. Proof panel review was conducted at validation/verification, deployment, and retirement stages and regular times during use.</li> <li>c. Panel report.</li> <li>d. Evidence of redress.</li> </ul>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <ul style="list-style-type: none"> <li>5. Fully Reviewed and Deficits Redressed</li> <li>4. Substantially Reviewed and Deficits Redressed</li> <li>3. Reviewed and Deficits Redressed</li> <li>2. Unacceptably Reviewed and Deficits Redressed</li> <li>1. Not Reviewed and Deficits Not Redressed</li> </ul>

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<p><b>G4.4—Awareness of Human Interaction in CTA/CTT</b></p> <p>Awareness that one may be dealing with a human instead of a machine, and that a handoff has occurred (or is about to occur or may occur) from a CTA/CTT to a human being and vice versa.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <p>a. All communication with users of CTA is to disclose if message is automated or delivered by a human. This includes online chat and info lines.</p>	N	LI	Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records of all forms of communication and access to the types of media with users of CTA should be accessible to public.</li> <li>b. Accessibility includes relevant information for feedback, questions, changes to proxy settings, and withdrawal at point of CTA download and afterward via links to developers, sponsors, and maintainers' stable sites.</li> </ul>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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<p><b>G4.5—Full Disclosure of Third-Party Arrangements Touching the End-to-End Life Cycle in the Ecosystem</b>          Entering into agreement so that all third-party entities will conform to the relevant rules and duties regarding the use and outcomes of data in accordance to the purpose throughout the life cycle.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The duty holder must ensure all third party entities disclose their privacy policies.</li> <li>b. All governmental and corporate policies and contracts pertaining to CTA/CTT are made easily accessible to the public covering commercialization of data, use of existing systems, e.g., US citizens' info line: 211/811 TSS systems.</li> </ul>	N	M	Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Proof all disclosures of third-party agreements are easily accessible to the public covering commercialization of data, use of existing systems, e.g., US citizens info line: 211/811 TSS systems.</li> </ul>	<p><b>Measurement:</b>          Multi-level on 1–5 scale such as:</p> <p>5—Excellent          4—Good          3—Average          2—Poor          1—Unacceptable</p>

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<p><b>G4.6—Care Giver/Guardian Proxy Control</b>            Ability of caregivers to take proxy control on behalf of a user with limited or diminished autonomy.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Users that are legal guardians or caregivers are given access/receive and respond to communication by the systems.</li> <li>b. The system should provide/permit the ability to proxy users access and control.</li> </ul>	N	H	Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Evidence of documentation of the functionality to allow caregiver/guardian permission and the evidence that it works.</li> </ul>	<p><b>Measurement:</b>            Multi-level on 1–5 scale such as:</p> <p>5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable</p>

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<p><b>G4.1—Exploitation of Privileged Access in CTA/CTT</b></p> <p>Dashboards and privileged access mechanisms may provide opportunities for malicious actors, government powers, or foreign states to discover vulnerabilities in the system, or attributes of its end users. The exploitation of vulnerabilities could be a major concern over privacy and potential for adoption of the CTA/CTT, as well as the entire class of such systems internationally.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Limit use of CTAs solely for purpose of COVID-19 contact tracing and notification.</li> <li>b. Prevent commercialization of data gathered.</li> <li>c. Limit use to COVID-19 tracing and notification by jurisdictions interoperating with CTAs.</li> <li>d. Collaboration with legal counsel in relevant jurisdictions and/or collaboration with civil society organizations tracking privacy regulations to ensure no <i>prima facie</i> violation of regulations and/or laws.</li> <li>e. Ensure an expert panel reviews security measures for data protection against hacking by malicious actors.</li> </ul>	N	HI	Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Proof of mechanisms to prevent exploitation of privileged access in CTA ecosystem.</li> <li>b. Evidence in the form of minutes, plans, etc., showing collaboration between legal entities, civil organizations, and political jurisdictions. Proof of an international body with powers to motivate jurisdictions to comply with international standards of CTA (e.g., guidelines created by EU/UN are ratified and enforced).</li> <li>c. Proof of expert panel access of documentation of data security validation and verification during deployment, maintenance, and retirement phase.</li> </ul>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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<p><b>G4.2—CTA/CTT Algorithmic Obfuscation</b>   A situation where a CTA/CTT may have been designed with a hidden agenda, secret process, or ulterior motive in mind, unknown to the end user or other stakeholders, or possibly even the developing organization itself.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Algorithm codes used within the entire ecosystem of CTA/CTT be accessible to expert panel.</li> <li>b. Any data processed by a CTT that could be or is described as machine learning, or artificial intelligence, or advanced analytics, or big data must conform to a globally recognized AI ethics toolkit when a publicly available written explanation for the use of that tool is provided.</li> <li>c. Form an expert panel that includes acknowledged security expert(s) with experience in surveillance technology.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Evidence of access to algorithm codes by panel of experts. (Evidence of access by panel needs access to a toy model to assess performance before it goes into production.)</li> <li>b. Proof of model performance parameters are stipulated ex ante, and mechanisms to monitor model drift need to be stipulated.</li> <li>c. Review of NDA by panel of experts to not disclose code.</li> <li>d. Traceability of design to test to performance and vice versa that demonstrates no hidden design in algorithm codes.</li> </ul>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <ol style="list-style-type: none"> <li>5. Fully Transparent</li> <li>4. Particularly Transparent</li> <li>3. Transparent</li> <li>2. Insufficiently Transparent</li> <li>1. Not Transparent</li> </ol>

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<b>G5—Confidence in Total CTA/CTT Ecosystem Behavior</b> Having complete confidence in total ecosystem behavior. This may be achieved through simulation, prediction, etc.	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Demonstrate that an appropriate and sufficient end-to-end process for verification, validation, testing pre-deployment, on-going surveillance of the CTT during operations and retirement of the CTA ecosystem is in place, including feedback mechanism of expert panel review outcomes.</li> <li>b. Provide transparent and complete information of testing and CTT surveillance outcomes to the expert panel that oversees the TAP of the CTA.</li> <li>c. Provide the to the public, in lay person's language, an overview of the quality control process that the CTA completed and the outcome.</li> <li>d. Provide to the public complete information of where all data is stored, its security, and who has access of what data and for what purpose.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records of all verification, validation and testing plans, including results of all discrete elements of the ecosystem and of the interconnections between the discrete elements of the complete ecosystem.</li> <li>b. Documentation of the data storage security process, policy, and licensing agreement.</li> <li>c. Documentation of the complete flow, storage, and retirement of data.</li> </ul>	<p><b>Measurement:</b></p> <p>Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

## ANNEX A—ETHICAL FOUNDATIONAL REQUIREMENTS FOR CTA/CTT

Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G5.1—Certainty of the Past Decisions</b>            (Indelible and immutable records of ecosystem performance and outcomes which may include a public ledger mechanism.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Transparency of all past technical performance evaluations of each discrete ecosystem element and the interaction between elements.</li> <li>b. Transparency of business and governmental decisions, determined through policy, legal agreements, and CTA product functionality.</li> <li>c. Expert Panel access to risk and impact assessment of TAP.</li> <li>d. Tracking of all changes to information made available.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Complete record of risk, impact and issues logs</li> <li>b. Minutes of project status meetings covering design and deployment.</li> <li>c. Minutes of steering committee meetings of government and business covering use and retirement.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p style="text-align: center;">5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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<p><b>G5.2—TAP of Federated Exchange and Learning in CTA/CTT</b>          (The ecosystem shall provide a framework for receiving, processing, and actioning end user feedback within a collaborative, supportive, and coherent setting. All participating stakeholders should be aware of all flows of original and metadata in the ecosystem, if and when outputs from one system/model may be passed to another for further processing, if and when a partner in the ecosystem may perform a function on their data, and what such a function may entail. The processing of end user feedback shall be actionable within a collaborative coherent environment.</p> <p>The qualities of the models should also be accounted for with full disclosure given, to better enable an informed decision leading to implementation. This includes system architecture options for centralized and distributed variants.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Creation of a comprehensive public forum where users communicate feedback. Forum is to be accessible to those with physical disabilities.</li> <li>b. Public forum is to be regularly and consistently monitored and actioned to the appropriate CTA ecosystem stakeholder with response to user of the outcome of their feedback.</li> <li>c. Centralized knowledge library for the ecosystem stakeholders to share all CTT information (process, architecture, data models).</li> <li>d. Internal interactive forum of all ecosystem participants to review feedback and to determine resolution. This may be part of the library.</li> <li>e. Steering committee oversight to include member of each element of the ecosystem.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records of feedback and resolution.</li> <li>b. Record of participants and their roles within ecosystem forum.</li> <li>c. Minutes of internal forum including action items.</li> <li>d. Minutes of steering committee meetings.</li> <li>e. Access to library and forum.</li> </ul>	<p><b>Measurement:</b>          Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:            5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable         </li> </ol>

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<p><b>G5.3—Documented Reference Model</b>            (Documented reference model(s) of the ecosystem and elements within should be created at the point of every push live from a staging environment. This should be compared with a live version at randomized intervals, either through submitting identical inputs, or through some nature of hashing function or cryptographic mechanisms. This will provide security that a live system is performing as intended and has not been compromised on the server environment. Considerations of interoperability are essential here. this could be used as a simulation for interoperability with various external data and algorithms.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Create and keep current the reference model of the elements and of the complete ecosystem including the foundational elements, services, interfaces, and connectors. Update of the reference model is at each deployment from staging to live.</li> <li>b. Ensure the live version of the model is functioning as approved in the staging environment.</li> <li>c. Where interoperability between jurisdictions is applicable, the reference model is to include the eco services, interfaces and connectors.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Maps, pictographs, and diagrams that depict all stages of the ecosystem (and its elements) from creation, deployment, use, to retirement.</li> <li>b. Records outlining behavior of CTA system including testing results, validation results of pre and post system behavior.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p>5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable</p>

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<p><b>G5.4—Understanding the overall CTA/CTT System Design</b>            (Technologies that help to provide a dashboard of insights into the behavior and outputs of a CTA/CTT system including comprehensive metrics for the public that includes all life cycle aspects including the retirement phase. Alternative mechanisms including reports and pictographics, FAQs in the recipient's plain language. The dashboards that give the human oversight in a timely, transparent, and comprehensible manner are included in this set. Monitoring is necessary during design, deployment, and operations, and should be contextually adjusted as necessary.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Provide a complete overview of how the ecosystem elements behave as themselves and together with all elements of the entire ecosystem, including the behavior between jurisdictions.</li> <li>b. The overview can be in the form of dashboard or maps of the data flow, security measures for all stages of the data.</li> <li>c. The overview is to be accessible by the public and understandable to a lay person, including those with disabilities.</li> <li>d. Should the public have questions, there is to be a mechanism of interactive communication where answers are in plain language.</li> <li>e. The overview is to be kept current, updated at appropriate intervals.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records outlining the mechanism used to provide an overview.</li> <li>b. Records outlining the interval of updating and what are the changes in behavior.</li> <li>c. Records indicating the communication flow to address questions.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p>5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable</p>

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<p><b>G5.5—Reliability of CTA/CTT Exposure Notifications</b>            (End user to be assured that when labelled At Risk, that they are truly at risk. The model lying behind the messaging system is configured appropriately and proportionately to the pandemic characteristics and features. The reliability depends on the underlying technology such as Bluetooth® functionality as well as the accuracy of the risk model.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Complete disclosure of the risk model and the parameters determining the risk levels.</li> <li>b. Testing for the accuracy of predictions.</li> <li>c. Ongoing monitoring of the accuracy of the notification. This may include integration of manual contact tracing activities.*</li> <li>d. Transparency of all issues related to the accuracy of at risk prediction.</li> </ul> <p>* Intent is to determine if those manually contacted have had a digital notification.</p>	N	HI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Documentation outlining the risk model characteristics and its parameters.</li> <li>b. Risk and issues log(s) kept during creation, deployment and use.</li> <li>c. Records of testing outcomes predicting contact risk levels of users.</li> <li>d. Records indicating extent of manual to digital contact/notification cross-checks.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p style="text-align: center;">5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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<b>G5.1—Data at Rest</b> (May present a more tempting target for attackers than data in motion.)	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Each element of the ecosystem that has access to or stores data at rest is to create and maintain a data at rest protection strategy (DARP) and an infrastructure to prevent data from being accessed, changed, stolen, or used for non-CTA purposes when at rest.</li> <li>b. Undergo, at appropriate intervals, an inspection of all data that is stored in any digital form to determine data breaches.</li> <li>c. Licensing agreement for stored data that is consistent with the jurisdiction's citizen privacy legislature.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Documentation of DARP strategy for each element that stores data.</li> <li>b. Licensing agreement of all entities that are accountable for the storage of the CTA data.</li> <li>c. Records proving ongoing surveillance of all stored data and the results of each review.</li> </ul>	<p><b>Measurement:</b></p> <p>Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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<p><b>G5.2—Malicious Attempt to Disrupt CTA/CTT Behavior</b>            (Contingency should be made for end users or third parties disrupting algorithmic systems or employing denial of service attacks, jamming GPS or Bluetooth® signals, e.g., by falsely declaring an emergency, or deliberately tripping safety interlocks. Such a situation may in itself create a genuine emergency if not managed effectively, or if such adversarial behavior input from human beings cannot be overridden by a high-level human operator (or panel, or swarm quorum of such decision makers.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Further to the DARP, each element of the ecosystem is to create and maintain a data in use (DIU) and data in transit (DIT) protection strategy; the protection strategy is to include the touchpoints where data travel between elements, including those of different jurisdictions.</li> <li>b. Undergo at appropriate intervals hacking attempts of DIT and DIU to determine threat levels.</li> <li>c. In the case of a breach, measures are to be taken to secure the system.</li> <li>d. Users are to be notified of the breach and the impact to their privacy.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Documentation of the data in use and data in transit protection strategies for each element of the ecosystem including the points of cross-over</li> <li>b. Records proving ongoing surveillance of DIU and DIT</li> <li>c. Examples of communication that would be sent to users should there be a breach</li> <li>d. Record of protocol for contacting users.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p style="text-align: center;">5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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<b>G5.3—Altered/Updated/Expanded Data Sets</b> (Changes, amendments, redactions, omissions of dataset entries may provoke different algorithmic outcomes. This must be taken into account and tested prior to deployment with prior versions to test for compatibility and the continuation of nominal outputs. This could also occur in the case of mission creep.)	The duty holder shall fulfill the following CTA/CTT requirement(s): <ol style="list-style-type: none"> <li>A strategy and plan to establish accuracy of the CTA prediction under differing data sets.</li> <li>Testing of the CTT with differing data sets.</li> </ol>	N	HI	Developer, Integrator, Operator, Maintainer	The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context: <ol style="list-style-type: none"> <li>Documentation outlining the strategy and plan to validate accuracy of outcomes under differing data sets.</li> <li>Records indicating results of testing to establish accuracy of predictivity.</li> </ol>	Two-tier approach to encourage adoption: <ol style="list-style-type: none"> <li>Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as: 5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</li> </ol>
<b>G5.4—Unknown or Novel CTA/CTT Environment</b> (An unknown or novel environment in which the algorithmic system has not been previously tested. This must be held to very stringent standards of testing. This requires warning end users up-front that unstable environment has occurred and is being rectified.)	The duty holder shall fulfill the following CTA/CTT requirement(s): <ol style="list-style-type: none"> <li>A strategy to test stability should the CTA environment change in any way to that which it was when deployed; this includes protocols for system shutdown.</li> <li>Users to be notified when there is a change to the ecosystem environment that has material impact to the transparency of the CTA or to the user’s privacy.</li> </ol>	N	HI	Developer, Integrator, Operator, Maintainer	The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context: <ol style="list-style-type: none"> <li>Documentation of the stability test strategy</li> <li>Records of surveillance of system to ensure stability.</li> <li>Example of the communication that will be sent to users when the environment becomes unstable.</li> <li>Communication protocol for user notification when a system changes with material effect.</li> </ol>	Two-tier approach to encourage adoption: <ol style="list-style-type: none"> <li>Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as: 5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</li> </ol>

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<p><b>G5.5—Lack of CTA/CTT Critical Mass/Uptake</b>  (A slow or insufficient adoption of CTA/CTT might frustrate its usefulness and thereby lead to a chicken and egg problem. This only works as an effective mitigation against the pandemic where it's not mandatory.)</p> <p>NOTE—Recent research shows a critical mass is not necessary for the benefits of CTA to be reaped.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <p>a. Provide to the public complete and concise information of the privacy protection of the entire end-to-end ecosystem. This includes what are all the elements of the ecosystem; who is accountable for what aspect of the CTT, protocols for all data handling including the keys for tracking; what data is stored where; licensing agreement of the data that is stored in the cloud.</p>	N	LI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Marketing, advertising, promotion, and public relations strategy plan and budget.</li> <li>b. Media plan and budget—all forms including social media.</li> <li>c. Examples of all media to the public.</li> </ul>	<p><b>Measurement:</b>  Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p>5—Excellent  4—Good  3—Average  2—Poor  1—Unacceptable</p>

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<p><b>G6—Accessible and Fair Control and Feedback</b>            (This is comprised of stakeholders understanding how to take back meaningful control from or a CT system, or influencing factors upon it, enabling end users to reliably and meaningfully opt in or out. This should include the right to be forgotten when the user opts out.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization shall respect end users' rights and interests and provide information and guidance to end users in plain language appropriate to the context on how the end user may share in the exercise of fair and meaningful control over data (being not necessarily personal data) they contribute and/or is contributed for and on their behalf whether by automation or by a third-party or by public authority or other private entity responsible for the management of data into the CTA/CTT system.</li> <li>b. The organization shall respect end users' rights and interests and provide information and guidance to end users in plain language appropriate to the context on how the end user may share in the exercise of fair and meaningful control over the outcomes the CTA/CTT system produces.</li> <li>c. The organization shall ensure that there is an appropriate mechanism within the CTA/CTT system to allow the end user to raise concerns, provide feedback, complain and/or seek modification, rectification, and/or erasure of data and/or meta data concerning the end user and their interaction with the CTA/CTT system, empowering the end user to contribute data and/or demand privacy and empowering the end user to have the right of data portability/mobility.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Copy of information and guidance provided to end users to help end users share in the exercise of meaningful control over the CTA/CTT system. This may include, without limitation, infographics, cartoons, privacy policies, opt-in and opt-out mechanisms, details on how to "pause" the CTA/CTT system or to switch off Bluetooth®; and shall include how it impacts on the end user's benefit/outcomes from the CTA/CTT system and/or the effectiveness of the CTA/CTT system to other end users and the mission of relevant public health organizations.</li> <li>b. Logs of help desk and other customer service access points demonstrating acknowledgement and resolution of end user, and stakeholder disputes and issues.</li> <li>c. Detailed description of the "end user journey" when interacting with the CTA/CTT system to provide feedback and/or raise concerns through the User Interface.</li> <li>d. Logs from User Interface interaction for feedback, issue, and/or dispute resolution.</li> <li>e. Data flow charts showing how and in what timeframes issues of modification, rectification, and/or erasure of data and/or meta data concerning the end user and their interaction with the CTA/CTT system are resolved.</li> <li>f. A copy of the organization's data deletion policy.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: "no critical findings in the detailed requirements"/"areas requiring attention for improvement."</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:               <ul style="list-style-type: none"> <li>5—Excellent</li> <li>4—Good</li> <li>3—Average</li> <li>2—Poor</li> <li>1—Unacceptable</li> </ul> </li> </ol>

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<p><b>G6.1—Appropriate Mechanism for Taking Control in CTA/CTT</b>            (It should appropriately match the mechanism of taking control in CTA/CTT to the specific situations, e.g., transmission of IDs. Interactive processes should make note of potential constraints, duress, or human factors issues with regard to interaction.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization shall have appropriate technical and organizational measures and mechanisms in place to address and resolve control issues as they arise in the CTA/CTT ecosystem in [anomalous?] situations. For example, the organization should have appropriate mechanisms in place to ensure the transmission of encrypted IDs (whether concerning a proximity event or to log end user information) are being provided within correct parameters.</li> <li>b. The organization shall take steps at the inception of the relationship to assure a common understanding of CTA/CTT ecosystem organization and operation and to continue to take additional steps during the CTA/CTT ecosystem relationship and thereafter to provide other stakeholders with the rights and abilities regarding the CTA system consistent with the parties mutual understanding, and consistent with overall good working system operations.</li> <li>c. The organization shall use best endeavors to put in place measures and mechanisms to identify potential constraints, duress, or human factor issues with regard to interaction of end users with the CTA/CTT ecosystem, and devise a plan for mitigation of their occurrence and/or effects.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Document detailing the control measures and mechanisms in place across the CTA/CTT ecosystem.</li> <li>b. A list of the specific situations sought to be addressed and resolved.</li> <li>c. Document detailing how the organization understands that each stakeholder across the CTA/CTT ecosystem understand the shared control issues, communicate them, and address and resolve them. Where possible provide a code of conduct or other collaborative agreed document to demonstrate a common understanding of control issues and how these need to be addressed and resolved. This could include a RACI chart</li> <li>d. Details of how the organization identifies potential constraints, duress, or human factor issues concerning the interaction of end users with the CTA/CTT ecosystem.</li> <li>e. The mitigation plan to address the occurrence and/or effects of the constraints, duress, or human factor issues concerning the interaction of end users with the CTA/CTT ecosystem.</li> <li>f. Clear statement of stakeholder rights and responsibilities as part of initial training and UI.</li> <li>g. Evidence of additional guidance provided to assist decision making of stakeholders that might otherwise be unaware of harmful system variables and implications of decisions (such as regarding availability of the service, potential alternative available services, etc.).</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p style="text-align: center;">5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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<p><b>G6.2—Exercising a Veto in CTA/CTT</b>  (End users should be able to set boundaries of a CTA/CTT and to refuse or deny continued or further access to, or training upon, their data without discrimination and stigmatization. The veto could be a regulatory instrument.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization shall ensure that technical mechanisms are in place such that all end users are able to refuse, deny access, refuse continued access to: <ul style="list-style-type: none"> <li>1. Data about the end user (being not just personal data, and irrespective of whether transmitted from the end user's device, third-party devices, or from other third parties) and/or</li> <li>2. The end user's device(s).</li> </ul> </li> <li>b. Where the organization is collecting data from or about an individual human, or any data that is defined as personal information, personal data or personal identifying information (or other terms of similar effect under applicable law), to the organization shall: <ul style="list-style-type: none"> <li>1. Maintain data intake log</li> <li>2. Maintain data transmission log</li> <li>3. Enable end users to set preferences regarding data intake, transmission and use at time of data collection</li> <li>4. Not make changes to the original purpose of the data collection and use without the explicit consent of the end user individual human (such consent being revocable at any time).</li> </ul> </li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Evidence of notification provided to all end users (and other third parties providing data) PRIOR to collection of data and its use.</li> <li>b. Details of the technical mechanisms that are in place to enable end users to refuse, deny access, refuse continued access to: <ul style="list-style-type: none"> <li>1. Data about the end user (being not just personal data, and irrespective of whether transmitted from the end user's device, third-party devices, or from other third parties) and/or</li> <li>2. The end user's device(s).</li> </ul> </li> <li>c. Data intake log.</li> <li>d. Data transmission log.</li> <li>e. Details of preference setting functionality regarding control of data intake, transmission, and use.</li> <li>f. Document with version control(s) detailing purpose limitation at point of data collection and use.</li> <li>g. Pictures and infographics demonstrating end user journey and User Interface where and when explicit consent is obtained and how it might be revoked at any time.</li> </ul>	<p><b>Measurement:</b>  Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: "no critical findings in the detailed requirements"/"areas requiring attention for improvement."</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p>5—Excellent  4—Good  3—Average  2—Poor  1—Unacceptable</p>

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
	<p>c. Demonstrate that interactions with the end user and/or others in the CTA/CTT ecosystem do not invoke stigmatization or discrimination (or coercion not to) exercise rights with respect to an end user through the end user exercising their data and CTA/CTT system controls and/or through feedback.</p>				<p>h. Screen shot of information and/or copies of correspondence conveyed to the end user on exercising their data and/or CTA/CTT system controls, and/or providing feedback.</p> <p>i. Evidence of internal policies and manuals that establish and assign each of the requirements listed within this section to specific personnel at the organization.</p> <p>j. Copies of processes and protocols employed when an end user exercises their data/ CTA/CTT system controls and/or through feedback, with clear delineation of how the end user journey ensures that end users are not discriminated, stigmatized, or otherwise coerced with respect to end user data and CTA/CTT system controls and/or through feedback.</p>	

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<p><b>G6.3—Being Aware of Rights</b>            (The end user's awareness of the legal rights (statutory, regulatory, customary, etc.) available to them in a particular jurisdiction, as well as any extra further privileges or guarantees which may be granted to them through the contract of CTA/CTT service. The duty holders also need to be aware of the end user rights.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization shall inquire and inform itself and its personnel to the legal rights (statutory, regulatory, customary, etc.) of the end users in the jurisdiction or (in the case where the CTA/CTT system is interoperable and can cross legal borders) jurisdictions of the CTA/CTT system's operation.</li> <li>b. The organization shall inform the end user of their legal rights (statutory, regulatory, customary, etc.) of the end users in the jurisdiction or (in the case where the CTA/CTT system is interoperable and can cross legal borders) jurisdictions of the CTA/CTT system's operation. Information shall be provided in plain language and appropriate to the context, nature of the transmission, and the operation environment. For example, will take into account if there is a child end user who would need to engage an adult with loco parentis in the process. This may include sending a copy of the information to the adult with loco parentis for and on behalf of the child.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Details of reasonable efforts undertaken to understand the legal rights (statutory, regulatory, customary, etc.) of the end users in the jurisdiction or (in the case where the CTA/CTT system is interoperable and can cross legal borders) jurisdictions of the CTA/CTT system's operation, including where specialist advisers have been engaged and their advice given.</li> <li>b. Details of training provided to personnel to inform them of the legal rights (statutory, regulatory, customary, etc.) of the end users in the jurisdiction or (in the case where the CTA/CTT system is interoperable and can cross legal borders) jurisdictions of the CTA/CTT system's operation.</li> <li>c. Copies of information provided to end users to inform them of the legal rights (statutory, regulatory, customary, etc.) of the end users in the jurisdiction or (in the case where the CTA/CTT system is interoperable and can cross legal borders) jurisdictions of the CTA/CTT system's operation.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: "no critical findings in the detailed requirements"/"areas requiring attention for improvement."</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p style="margin-left: 40px;">5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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					<p>d. Infographics of the customer journey and user interface demonstrating how the end users have been informed</p> <p>e. Instructional and publicity materials relating to the CTA system that set forth legal rights (statutory, regulatory, customary, etc.) of the end users in the jurisdiction or (in the case where the CTA/CTT system is interoperable and can cross legal borders) jurisdictions of the CTA/CTT system's operation.</p> <p>f. Maintenance of public comments board and "FAQ" to help stakeholders get answers about the legal rights (statutory, regulatory, customary, etc.) of the end users in the jurisdiction or (in the case where the CTA/CTT system is interoperable and can cross legal borders) jurisdictions of the CTA/CTT system's operation.</p>	

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<p><b>G6.4—Awareness of Repercussions</b>            (An end user's understanding of the consequences of setting a boundary or taking control over something, and what limitations that may set on an interaction. This relates to the concept of counterfactual analysis and awareness of consequences. The duty holders shall not use manipulative and emotional language in presenting the constraints arising from taking control.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization shall provide educational materials to end users to help aid understanding of the benefits and consequences of setting preferences, setting limitations, and/or exercising control measures and/or contributing or not contributing data, etc. within the CTA/CTT system, describing the implications of each.</li> <li>b. The organization shall provide statements, examples, use cases which provide counterfactual analysis of reasonably possible scenarios that an end user may face as a consequence of their actions.</li> <li>c. The organization shall also present possible viable alternatives available to the end user should they take a given decision.</li> <li>d. Counterfactual analysis and presentation of viable alternatives should allow the end user to gain a better understanding of potential consequences without having to fully experience its effect.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Copies of all <b>information</b> provided to end users, including educational materials, counterfactual analysis, and viable alternatives.</li> <li>b. Screenshots including all frames surrounding the access to the information provided to the end user.</li> <li>c. Infographic of the user journey providing details of where and when the information is made available (with minimal difficulty and not hidden) to the end users.</li> <li>d. Evidence that the organization operated a system of resolution pathways that helps to address end user concerns and gaps in information.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p>5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable</p>

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	<p>a. The organization shall present the educational material, counterfactual analysis, and viable alternatives (<b>information</b>) in plain language appropriate to the context. Under no circumstances shall the <b>information</b> be conveyed in a way that is manipulative, coercive, or emotive to bring about a given outcome that is contrary to the goals of the CTT/ CTA system. For clarification, an organization MAY use persuasive speech consistent with CTA/ CTT goals, for example, emotive language to engender feelings of social obligation on the end user should they put in place data and/or system restrictions on their device.</p> <p>b. The organization shall provide mechanisms through which end users can obtain fair resolution of their concerns.</p>					

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<p><b>G6.5—External Feedback from CTA/CTT Users and Appropriate Response/Action</b></p> <p>(This relates to independent testimony supplied by the user community regarding their personal interaction with the CTA/CTT system. The necessity for the duty holders to feed the information into the continuous improvement loop and identify potential trends and necessity for appropriate corrective/preventive actions. The feedback may be shared by other interoperable systems for the sake of optimization between CTA/CTTs. This aspect may need to be made transparent to the givers of feedback.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization shall have a mechanism in place (whether in the CTA/CTT system itself or external to it, (e.g., via a separate website and/or via social media) to allow end user's opportunity to provide feedback regarding their user experience of the CTA/CTT system. This mechanism shall be accompanied by a Feedback Policy which shall be made easily accessible and publicly available.</li> <li>b. The organization shall log all feedback (through whatever channel that feedback is received).</li> <li>c. The organization shall evaluate all feedback it receives.</li> <li>d. The organization shall act upon feedback received either to retrospectively or proactively resolve an issue raised via the feedback mechanism.</li> <li>e. The organization shall communicate the results of its evaluation and proposed recourse to resolve issue to the end user who raised the issue through the feedback mechanism, and where appropriate and proportionate to the resolution to other stakeholders within the CTA/CTT ecosystem.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Details of the feedback mechanism and channels through which end users can provide feedback.</li> <li>b. Processes and procedures followed internally by the organization to log, evaluate, resolve, and correspond with the end user who provided the feedback.</li> <li>c. A copy of the feedback log.</li> <li>d. Policies and procedures for publishing feedback outcomes, a list of the channels through which feedback outcomes are published, and provision of screenshots and other examples of feedback and feedback outcomes made available for end user and potential end user review.</li> <li>e. A copy of Feedback Policy made publicly available. Contract terms, logs, and copies of correspondence evidencing feedback shared with other stakeholders in the CTA/CTT ecosystem.</li> </ul>	<p><b>Measurement:</b></p> <p>Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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	<p>f. The organization shall publish on a publicly available website and/or on the channel through which the feedback was received the outcome of the feedback for end user and potential end user review. The outcome of the feedback shall not disclose information that would identify the end user, unless that end user consents to that information being disclosed. The outcome of the feedback shall not disclose other confidential information about the CTA/CTT system that could lead to it being gamed and/or compromised.</p>					

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<p><b>G6.6—CTA/CTT Transparency of Resource Usage</b>            (Resource usage of CTA/CTT should be transparent, whether that is usage of thermal scanner, GPS, cameras, network, energy usage, etc.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization shall inform the end user CTA/CTT sensor and operating parameters with full disclosure of resource usage associated with CTA/CTT system operation, including, but not limited to, thermal scanners, GPS, biometrics, cameras, network, energy usage, data from other operating system apps and/or tools.</li> <li>b. The organization shall inform the end user of the minimum system operating requirements for CTA/CTT system.</li> <li>c. The organization shall inform the end user whether the resource usage accessed with respect to CTA/CTT system usage is mandatory or optional for the proper functioning of the CTA/CTT system.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Specifications of CTA/CTT system detailing access to resource usage and operating requirements (whether mandatory or optional).</li> <li>b. Copies of information provided to end users about resource usage, including details of whether or not access to such resources is mandatory or optional to the proper function of the CTA/CTT system, with guidance (where possible) for the end user to opt in or opt out.</li> </ul> <p><b>Copies of information provided to end users regarding minimum system operating requirements.</b></p>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p>5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable</p>

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<p><b>G6.1—CTA/CTT Algorithmic Obfuscation</b>            (A situation where a CTA/CTT may have been designed with a hidden agenda, secret process, or ulterior motive in mind, unknown/unknowable to the average end user or other stakeholders, or possibly even the developing organization itself.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization shall keep a register of all interests (whether legal, beneficial, or contractual), that could be viewed as involving the potential for impropriety, conflicts of interest, and receipt of benefits (whether financial or in kind or otherwise) that are not otherwise made public (e.g., through government filings, etc.) and are inconsistent with the organization and operation of the CTA/CTT system.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. A copy of the register of interests, potential conflicts of interest, and receipt of benefits.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:            5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable</li> </ol>

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<p><b>G6.2—Malicious Attempt to Disrupt CTA/CTT Behavior</b>  (Contingency should be made for end users or third parties disrupting algorithmic systems or employing denial of service attacks, jamming GPS or Bluetooth® signals, e.g., by falsely declaring an emergency, or deliberately tripping safety interlocks. Such a situation may in itself create a genuine emergency if not managed effectively, or if such adversarial behavioral input from human beings cannot be overridden by a high-level human operator (or panel, or swarm quorum of such decision makers).</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization shall put in place contingency plans which include (among other things) business continuity, disaster recovery and back-up servers, and technical organization measures to ensure the continued and proper working of the CTA/CTT system and/or CTA/CTT ecosystem in the event of an intentional attempt to disrupt the CTA/CTT system and/or ecosystem.</li> <li>b. The contingency plan shall take account of all potential misuse/adversarial use case scenarios.</li> <li>c. The contingency plan and commensurate technical and organizational measures put in place shall include a mechanism for a high-level human operator (or panel, or swarm quorum of such decision makers) to override the CTA/CTT system/ecosystem in the event of a trigger event. The plan would detail the name, role, and organization of the high-level human operators within the CTA/CTT ecosystem, and shall be regularly updated.</li> <li>d. The organization shall continuously monitor the CTA/CTT ecosystem for potential and actual trigger events signaling intentional misuse, and where possible take actions in an effort to prevent and mitigate against the contingency plan having to be invoked. Accordingly, all stakeholders involved in CTA/CTT ecosystem shall operate a “neighborhood watch” approach across the whole CTA/CTT lifecycle (including design, development, intermediary, operation, maintenance of such systems) to raise awareness of and to monitor for potential and actual contingency event triggers.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Copy of the full contingency plan to ensure the continued and proper working of the CTA/CTT system and/or CTA/CTT ecosystem in the event of a malicious attempt to disrupt the CTA/CTT system and/or ecosystem.</li> <li>b. Copy of risk analysis undertaken and maintained to guard against risks resulting from malicious attempts and disruptions.</li> <li>c. List of all potential misuse/adversarial use case scenarios.</li> <li>d. Details of the mechanism for a high-level human operator (or panel, or swarm quorum of such decision makers) to override the CTA/CTT system/ecosystem in the event of a trigger event.</li> <li>e. List of up-to-date names, roles, and organizations (where available) that are designated a high-level human operator (or panel, or swarm quorum of such decision makers) to override the CTA/CTT system/ecosystem in the event of a trigger event.</li> <li>f. Plan for monitoring across the CTA/CTT ecosystem for potential and actual trigger events.</li> </ul>	<p><b>Measurement:</b>  Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:  5—Excellent  4—Good  3—Average  2—Poor  1—Unacceptable</li> </ol>

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<b>G6.3—Lack of User Trust Due to Captcha Method</b> [The user not trusting global or alternative solutions due to not invented here bias (e.g., a common Captcha solution in France).]	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <p>a. The organization shall seek to assure all CTA/CTT system stakeholders with which they interact that they can have trust in them through a shared understanding of their respective rights and responsibilities regarding organization and operation of the CTA/CTT system. In order to localize a CTA/CTT system, it may be necessary for the organization to translate language, adapt interfaces, and otherwise localize relevant aspects of the CTA/CTT system UI and other elements consistent with anticipated stakeholder expectations and to make alterations to incorporate subsequent additional evidence of the same.</p>	I	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <p>a. Copies of localized materials and user interfaces, made relevant and accessible for local jurisdiction of the relevant stakeholder, whether end user or other CTA/CTT system stakeholder.</p>	<p><b>Measurement:</b>  Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p>5—Excellent  4—Good  3—Average  2—Poor  1—Unacceptable</p>

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<b>G6.4—Lack of suitable CTA/CTT Alternatives</b> (There may be a lack of meaningful alternatives for a product or service beyond the holder of its natural monopoly.)	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization shall use reasonable efforts to accommodate end users that might not be able to gain access to CTA/CTT systems due to operating system constraints and/or lack of trust in the CTA/CTT ecosystem.</li> <li>b. The organization shall, in conjunction with public health authorities (in the event that the organization itself is not a public health authority), provide access to an alternative to the CTA/CTT system through manual contact tracing.</li> </ul>	I	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Details of reasonable efforts undertaken to accommodate end users that might not be able to gain access to the CTA/CTT system.</li> <li>b. Details (whether contractually or statutorily) of how the organization provides access to a public health authority (or equivalent body) manual contact tracing alternative service for end users that cannot for whatever reason engage in the CTA/CTT ecosystem.</li> <li>c. Details of how the CTA/CTT system operating requirements align with end user demographic operating accessibility.</li> <li>d. Copy of any accessibility, discrimination, disability, or equality risk impact assessment undertaken of the CTA/CTT system.</li> </ul>	<p><b>Measurement:</b></p> <p>Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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<p><b>G7—Upholding Ethical Integrity of CTA/CTT</b>            (This goal is concerned with upholding the intended purpose and scope of the CT outcomes as a concern throughout the life of the system. This also caters for changes in ethical norms or technology that may invalidate prior assumptions.) There are affirm to governance and health outcomes of concern.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Demonstrate that efforts are put in place to include TAP criteria/behavior as part of the CTA/CTT's ethical profile during design, development, implementation, maintenance, and retirement.</li> <li>b. Mapping algorithmic CTA/CTT's ethical profile to the organizational ethical policies and values.</li> </ul>	N	LI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Ethical Issues Register</li> <li>b. Tailored Organizational Ethical Policy Statement</li> <li>c. Documents explaining the risk management and strategic response actions in case of malfunctions or deviations from the intended/desired ethical behavior.</li> <li>d. Section on website explaining A/IS ethical profile that demonstrates the human operator's capability to challenge algorithmic decision making.</li> <li>e. Audit reports.</li> <li>f. External studies/reports (if any).</li> <li>g. Interviews with employees/agents/business partners/supply chain operators, and (where relevant) clients.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: "no critical findings in the detailed requirements"/"areas requiring attention for improvement."</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p>5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable</p>

## ANNEX A—ETHICAL FOUNDATIONAL REQUIREMENTS FOR CTA/CTT

Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G7.1—CTA/CTT Efficacy and Compliance with Regulations</b>  (Awareness and adherence must be maintained of laws and regulations that may emerge or alter post-development of the A/IS. The second dimension here is the efficacy of relevant body of regulations pertinent to CTA/CTT TAP.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Create/maintain an up-to-date register containing the record of all pertinent CTA/CTT regulations, including those relating to transparency, accountability, and privacy.</li> <li>b. Put policies and roles in place to implement CTA/CTT in alignment with the applicable regulations in the relevant jurisdictions of deployment and use.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Ethical Regulations List or Register.</li> <li>b. Organigram showing existence of employees in charge (either as part of other functions or dedicated exclusively to this function).</li> <li>c. Documents explaining procedures to maintain compliance up to date, with particular attention to the validation chain (i.e., independence of employee responsible for the register and preferably favoring wide application of TAP)</li> <li>d. Documents explaining the risk management and strategic response actions in case of malfunctions or deviations from the expected/intended ethical performance.</li> <li>e. Audit reports.</li> <li>f. External consultant studies/reports (if any).</li> <li>g. Interviews with employees/agents/business partners/supply chain operators, and (where relevant) clients.</li> </ul>	<p><b>Measurement:</b>  Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p>5—Excellent  4—Good  3—Average  2—Poor  1—Unacceptable</p>

## ANNEX A—ETHICAL FOUNDATIONAL REQUIREMENTS FOR CTA/CTT

Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G7.2—Demonstrated CTA/CTT Capability to Maintain Integrity of TAP</b>            (This refers to the organizational capabilities to design, develop, deploy, and enforce changes required to comply with changes in the legal environment or societal norms and expectations for CTA/CTT. The demonstration could be fulfilled by test and verification capabilities in similar technologies within the context of TAP.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Demonstrate efforts toward promotion and maintenance of organizational ethics and CTA/CTT TAP capability and culture.</li> <li>b. Ensure that changes in the legal environment and societal norms/expectations are detected and appropriate modifications to the CTA/CTT or the operational procedures are made in response to these changes to maintain the integrity of the CTA/CTT TAP.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Documents setting out the organization's approach to CTA/CTT TAP, its capabilities and mechanisms for detecting changes in law or societal norms for CTA/CTT.</li> <li>b. Section on website regarding capabilities for maintenance of CTA/CTT TAP.</li> <li>c. Internal campaigns (e.g., posters in the organization's premises, intranet posts, articles, videos).</li> <li>d. Internal documents showing who is responsible for CTA/CTT TAP and how the work should be carried out.</li> <li>e. Organizational ethical TAP audits to establish the degree of capability and maturity as applicable to the CTA/CTT and prevailing ethical culture.</li> <li>f. External consultant studies/ reports (if any requested by the organization).</li> <li>g. Wide ranging employee interviews at all hierarchical levels; the wider the range and number of interviewees, the better.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p>5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable</p>

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G7.3—CTA/CTT Continuous TAP Compliance Framework and Monitoring</b>            (Real-time system oversight mechanism is important to maintain operational readiness and fitness for CTT and to assure TAP operational integrity during launch, deployment, operation, maintenance/upgrade, and decommissioning. Also, the security considerations of the CTT in terms of proactive measures to maintain the security of the total operation. Monitoring the users at device level may prove a challenge including visibility of the geolocation data. Considerations of privacy during monitoring and handover operations is also a major facet of the framework. The explicability of the interactions internally and between the ecosystem players will be essential for transparency for the operations. The monitoring framework needs to have a process for identification and timely remedial action.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Arrangements are made for a continuous TAP compliance for the CTA/CTT throughout the life cycle of the product/system.</li> <li>b. The security of the CTA/CTT is assured throughout the operational life.</li> <li>c. TAP considerations and monitoring during handover including explicability of the interactions between the ecosystem players.</li> <li>d. Arrangements for a timely detection and response to deviations from the TAP of the CTA/CTT are in place.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. The process and appropriate procedures for a continuous TAP monitoring of CTA/CTT.</li> <li>b. PEN testing and implementation of a security assurance process.</li> <li>c. Monitoring architecture and records for handover stages in CTA/CTT operation.</li> <li>d. Monitoring and responsive detection system architecture and operational records for deviation from TAP and timely actions.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p>5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable</p>

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<b>G7.4—CTA/CTT Awareness of and Responsiveness to TAP Risks</b>  (The capability and awareness required for timely detection, evaluation, assessment, and management of TAP risks that may arise from operational, degraded, and failure modes of the CTA/CTT system. The risk assessment and management need to be transparent and subject to a representative oversight including tolerability benchmarks. This could be based on automated threat detection and peer review and taking a proactive approach to determination of new attack vectors and enforce preventive measures.)	The duty holder shall fulfill the following CTA/CTT requirement(s):  a. Demonstrate the existence of processes and procedures to identify, evaluate, and address existing and emerging risks, including realistic mitigating measures.  b. Demonstrate the capability to run a responsive and effective operational risk management for CTA/CTT.  c. Demonstrate that there is an oversight arrangement for the transparent and successful identification, evaluation, and management of operational risks.	N	MI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Impact studies for new product/service/system to identify emerging risks and implementation of corrective measures (or section within feasibility studies).</li> <li>b. Ethics Risk Register and remedial actions</li> <li>c. Internal documents showing the organization's approach to and capabilities for risk management.</li> <li>d. Audit reports on risk management.</li> <li>e. External consultant studies/ reports (if any requested by the organization) which include capability and accountability aspects.</li> <li>f. Interviews with relevant employees/agents/business partners/supply chain operators.</li> </ul>	<b>Measurement:</b> Two-tier approach to encourage adoption: 1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”  2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:  5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G7.5—CTA/CTT Responsive and Transparent Ecosystem Communications</b>          (Informing the stakeholders in the ecosystem in the normal run of the CTA/CTT as well as fault and emergency states about the status and appropriate actions. This process needs to be transparent and subject to a representative oversight. Events and decisions within the global CTA/CTT ecosystem may influence the perception of organization's operations based on experience and events in other localities. This should include communication of healthy and assuring aspects of the operation as well as related to errors, faults, and failures as a service level agreement (SLA) type relationship with the ecosystem stakeholders.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Demonstrate communications processes to inform the stakeholders in the ecosystem in the normal run of the CTA/CTT, as well as fault and emergency states, about the status and appropriate actions.</li> <li>b. Demonstrate that the communications process is subject to an oversight arrangement for the transparent and successful implementation.</li> </ul>	N	LI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. A representation of communication processes that covers information exchange with the stakeholders.</li> <li>b. Examples of communications for normal, fault, and emergency states of the CTA/CTT.</li> <li>c. Description and examples of the workings of an oversight mechanism for the stakeholder communications.</li> <li>d. Examples of communication of healthy and assuring aspects of the operation as well as information related to errors, faults, and failures as a service level agreement (SLA) type relationship with the ecosystem stakeholders.</li> </ul>	<p><b>Measurement:</b>          Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: "no critical findings in the detailed requirements"/"areas requiring attention for improvement."</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:            5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable         </li> </ol>

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<p><b>G7.1—OPs Constraints re Deprecated CTA/CTT State</b>            (It may not be practicable to suspend a CTA/CTT in every specific instance where it is found to be compromised or non-compliant. Such non-compliant, deprecated, degraded, exploitable, or failure cases must be managed until a final solution is found. A unilateral decision made to ignore TAP in favor of the benefits such as public safety.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Demonstrate a robust structure and process in place for managing deprecated or degraded states of CTA/CTT, including dependencies and libraries from third parties, and mitigating first and second order impacts on stakeholders and users. In particular:</li> <li>b. Measure efficiency and relevance of tests in place throughout the CTA/CTT life cycle to ensure robustness of systems to continue to function in a deprecated or degraded state.</li> <li>c. Measure the number and level of deprecations that have occurred or may occur in the future and how well they have been addressed in CTA/CTT.</li> <li>d. Measure the efficiency and speed at which the organization can implement its CTA/CTT emergency response (e.g., red button procedure).</li> <li>e. Measure the efficiency and speed of mitigation procedures.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Tests and test records for normal, deprecated, and emergency states of CTA/CTT.</li> <li>b. Representation of management processes for deprecated and emergency states of CTA/CTT.</li> <li>c. Records of incidents and response logs.</li> <li>d. Red button procedure or some other emergency response mechanism in CTA/CTT.</li> <li>e. Risk matrix and emergency procedures that are updated on a regular basis.</li> <li>f. Risk mitigation procedures and strategy.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p style="text-align: center;">5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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<b>G7.2—CTA/CTT Liability and PR Fallout</b> (The threat of being held accountable for good as well as adverse circumstances that will promote closed shop mentality and inhibit transparency and undermine the whole ecosystem.)	The duty holder shall fulfill the following CTA/CTT requirement(s): <ol style="list-style-type: none"> <li>Demonstration that the threat of being held accountable for adverse circumstances will not result in a closed shop mentality and inhibit transparency and undermine the whole ecosystem.</li> </ol>	N	MI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ol style="list-style-type: none"> <li>Records of response to adverse circumstances either as internal documentation or media reports.</li> <li>Claim or records that indicate organization/enterprise has been free from a closed shop mentality.</li> <li>Examples of behavior and public exchanges that illustrate transparency under cases of adversity.</li> </ol>	<b>Measurement:</b> Two-tier approach to encourage adoption: <ol style="list-style-type: none"> <li>Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement.”</li> <li>Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:               <ul style="list-style-type: none"> <li>5—Excellent</li> <li>4—Good</li> <li>3—Average</li> <li>2—Poor</li> <li>1—Unacceptable</li> </ul> </li> </ol>

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<p><b>G1—CTA/CTT Behavioral Obfuscation</b></p> <p>This relates to CTT systems behaving in a manner that is not fully recognizable or accurate in the given context. This could additionally cover aspects relating to undeclared uses and behaviors as well the social and political environments. This could be intentional or unintentional.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Have documents in place to provide clear and unequivocal explanations of the life cycle of the CTA/CTT (within the organization, between other organizations in the ecosystem, and with end users), including its intended goal and purpose, the manner in which the intended goal and purpose is achieved, the outcome and consequences (both intended and unintended) of the CTA/CTT.</li> <li>b. Have processes and procedures in place to screen for and identify any uses or behaviors in the CTA/CTT ecosystem which could undermine ethical transparency, accountability, and/or privacy.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Documents evidencing clear and unequivocal explanations of the life cycle of the CTA/CTT (within the organization, between other organizations in the ecosystem, and with end users), including its intended goal and purpose, the manner in which the intended goal and purpose is achieved, the outcome, and consequences (both intended and unintended) of the CTA/CTT.</li> <li>b. A copy of the flowchart illustrating the processes and procedures.</li> <li>c. Have processes and procedures in place to screen for and identify any uses or behaviors in the CTA/CTT ecosystem which could undermine ethical transparency, accountability, and/or privacy.</li> <li>d. An example of an unethical behavior or use that was identified by the organization and provide details of how that unethical behavior or use was mitigated.</li> <li>e. Show traceability from design to test to performance and vice versa demonstrating that there are no undeclared uses and behaviors.</li> </ul>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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<p><b>G1.1—Diverging Incentives in CTA/CTT</b>             Operators may derive a financial, tangible, or intangible benefit from obfuscating certain behaviors, or the full extent of their potential effects upon others.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Where an organization has a worker incentive scheme or reward system in place, such incentive scheme or reward system shall be documented.</li> <li>b. Any incentive scheme or reward system in place must ensure that it recognizes and rewards ethical TAP behaviors.</li> <li>c. Have processes and procedures in place to regularly review both individual worker and organizational incentive schemes and reward structures which apply to the whole ecosystem or any part thereof (including but not limited to bonuses, commissions, contractual enhanced payments or referral payments, benefits in kind, access rights, renewal payments, service level agreements, turnaround time commitments, etc.) which could have an adverse or disproportionate effect on the ecosystem resulting in unethical or negative TAP behaviors.</li> <li>d. Regularly review and evaluate the incentive scheme and reward structures and how these align with the organization's ethical principles and further the organizational ethical culture.</li> <li>e. Document any findings and corrective or preventative measures put in place following a review or evaluation of the incentive schemes and reward structures.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. A copy of any documents detailing incentive schemes and reward systems, which reward behaviors both at an individual level and/or an organizational level, providing details of the end goal ethical behaviors that are being incentivized.</li> <li>b. Records of the processes and procedures for review and evaluation of the incentive scheme and reward system, including frequency.</li> <li>c. Flowchart or equivalent showing how and who reviews and evaluates the processes and procedures. For example, this function could be fulfilled by internal audit, Human Resources, anti-bribery and anti-corruption teams, procurement and supply chain management, or any combination of these internal teams as appropriate to the organization.</li> <li>d. Records demonstrating the workers performing reviews and conducting evaluation of incentive schemes and reward structures are appropriately trained and competent to identify whether or not an incentive scheme is resulting in divergent behaviors.</li> <li>e. Records showing details of the last two reviews that were undertaken.</li> </ul>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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<p><b>G1.2—Covering Up in CTA/CTT</b></p> <p>Following awareness of specific information, covering up potential hotspots or making unjustified statistical inferences. There may be an incentive to hide such effects within algorithmic processes.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Have documented processes and procedures in place to provide quality assurance and rigor of CTA/CTT collected and processed data, the models applied to such data, the statistical inferences and/or assumptions made, and algorithmic behaviors, processes, and outcomes.</li> <li>b. Ensure that all quality assurance activity is documented and auditable.</li> <li>c. Have documented processes and procedures in place to regularly review quality assurance processes and procedures to ensure that they meet and are aligned with the organization's ethical principles and further the ethical, transparent, accountable, and privacy oriented culture of the organization.</li> <li>d. Have appropriate disciplinary procedures in place to disincentivize poor and/or unethical TAP behaviors, including but not limited to discouraging non-disclosure of covering up.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records of processes and procedures which provide quality assurance and rigor of CTA/CTT collected and processed data, the models applied to such data, the statistical inferences and/or assumptions made, and algorithmic behaviors, processes, and outcomes.</li> <li>b. Records of quality assurance review activity undertaking in the last six months.</li> <li>c. Records of processes and procedures that review quality assurance processes and procedures to ensure that they meet and are aligned with the organization's ethical principles and further the ethical transparent, accountable, and privacy oriented culture of the organization.</li> <li>d. Records of disciplinary procedures to disincentivize poor and/or unethical TAP behaviors, including but not limited to discouraging non-disclosure of covering up.</li> <li>e. Provide examples (where available) of where poor or unethical TAP behaviors were uncovered during the quality assurance processes and procedures and details of the corrective and/or preventative measures that ensued, including any disciplinary action taken.</li> </ul>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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<b>G1.3—Regulatory Avoidance</b> Any attempt to pretend to meet the regulatory requirements (or pay cursory lip service) without actually fulfilling them in a proper manner.	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Have appropriate regulatory compliance processes and procedures.</li> <li>b. Have a clear program of adherence to such regulatory compliance processes and procedures.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer		<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records of the regulatory compliance processes and procedures.</li> <li>b. Flowchart or equivalent showing how, by whom, and when the regulatory compliance processes and procedures are followed.</li> <li>c. Records of regulatory change management that resulted from regulatory horizon scanning.</li> </ul>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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<p><b>G1.4—Difficulty of Detection</b></p> <p>There may be tremendous technical challenges in measuring and detecting the obfuscated feature/behavior. Audits and incentives for decentralized detection mechanisms may play a role in detection.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Have appropriately trained and competent resource in place which understands the complexity and multi-dimensional nature of CTA/CTT ecosystem behaviors, processes, and outcomes.</li> <li>b. Have processes and procedures in place to regularly audit for decentralized detection mechanisms.</li> <li>c. Have regular meetings or collaborative workshops designed specifically to challenge and/or corroborate existing features and behaviors at a technical, managerial, and organizational level to ensure that they align with the ethical principles.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records demonstrating that appropriately trained and competent resource is in place.</li> <li>b. Copies of the processes and procedures used to audit for decentralized detection mechanisms, including their frequency.</li> <li>c. Flowchart or equivalent showing how, by whom, and when audit for decentralized detection mechanisms occurs.</li> <li>d. Records of meetings or group work undertaken to challenge and/or corroborate existing features and behaviors at a technical, managerial, and organizational level to ensure that they align with the ethical principles.</li> </ul>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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<p><b>G1.5—Propaganda</b></p> <p>CTA/CTT must not be used to gaslight people as to their perceptual impressions, or to intentionally use CTA to control people's perceptions and behaviors through using emotive language and misinformation.</p> <p><a href="https://medicalxpress.com/news/2019-09-distractions-distort-real.html">https://medicalxpress.com/news/2019-09-distractions-distort-real.html</a></p> <p><a href="https://warontherocks.com/2019/08/the-coming-automation-of-propaganda/">https://warontherocks.com/2019/08/the-coming-automation-of-propaganda/</a></p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Have appropriately trained and competent resource in place to identify where, when, and how language may be used to control people's perceptions and behaviors concerning CTA/CTT.</li> <li>b. Have awareness programs in place to ensure that the resource that produces content for dissemination to end users and/or to be shared within the ecosystem is sufficiently aware of the dangers of nudging, misinformation, and gaslighting, among other potential propaganda/information dissemination and marketing practices to a CTA/CTT audience, including but not limited to the ethical, legal, and human rights implications.</li> <li>c. Have documented marketing and PR screening processes and procedures to vet content to be disseminated to end users and/or shared with the CTA/CTT ecosystem to ensure that it adheres to the organization's ethical principles and high standards of ethical practice.</li> <li>d. Have documented audit processes and procedures in place to ensure that no unethical practices were employed in the dissemination and/or marketing of information either by the organization or others in the ecosystem to end users, which would have the effect of controlling people's perceptions and behaviors.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records demonstrating that appropriately trained and competent resource is in place to identify where, when, and how language may be used to control people's perceptions and behaviors concerning CTA/CTT. This may include details of internal/external training which has been conducted or CVs/resumes of those engaged to provide such resource.</li> <li>b. Records of awareness programs employed to increase understanding of the dangers of propaganda by the organization and/or within the ecosystem.</li> <li>c. Copies of the processes and procedures used to screen content for propaganda to be disseminated to end users and/or shared with the CTA/CTT ecosystem.</li> <li>d. Flowchart of screening processes and procedures to screen content for propaganda to be disseminated to end users and/or shared with the CTA/CTT ecosystem.</li> <li>e. Copy of documented audit processes and procedures in place to ensure that no unethical practices were employed in the dissemination and/or marketing of information either by the organization or others in the ecosystem to end users, which would have the effect of controlling people's perceptions and behavior.</li> <li>f. Flowchart of audit processes and procedures in place to ensure that no unethical practices were employed in the dissemination and/or marketing of information either by the organization or others in the ecosystem to end users, which would have the effect of controlling people's perceptions and behavior.</li> <li>g. Examples (where available) of marketing/information dissemination which failed to adhere to the organization's ethical principles and high standards of ethical practices and/or had the effect of controlling people's perceptions and behaviors.</li> </ul>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

## ANNEX A—ETHICAL FOUNDATIONAL REQUIREMENTS FOR CTA/CTT

Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder			Required Evidence		Evidence Measurement and Benchmark
<p><b>G1.6—Dark Patterns in CTA/CTT</b>          Dark patterns that manipulate people in a direction they would not willingly go by manipulation/misuse of the user interface.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Have in place documented processes and procedures that continually monitor for dark patterns, misuse, and/or dual use of the CTA/CTT.</li> <li>b. Have in place documented processes and procedures for handling dark patterns, misuse, and dual use of the CTA/CTT.</li> <li>c. Have a log/register of the dark patterns, misuse, and/or dual use identified and handled, along with details of any and all commensurate corrective and/or preventative measures that ensued.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer			<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records of the processes and procedures that continually monitor for dark patterns, misuse, and/or dual use of the CTA/CTT.</li> <li>b. Records of the processes and procedures for handling dark patterns, misuse, and dual use of the CTA/CTT.</li> <li>c. A copy of the log/register to provide examples of where potential dark patterns, misuse, and/or dual use of the CTA/CTT have been identified, and details of the ensuing corrective and/or preventative measures taken.</li> </ul>		<p><b>Measurement:</b>          Multi-level on 1–5 scale such as:</p> <p>5—Excellent          4—Good          3—Average          2—Poor          1—Unacceptable</p>

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G1.1—Appropriate Regulatory Oversight of CTA/CTT</b>  Formal regulation of the CTA/CTT ecosystem by appropriate regulatory bodies, and imposition of fines and sanctions for law breakers who intentionally obfuscate behavior.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Shall comply with CTA/CTT ecosystem regulation.</li> <li>b. Shall maintain a log/register of all formal interactions with and oversight by the CTA/CTT ecosystem regulator and include details of how the interaction was handled and resolved.</li> <li>c. Shall comply with any sanctions and/or follow any corrective and/or preventative guidance, advice or measures proposed by the CTA/CTT ecosystem regulator.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Details of the CTA/CTT ecosystem regulator(s).</li> <li>b. Records of how CTA/CTT regulation(s) has been complied with, including but not limited to the role of the regulatory compliance function, risk management function, and/or internal compliance authority in adhering to CTA/CTT ecosystem regulation.</li> <li>c. Records of any formal interactions (letters, warnings, advice, spot checks, audit, fines, and/or sanctions) from or by the CTA/CTT regulator.</li> <li>d. A copy of the log/register of formal iterations with the regulation including details and supporting documentary evidence of how the matter was handled and/or resolved.</li> <li>e. Other evidence of informal and proactive interaction with the CTA/CTT ecosystem regulator which could demonstrate that the organization has positive and productive relations with the regulator.</li> </ul>	<p><b>Measurement:</b>  Multi-level on 1–5 scale such as:</p> <p>5—Excellent  4—Good  3—Average  2—Poor  1—Unacceptable</p>

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder			Required Evidence		Evidence Measurement and Benchmark
<p><b>G1.2—Independent Monitoring of CTA/CTT</b>  Third party independent bodies and auditors that assist with the task of monitoring behavior and ensuring appropriate practices.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Have in place processes and procedures for the organization to be regularly monitored by third-party independent bodies. This may be in the form of an Ethical Advisory Board/ Panel/Committee or independent counsel.</li> <li>b. Have in place processes and procedures for regular audit by independent third-party auditors.</li> <li>c. Have in place processes and procedures for regular review of the appropriate competence and capability of both independent monitoring bodies and independent auditors regarding CTA/CTT ecosystem issues and concerns.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer			<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Copies of processes and procedures for regular independent monitoring, including frequency and outcomes and consequences of such independent monitoring.</li> <li>b. Copies of processes and procedures for regular independent auditing, including frequency and outcomes and consequences and such independent audit.</li> <li>c. Records, including meeting minutes and proposed actions, following last independent monitoring round.</li> <li>d. Where no audit or independent monitoring has yet taken place, a clear schedule of when such monitoring and/or audit is to take place.</li> </ul>		<p><b>Measurement:</b>  Multi-level on 1–5 scale such as:</p> <p>5—Excellent  4—Good  3—Average  2—Poor  1—Unacceptable</p>

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark					
<p><b>G1.3—Listening to the End User/Lobbying</b>            Taking the feedback from the end users or influencing bodies into account.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Have processes and procedures in place to listen to feedback from either end users or other influencing bodies.</li> <li>b. Have processes and procedures in place to handle feedback from either end users or other influencing bodies.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. A process map of the end-to-end process of receiving, handling, communicating with, and resolving end user and/or influencing body feedback in accordance with the organization's feedback processes, procedures, and logging requirements.</li> <li>b. A copy of the log(s)/register(s) of user feedback and/or other influencing body feedback.</li> <li>c. Examples of when end user feedback and/or other influencing body feedback has been received, handled, communicated, and resolved, providing all supporting documents to evidence the end user/influencing body feedback journey.</li> </ul>	<p><b>Measurement:</b>            Multi-level on 1–5 scale such as:</p> <table> <tr> <td>5—Excellent</td> </tr> <tr> <td>4—Good</td> </tr> <tr> <td>3—Average</td> </tr> <tr> <td>2—Poor</td> </tr> <tr> <td>1—Unacceptable</td> </tr> </table>	5—Excellent	4—Good	3—Average	2—Poor	1—Unacceptable
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<p><b>G2- Concern with Liability in CTA/CTT</b>            (The stakeholders' awareness of potential risk exposure and delivery of bare minimal (or inadequate) information to manage the risk. This could include legal, commercial, financial, human intervention dimensions. The scope of liability concerns all ecosystem players i.e., developers, service providers, integrators, data processors and authorities. This is a supra-legal aspect governed by international administrative law.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization shall inquire and inform itself and its personnel to the potential risks associated with proper and effective and improper and ineffective working of the CTA/CTT system within the duty holder's control, and any potential liability associated with such risks. These risks may include but are not limited to concerning accountability, bias, commercial, competition, cybersecurity, data protection, ethical, environmental, equality, fairness, financial, intellectual property, organizational, privacy, reliability, reputation, safety, security, societal, technical and/or other legal risks, with regard to their first order, second and third order effects "<b>the potential CTA/CTT risks</b>".</li> <li>b. The organization shall make inquiry and inform itself and its personnel aware of the potential CTA/CTT risks and potential harm/liability to other stakeholders within the CTA/CTT ecosystem (which could undermine trust in the outcomes of the CTA/CTT system and/or the effectiveness of the CTA/CTT system).</li> <li>c. Provide appropriate alternative human intervention to automated decision making.</li> <li>d. Designate a person(s) within the organization who will liaise with other stakeholders within the CTA/CTT ecosystem concerning matters of risk and harm/liability.</li> <li>e. Where it is lawful to do so (and with the ultimate impact on trust in and effectiveness of the CTA/CTT ecosystem on end users in mind), the organization shall warn (and keep a log of all engagement with) other stakeholders within the CTA/CTT ecosystem when the organization becomes aware of potential CTA/CTT risks and potential CTA/CTT harm/liabilities, whether direct or indirect, which (i) (a) impact the organization, AND (b) could have an impact on an stakeholder(s) within the CTA/CTT ecosystem, OR (ii) impacts or could have an impact on a stakeholder(s) within the CTA/CTT ecosystem.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Details of methods and associated working documents, including referral to and receiving advice from specialist advisors and trainers, used to inquire and to inform the organization and make personnel within the organization aware of <b>the potential CTA/CTT risks</b> associated with proper and effective and improper and ineffective working of the CTA/CTT system within the duty holder's control, and any associated harm/liability.</li> <li>b. Details of methods and associated working documents including referral to and receiving advice from specialist advisors and trainers, used to inquire of and inform its personnel within the organization of the potential CTA/CTT risks and associated harm/liability to other stakeholders within the CTA/CTT ecosystem.</li> <li>c. End user journey providing human intervention in the instance of automated decision making as a viable alternative practice.</li> <li>d. Copies of the information made available to end users including internal and external policies and procedures to be followed to facilitate an end user gaining access to human intervention as a viable alternative to automated decision making.</li> <li>e. RACI chart and organigram detailing designated person(s) within the organization who will liaise with other stakeholders within the CTA/CTT ecosystem concerning matters of risk and harm/liability.</li> <li>f. A log of all communication whether written or verbal engaging with other stakeholders within the CTA/CTT ecosystem warning of <b>the potential CTA/CTT risks</b> and potential CTA/CTT liabilities, whether direct or indirect, which (i) (a) impact the organization, AND (b) could have an impact on a stakeholder(s) within the CTA/CTT ecosystem, OR (ii) impacts or could have an impact on a stakeholder(s) within the CTA/CTT ecosystem.</li> </ul>	<p><b>Measurement:</b>            Multi-level on 1–5 scale such as:            5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable</p>

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<p><b>G2.1—Understanding of All CTA/CTT Op Environments</b>  (People are mobile, and environments change. The system needs to be aware of its environment of operation and to transparently outline for the end user how those factors may influence commercial, technical, and jurisdictional concerns including second order effects (what it has done to us), and how that may alter the function of the CTA and its ecosystem. This could include interoperability between different jurisdictions or places without a formal jurisdiction, or a disputed jurisdiction. The PR risk plays a role where liability does not strictly apply. It causes damage to reputation.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization shall make all reasonable efforts to understand the social, economic, commercial, technical, political, and jurisdictional environment in which the CTA/CTT system will be operational with end users.</li> <li>b. The organization shall keep (and keep regularly update) a list of factors affecting operations of the CTA/CTT system known to it which may be influenced by social, economic, commercial, technical, political, and jurisdictional environment changes in which the CTA/CTT system operates, in contrast to where it is intended to be operational.</li> <li>c. The organization shall inform the end user in plain language and in a manner which is context appropriate prior to their engagement with the CTA/CTT system of the factors that may influence their use of the CTA/CTT system, and how those factors may result in a difference in outcomes for the end user.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Evidence reasonable efforts made to understand the operational environment of the CTA/CTT ecosystem and factors that may cause its proper and effective working to change.</li> <li>b. A list of the factors known to influence the CTA/CTT system, with version control demonstrating regularity of update and review. This list of factors may be stored with a specified third-party association or a specified stakeholder within the CTA/CTT ecosystem.</li> <li>c. Clear and accessible description of CTA/CTT operational system anticipated and intended uses and limitations.</li> <li>d. Any and all contracts with the organization which could impact on the identified known factors e.g., end user license terms of use, development contract, operating agreement, services provider agreement, etc.</li> <li>e. Documents which demonstrate the organization making these factors and their effects on outcomes to end users known to end users, including (but not limited to) web pages with appropriate date stamp, service description documents, service level agreements, and end user terms of use agreements.</li> </ul>	<p><b>Measurement:</b>  Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement”.</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:  5—Excellent  4—Good  3—Average  2—Poor  1—Unacceptable</li> </ol>

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<p><b>G2.2—Jurisdiction Shopping</b>            (Use of a virtual jurisdiction or “flag of convenience” to insulate a corporation/private sector entity from liability or to avoid a clear record of provenance. This might be used for research and test purposes. Conversely, some organizations may gravitate to jurisdictions where there are more guidance and clarity to avoid upstream fines and challenges.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization shall demonstrate that its choice of jurisdiction of establishment and use of “choice of law,” venue for law suits, and other legal and operational decisions is consistent with and supports the operation of the CTA/CTT system and is not so organized primarily to avoid liability, enforcement, penalties or fines, or the ability of the end user to get redress.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Details of place of establishment, including certificate of incorporation (where appropriate).</li> <li>b. Operations geographical location diagram.</li> <li>c. Details of end user and CTA/CTT ecosystem stakeholder contract terms for “choice of law,” “venue for lawsuits” and other jurisdictional elements.</li> <li>d. Reports and/or studies published by the organization regarding any venue/jurisdiction-related challenges or complaints from other CTA/CTT system stakeholders.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement”.</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:               <ul style="list-style-type: none"> <li>5—Excellent</li> <li>4—Good</li> <li>3—Average</li> <li>2—Poor</li> <li>1—Unacceptable</li> </ul> </li> </ol>

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<p><b>G2.3—Competitive Risks within CTA/CTT Ecosystem</b>  (Liability suspicions between the ecosystem partners undermining the internal cohesiveness of the ecosystem.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <p>a. The organization shall use and adopt standard form contracts (so far as is reasonably practicable) to allay suspicions of liability not adequately addressed within the CTA/CTT ecosystem. Such standard form contract(s) shall also include a documented escalation process.</p>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Organigram.</li> <li>b. Evidence of standard terms applied in contracts between and among CTA/CTT ecosystem stakeholders which would allay suspicions of liability not being addressed within the CTA/CTT ecosystem.</li> <li>c. Evidence of the documented and implemented escalation process between CTA/CTT ecosystem stakeholders to enable them to resolve issues.</li> </ul>	<p><b>Measurement:</b>  Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement”.</li> <li>Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:  5—Excellent  4—Good  3—Average  2—Poor  1—Unacceptable</li> </ol>

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<p><b>G2.1 - CTA/CTT Risk Management &amp; Execution Capability</b>            (Having the experience, foresight, and capacity to understand and manage ethical risks and the execution of mitigating risks identified. With respect to TAP, ability to proactively assess risk to citizens' freedoms/ autonomy and install mitigation plans.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization shall have (and/or can procure) appropriate transparency, accountability, and ethical privacy capacity and capability within or to its organization to foresee, proactively engage with, manage, and mitigate the <b>potential CTA/CTT risks</b>, including without limitation, where these may impact on the rights and freedoms and autonomy of individuals and/or groups of individuals.</li> <li>b. The organization shall have policies and procedures with commensurate risk impact assessment in place to identify the <b>potential CTA/CTT risks</b>, including without limitation, where these may impact on the rights and freedoms and autonomy of individuals and/ or groups of individuals.</li> <li>c. The organization shall conduct regular risk impact assessment (and retain details in a log) of the <b>potential CTA/CTT risks</b> including without limitation, where these may impact on the rights and freedoms and autonomy of individuals and/or groups of individuals.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Details of each of the specific roles and responsibilities of those within the organization with appropriate transparency, accountability, and ethical privacy capacity and capability within its organization to foresee, proactively engage with, manage, and mitigate <b>the potential CTA/CTT risks</b>, particularly where these may impact on the rights and freedoms and autonomy of individuals and/or groups of individuals.</li> <li>b. Policies and procedures within the organization detailing method and frequency with which risk impact assessments are carried out with respect to <b>the potential CTA/CTT risks</b> particularly where these may impact on the rights and freedoms and autonomy of individuals and/or groups of individuals.</li> <li>c. A copy of the log of risk impact assessments undertaken with respect to <b>the potential CTA/CTT risks</b> particularly where these may impact on the rights and freedoms and autonomy of individuals and/or groups of individuals.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement”.</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:               <ul style="list-style-type: none"> <li>5—Excellent</li> <li>4—Good</li> <li>3—Average</li> <li>2—Poor</li> <li>1—Unacceptable</li> </ul> </li> </ol>

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<p><b>G2.2—Availability of Insurance</b></p> <p>(Insurance to limit CTA/CTT liability is an important aspect to minimizing risk for operators, and will contribute toward ensuring safety, TAP, and just recompense for adversely affected end users and/or operators within the ecosystem should an issue occur. Insurance may also have an effect on stakeholders having a more cavalier attitude toward risk that may not be the ideal situation for the society at large.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization shall formulate a risk and insurance policy to recompense the affected stakeholders in the event of undesirable circumstances.</li> <li>b. The availability of insurance shall not undermine the organization's responsible attitude toward its duties.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Policies and overall approach to owning or outsourcing risks that may require affected stakeholders to be recompensed.</li> <li>b. Records that indicate responsible stance toward responsibilities.</li> </ul>	<p><b>Measurement:</b></p> <p>Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement”.</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:           <ul style="list-style-type: none"> <li>5—Excellent</li> <li>4—Good</li> <li>3—Average</li> <li>2—Poor</li> <li>1—Unacceptable</li> </ul> </li> </ol>

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<p><b>G3—Protection of CTA/CTT Secrets and Practices/IP</b>            (Stakeholders' desire to protect their national or proprietary secrets and practices, including intellectual property. These actions could include the protection of third-party confidentiality or rights.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Organizations shall not use protection of trade secrets/IP as a blanket basis to minimize/avoid the fulfillment of TAP or other ethical practices.</li> <li>b. Demonstrate that due consideration has been given to balancing requirements for secrecy versus TAP.</li> <li>c. Demonstrate due consideration for the needs of other stakeholders in the ecosystem, negotiating disclosure with them if necessary.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Documented levels of acceptable disclosure to various stakeholders, with the application of specific safeguards.</li> <li>b. Explication of the necessity and rationale for choices and compromises made which should be in line with prioritizing TAP over IP protection.</li> <li>c. Risk assessments of potential liability for accidental exposure or unintended disclosure.</li> <li>d. Coordinate with other stakeholders as necessary to agree to acceptable terms of disclosure of which information, when, given what conditions, and to whom.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement”.</li> <li>Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:            5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable         </li> </ol>

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<p><b>G3.1—CTA/CTT Audit Accessibility</b>            (Technologies that facilitate testing of the CTT/App, stack, and ecosystem by independent/third-party auditors, consistent with the right of the duty holder to protect their rights, may take unreasonable steps to prevent the system potentially becoming more vulnerable to attacks and misuse, reverse engineering and data leaks.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Demonstrate the organization's internal facing and external facing (system) audit practices.</li> <li>b. Log the frequency at which (system) audit has occurred.</li> <li>c. Log the frequency at which (system) audit policies and procedures have been reviewed.</li> <li>d. Monitor the CTA/CTT system for actual and potential vulnerabilities and/or points of exposure where the CTA/CTT system could be open to attack, misuse, reverse engineering, and/or data leakage.</li> <li>e. Log all identified vulnerabilities and points of exposure, both actual and potential.</li> <li>f. Devise an action plan and/or mitigation strategy to address any vulnerabilities or points of exposure identified.</li> <li>g. Provide details of any actions and mitigations implemented to address vulnerabilities or points of exposure identified.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator  Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. A copy of the organization's internal facing and external facing (system) audit policies, procedures, and protocols.</li> <li>b. A copy of the (technical) log of when a (system) audit occurred in the preceding 12 months.</li> <li>c. A copy of the log detailing when and who reviewed and updated (system) audit policies and procedures.</li> <li>d. Details of who, how, and when monitoring was conducted in the preceding 12 months to identify actual and potential points of exposure.</li> <li>e. A copy of the log identifying all actual and potential vulnerabilities and points of exposure.</li> <li>f. A copy of the action plan and/or mitigation strategies required to address any vulnerabilities and points of exposure.</li> <li>g. Document(s) detailing the actions and mitigations implemented to address the vulnerabilities or points of exposure that had been identified during CTA/CTT system monitoring exercises.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:            1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement”.             2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:             5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable         </p>

## ANNEX A—ETHICAL FOUNDATIONAL REQUIREMENTS FOR CTA/CTT

Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G3.2—Awareness of CTA/CTT Licensing T&amp;Cs</b>            (All third-party licensing terms and conditions that may affect the end users in the ecosystem, e.g., the hosting terms and location of data, as well as routing mechanisms, should be communicated to them in a simple and clear language of relevance to the context of application. This may prevent sharing the agreements due to confidentiality concerns.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization shall undertake and document a comprehensive review of all agreements and arrangements that may affect end users of the CTA/CTT and their adoption and use of CTA/CTT.               <ul style="list-style-type: none"> <li>1. This shall include agreements and arrangements, whether directly or indirectly in the organization's supply chain, and (where practically possible and lawfully permissible) those agreements and arrangements which are not directly in its supply chain, but that will still have an impact on the end user.</li> </ul> </li> <li>b. The organization shall review the terms and conditions of use of CTA/CTT by the end user to assess whether they are in clear and plain language, relevant to the context of the CTA/CTT's application, and not misleading to the end user.</li> <li>c. The organization shall (so far as is within its power to influence and change) ensure that the terms and conditions of use of CTA/CTT by the end user are in clear and plain language, relevant to the context of the CTA/CTT's application, and not be misleading to the end user.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. A copy of the document detailing the comprehensive review of CTA/CTT ecosystem agreements and arrangements affecting end users, including the end user terms and conditions.</li> <li>b. Written documents, emails, and/or minutes of meetings attesting to attempts to negotiate terms and conditions for end users which are in clear and plain language, relevant to the context of the CTA/CTT's application, and are not misleading. This may include a copy of a contractually binding agreement with either end user license terms and conditions of CTA/CTT use or minimum standards to be included within such end user license terms and conditions of CTA/CTT use.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: "no critical findings in the detailed requirements"/"areas requiring attention for improvement".</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:            5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable         </li> </ol>

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G3.3—IP Protection Culture/Strong Secrecy</b>            (Many organizations and ecosystems are reluctant to allow users or outside developers to know the details of how various systems work to protect IP and ensure competitiveness. Additional domains including governmental agencies and their contractors may have a classification culture that is not open due to political concerns. The secrecy arising from classification can be both a desirable and undesirable feature that needs to be carefully evaluated and with appropriate justifications given for its necessity, e.g., official secrets and trade secrets under applicable law and other confidentiality agreements.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Maintain a detailed library log of all intellectual property owned by and/or licensed to the organization with respect to the CTA/CTT and assign to it a corresponding categorization or classification of treatment both with respect to internal personnel, independent contractors, and other third parties.</li> <li>b. Complete a risk impact assessment with respect to whether having appropriate non-disclosure agreements and/or IP escrow arrangements in place would facilitate sharing by the organization.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. A copy of the detailed library log of all intellectual property owned by and/or licensed to the organization with respect to the CTA/CTT along with assigned categorization or classification of treatment both with respect to internal personnel, independent contractors, and other third parties.</li> <li>b. A copy of the risk impact assessment assessing whether having appropriate non-disclosure agreements and/or IP escrow arrangements in place would facilitate sharing by the organization.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement”.</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:            5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable</li> </ol>

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G3.4—Reverse Engineering of CTA/CTT</b>            (Algorithms can be probed into giving out information they should not through reverse engineering or clever use of adversarial examples.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Regularly monitor and scan the horizon, logging findings for technologies and techniques that may be able to undermine, bypass, cheat, and/or reverse engineer the CTA/CTT ecosystem.</li> <li>b. Undertake regular testing of the CTA/CTT ecosystem, logging results of such testing, with the latest technologies and techniques to ensure that is not able to be undermined, by passed, cheated, and/or reverse engineered.</li> <li>c. Where testing discovers that the CTA/CTT ecosystem can be undermined, by passed, cheated, and/or reverse engineered, then organization shall put in place an action plan and mitigation strategies and (so far as is possible, implement the same) to prevent such technologies or techniques from undermining, by passing, cheating, or reverse engineering the CTA/CTT ecosystem.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. A copy of the horizon scanning and monitoring log identifying technologies and techniques that may be able to undermine, bypass, cheat, and/or reverse engineer the CTA/CTT.</li> <li>b. A copy of the log of testing of the CTA/CTT ecosystem with the latest technologies and techniques to ensure that it is not able to be undermined, by passed, cheated, and/or reverse engineered.</li> <li>c. A copy of any action plan or mitigation strategies identified to prevent technologies or techniques from undermining, by passing, cheating, or reverse engineering the CTA/CTT ecosystem.</li> <li>d. Written documentation detailing any implementation of an action plan or mitigation strategy, whether by the organization or another party within the CTA/CTT ecosystem, to prevent technologies or techniques from undermining, by passing, cheating, or reverse engineering the CTA/CTT ecosystem.</li> </ul>	<p><b>Measurement:</b>            Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement”.</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:            5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable         </li> </ol>

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G3.1—CTA/CTT Strong Open Source Culture</b>  (The culture and history of the code base and user community will have a strong influence on the level of familiarity and appreciation of the workings of previously developed code, models, and CTA/CTT systems. Open source is a community construct that is often free, permits scrutiny by others, and goes beyond copyright and patent issues.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization shall keep a record of all intellectual property where it has been developed either solely by, or in conjunction with, the open source community with respect to the CTA/CTT system.</li> <li>b. The organization shall keep a record of (i) all intellectual property that has been made available on an open source licensing basis, including details of the open source licensing terms and (ii) where the open source code has also been published in the public domain, details of where and when it was published.</li> <li>c. Provide details of any events run by the organization to engage the open source community, such as community collaborations and expressions of interest for hackathons.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. A copy of the record detailing the intellectual property of the organization which has developed either solely by, or in conjunction with, the open source community with respect to the CTA/CTT system.</li> <li>b. A copy of the records detailing: (i) all intellectual property that has been made available on an open source licensing basis, including details of the open source licensing terms and (ii) where the open source code has also been published in the public domain, details of where and when it was published.</li> <li>c. Copies of any communication with open source community to engage in collaborative projects and/or hackathons.</li> </ul>	<p><b>Measurement:</b>  Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement”.</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p>5—Excellent  4—Good  3—Average  2—Poor  1—Unacceptable</p>

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<b>G3.2—CTA/CTT PEN Testing</b>  (Mechanisms whereby organizations may invite penetration testers, red teams, or bounty hunters of exploits in order to pre-emptively locate any weaknesses in the CTA/CTT and protect them.)	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Keep a comprehensive record of all pre-emptive measures undertaken to ensure the ongoing security and integrity of the CTA/CTT system, including penetration testing, red teams, and/or bounty hunters either employed, engaged, or who otherwise volunteered their findings, which was conducted with respect to the CTA/CTT system.</li> <li>b. Maintain a log of all weaknesses located pursuant to penetration testers, red teams, and/or bounty hunters challenging the CTA/CTT system.</li> <li>c. Maintain a log of the actions and mitigations implemented with respect to weaknesses in the CTA/CTT system which came to light as a result of penetration testing, red teams, or bounty hunters.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. A copy of the record of all preemptive measures undertaken to ensure the continued security and integrity of the CTA/CTT system, including details of when, who, where, and why penetration testing, red teams, and/or bounty hunters were employed, engaged, or involved in such measures.</li> <li>b. A copy of the log identifying weaknesses located as a result of penetration testers, red teams, and bounty hunters challenging the CTA/CTT system.</li> <li>c. A copy of the log of all weaknesses located pursuant to penetration testers, red teams, and/or bounty hunters challenging the CTA/CTT system.</li> <li>d. A copy of the log of the actions and mitigations implemented with respect to weaknesses in the CTA/CTT system which came to light as a result of penetration testing, red teams, or bounty hunters.</li> </ul>	<p><b>Measurement:</b></p> <p>Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement”.</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G3.3—CTA/CTT Hardened Oversight System</b>  (Monitoring and oversight systems should have hardened security. This may include the security of the messaging and management systems of human operators, security of logging systems, etc. The hardening involves searching for vulnerabilities and exploits through periodic testing.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. The organization should have in place policies and procedures to ensure that monitoring and oversight systems are in place and are effective.</li> <li>b. The organization should periodically test the effectiveness of monitoring and oversight systems, and keep a log of such testing.</li> <li>c. The organization should ensure that all human operatives are fully trained and that any machines and/or devices involved in system monitoring and oversight are regularly maintained and kept up to date, and continue to refresh the technology log.</li> </ul>	N	HI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. A copy of the policies and procedures requiring the monitoring and oversight systems.</li> <li>b. A copy of the log of testing of the monitoring and oversight systems.</li> <li>c. Details of all training provided to human operatives with respect to monitoring and oversight systems.</li> <li>d. A copy of the log of machine and device maintenance and documentation of it being kept up to date.</li> </ul>	<p><b>Measurement:</b>  Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement”.</li> <li>2. Organizational readiness finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:  5—Excellent  4—Good  3—Average  2—Poor  1—Unacceptable</li> </ol>

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G4—Misuse of System</b>  (Misusing a CTA/CTT beyond its intended purpose, including dual use technologies, detection of criminality, and use of the data beyond the intended purpose (i.e., public safety and pandemic management). Also misuse of a CTT that may negatively impinge on freedoms or human rights.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. To prevent the potential misuse of a CTA/CTT beyond its intended purpose shall be identified and appropriate protective measures taken including CTT that may negatively impinge on freedoms or human rights, dual use technologies, detection of criminality, use of the data beyond the intended purpose (i.e., public safety and pandemic management).</li> </ul>	N	LI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records showing audit processes and procedures to ensure end-to-end verification of misuse</li> <li>b. Records indicating risk analysis and identification of vulnerabilities of the CTA/CTT and evaluation of risks and their relative short- and medium-term impacts.</li> <li>c. Records indicating the identification and verification of appropriate risk mitigation and control measures against all identified vulnerabilities in the CTA/CTT.</li> <li>d. Documented risk analysis process and the outcomes including a risk register for all vulnerabilities and areas of potential misuse/abuse.</li> <li>e. Proof that those conducting the analysis are competently trained and experienced.</li> </ul>	<p><b>Measurement:</b>  Two-tier approach to encourage adoption:</p> <ol style="list-style-type: none"> <li>1. Top-level finding: “no critical findings in the detailed requirements”/“areas requiring attention for improvement”.</li> <li>2. System misuse finding: On 1-5 scale (based on aggregate of satisfying sub-level goals) such as:</li> </ol> <p>5—Excellent  4—Good  3—Average  2—Poor  1—Unacceptable</p>

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder			Required Evidence		Evidence Measurement and Benchmark
<p><b>G4.1—Audit Accessibility of CTA/CTT</b>            (Technologies such as APIs that facilitate testing of the CTT app, stack, and ecosystem by independent/third-party auditors. This ability may ironically make the system potentially more vulnerable to attacks and misuse, reverse engineering, and data leaks.)</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Ensure that audit ability of CTA/CTT does not render these more vulnerable to attacks and misuse, reverse engineering, and data leaks.</li> </ul>	N	LI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records indicating all access mechanisms to CTA/CTT for the purposes of audit have been risk assessed for vulnerability and misuse.</li> <li>b. Records indicating that all potential vulnerabilities arising from audit process and access mechanisms have been adequately protected to avoid attacks, misuse, reverse engineering, or data leaks.</li> </ul>		<p><b>Measurement:</b>            Multi-level on 1–5 scale such as:</p> <p>5—Excellent            4—Good            3—Average            2—Poor            1—Unacceptable</p>		

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<p><b>G4.2—IP Protection Culture/Strong Secrecy</b></p> <p>Many organizations and ecosystems are reluctant to allow users or outside developers to know the details of how various systems work to protect IP and ensure competitiveness. Additional domains including governmental agencies and their contractors may have a classification culture that is not open due to political concerns. The secrecy arising from classification can be both a desirable and undesirable feature that needs to be carefully evaluated and with appropriate justifications given for its necessity.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Ensure that the culture of secrecy or IP protection practices and procedures does not result in the misuse of the CTA/CTT or of elements contained within the ecosystem that could compromise citizen TAP.</li> <li>b. Ensure that information classification processes and political considerations are carefully evaluated and justified when applied to matters of transparency in the context of CTA/CTT ecosystem.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer, Regulator			<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records indicating consideration of any IP concerns in the accessibility of information and transparency in the development, deployment, and use of CTA/CTT.</li> <li>b. Records indicating that the information classification and political considerations in the development, deployment, and use of CTA/CTT have been transparently noted and have not resulted in obfuscation or potential for misuse.</li> </ul>		<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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<p><b>G4.3—Anomaly Detection and Malicious Action</b></p> <p>Malicious actors in the ecosystem (including competitive nation states) could employ eavesdropping, war driving, Bluetooth® LE antenna extensions, or other such tactics. These could plausibly be used to transform ephemeral IDs into persistent IDs, enabling re-identification of persons, or an inference of hidden characteristics. Detection mechanisms should be employed defensively to search for statistical aberrations that may uncover such tactics or denote spoofing of identity (altered MAC addresses, etc.).</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <p>a. Take requisite measures to prevent malicious actors in the ecosystem (including competitive nation states and corporations) employing eavesdropping, war driving, Bluetooth® LE antenna extensions, or other such tactics. [These could plausibly be used to transform ephemeral IDs into persistent IDs, enabling re-identification of persons, or an inference of hidden characteristics. Detection mechanisms should be employed defensively to search for statistical aberrations that may uncover such tactics or denote spoofing of identity (altered MAC addresses, etc.)].</p>	N	LI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records indicating consideration of any risks arising from malicious actors in the CTA/CTT ecosystem.</li> <li>b. Records indicating that the risks arising from malicious actors' actions in the CTA/CTT ecosystem including eavesdropping, war driving, Bluetooth® antenna extensions, or similar tactics have been assessed and appropriately mitigated through technical and operational measures.</li> <li>c. Records indicating when malicious action occurred, and actions taken to stop and prevent it in the future.</li> </ul>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

<sup>1</sup>Bluetooth is a registered trademark owned by Bluetooth SIG.

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<p><b>G4.4—CTA/CTT Mission/Scope Creep</b>  Deploying and using the CTA/CTT beyond its originally intended purpose or necessity, and its use without a sunset clause, or beyond a sunset clause. This includes scope creep, such as including an immunity passport function within an app which was ostensibly aimed at only contact tracing or non-transparently sharing data with government/law enforcement agencies.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Ensure that transparent commitments are made regarding the deployment and use of the CTA/CTT within originally intended purpose and necessity.</li> <li>b. That the CTA/CTT condition of use includes a sunset clause.</li> <li>c. Ensure that scope creep, such as including an immunity passport function within an app which was ostensibly aimed at only contact tracing or non-transparently sharing data with government/law enforcement agencies, will not be permitted.</li> </ul>	N	LI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records indicating a transparent commitment regarding the deployment and use of the CTA/CTT within originally intended purpose and necessity.</li> <li>b. Existence of a sunset clause in the condition of deployment and use for the CTA/CTT.</li> <li>c. Open and public announcements and commitments to maintaining and upholding the original scope for deployment and use of CTA/CTT.</li> </ul>	<p><b>Measurement:</b>  Multi-level on 1–5 scale such as:</p> <p>5—Excellent  4—Good  3—Average  2—Poor  1—Unacceptable</p>

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<p><b>G4.1—CTA/CTT Strong Open Source Culture</b></p> <p>The culture and history of the code base and user community will have a strong influence on the level of familiarity and appreciation of the workings of previously developed code, models, and systems.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Recognize that the culture and history of the code base and user community will have a strong influence on the level of familiarity and appreciation of the workings of previously developed code, models, and systems.</li> <li>b. Develop, adopt, and foster a strong Open Source culture in the development, deployment, and use of CTA/CTT.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records that demonstrate recognition and history of the code base have been shared, reviewed, and available by the end user community.</li> <li>b. The architecture, design, and development processes that employ tested and trusted open source components in the CTA/CTT and associated documentation.</li> </ul>		<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>		

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G4.2—Reverse Engineering of CTA/CTT</b>  Algorithms can be “tortured” through reverse engineering or clever use of adversarial examples.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Take necessary precautionary and preventative measures to prevent algorithms from being “tortured” through reverse engineering or clever use of adversarial examples.</li> </ul>	N	MI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records demonstrating the identification of vulnerabilities and loopholes in reverse engineering of algorithms in CTA/CTT.</li> <li>b. Design decisions and mitigation solutions that will prevent the CTA/CTT algorithms being reverse engineered to undermine the integrity of the system operations, data, and advisory messages.</li> </ul>	<p><b>Measurement:</b>  Multi-level on 1–5 scale such as:</p> <p>5—Excellent  4—Good  3—Average  2—Poor  1—Unacceptable</p>

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<p><b>G4.3—CTA/CTT PEN Testing</b>  Mechanisms whereby organizations may invite penetration testers, red teams, or bounty hunters of exploits in order to pre-emptively locate any weaknesses in the CTA/CTT and protect them.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Devise processes and mechanisms to invite organizations and entities for penetration testing, form red teams, or bounty hunters of exploits in order to pre-emptively locate any weaknesses in the CTA/CTT.</li> <li>b. Ensure adequate control and mitigation measures are incorporated into the CTA/CTT to protect against the identified vulnerabilities and weaknesses.</li> </ul>	N	MI	Developer, Integrator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records of consultation with community of penetration testers, red teams, bounty hunters, etc. to pre-emptively locate any vulnerabilities in the CTA/CTT.</li> <li>b. Records and design and operational decisions that will mitigate the risks arising from the identified weaknesses/vulnerabilities.</li> <li>c. Records of testing results and traceability from design to test to outcome and vice versa.</li> </ul>		<p><b>Measurement:</b>  Multi-level on 1–5 scale such as:</p> <p>5—Excellent  4—Good  3—Average  2—Poor  1—Unacceptable</p>		

## ANNEX A—ETHICAL FOUNDATIONAL REQUIREMENTS FOR CTA/CTT

Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder			Required Evidence		Evidence Measurement and Benchmark
<p><b>G4.4—CTA/CTT Hardened Oversight System</b>  Monitoring and oversight systems should have hardened security. This may include the security of the messaging and management systems of human operators, security of logging systems, etc.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <p>a. Ensure the CTA/CTT ecosystem monitoring and oversight systems have hardened security. This may include the security of the messaging and management systems of human operators, security of logging systems, etc.</p>	N	LI	Developer, Integrator, Operator, Maintainer	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records to demonstrate that the CTA/CTT ecosystem monitoring and oversight systems have hardened security including the security of the messaging and human operator management systems, logging systems, etc.</li> <li>b. Any records of breaches of security and the analysis and subsequent mitigations.</li> </ul>		<p><b>Measurement:</b>  Multi-level on 1–5 scale such as:</p> <p>5—Excellent  4—Good  3—Average  2—Poor  1—Unacceptable</p>		

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G4.5—CTA/CTT Hardened Oversight System</b>  All third-party licensing info that may affect the end user in the ecosystem, e.g., the hosting terms and location of data, as well as routing mechanisms, should be communicated to them in a simple and clear language of relevance to the context of application.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <p>a. Ensure that all third-party licensing information that may affect the end user in the ecosystem, e.g., the hosting terms and location of data, as well as routing mechanisms, are communicated to them in a simple and clear language of relevance to the context of application.</p>	N	LI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Publicly available third-party licensing terms that may affect the end users.</li> <li>b. Licensing terms to explicitly indicate hosting terms, routing mechanisms, and that data will not be transferred out of jurisdiction.</li> <li>c. The language of the licensing terms shall be demonstrably simple and relevant to the context of applications.</li> </ul>	<p><b>Measurement:</b>  Multi-level on 1–5 scale such as:</p> <p>5—Excellent  4—Good  3—Average  2—Poor  1—Unacceptable</p>

## **ANNEX A—ETHICAL FOUNDATIONAL REQUIREMENTS FOR CTA/CTT**

Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<b>G5—CTA/CTT Interoperability Detractors</b>  Concerns over transparency and its effects on privacy and accountability in terms of processes which support interoperability between various CTA solutions.	The duty holder shall fulfill the following CTA/CTT requirement(s):  a. The interoperability between various CTA implementations shall be transparently taken into account to ensure privacy and accountability in these solutions.  b. CTAs should strive to offer interoperability with electronic health records systems from at least the top five vendors internationally.  c. Access to CTA data for the users shall not be fee-based.	N    I   N	LI    MI   LI	Developer, Integrator, Operator, Maintainer, Regulator    Developer, Integrator, Operator, Maintainer, Regulator   Developer, Integrator, Operator, Maintainer, Regulator	The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:  a. Records indicating architectural flexibility and APIs for interoperability.  b. Public documentation and accessible guidelines for data exchange and compatibility.  c. User guidelines and options for interoperability across jurisdictional, administrative, and national borders/operational boundaries.  d. Warnings to users when the cross-border switchover results in change of terms, privacy rights, and accountability.	<b>Measurement:</b> Multi-level on 1–5 scale such as:  5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder			Required Evidence			Evidence Measurement and Benchmark
<p><b>G5.1—Licensing Agreement between CTA/CTT Entities</b></p> <p>Licensing agreements that prevent the ability to use and share appropriate data or agreements are fluid such that data can be inappropriately used between corporations and government departments.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <p>a. Any licensing agreements between various national/jurisdictional or regional CTA implementations shall transparently include sharing of appropriate anonymized data and exclude inappropriate use between corporations and government departments. The data shared must be reviewed and endorsed by an ethics committee.</p>	N	LI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Publicly accessible licensing agreements setting out the terms and conditions for anonymity of data exchange between national/jurisdictional regarding regional CTA implementations.</li> <li>b. Publicly accessible terms and commitments declaring restrictions/conditions for use of IDs and data between government departments, private and public corporations as appropriate.</li> <li>c. Giving the end users an opt-out mechanism should the licensing agreements or data exchange terms be regarded as unacceptable to them.</li> </ul>		<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>			

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G5.2—Lack of Transparency between Different CTA/CTT Ecosystems</b></p> <p>There are no handover mechanisms between national CTTs due to their centralized/closed architectures. It is unclear how these systems can interoperate on ephemeral IDs from another environment.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Transparently specify and explain the mechanisms built into a CTT/CTA to facilitate handover between different regional/jurisdictional/national implementations.</li> <li>b. Specify how ephemeral IDs and associated data from other CTA/CTTs can be meaningfully exchanged without compromising user privacy settings and agreements at the original point of deployment.</li> <li>c. A full opt-in mechanism for data sharing across international platforms shall be considered alongside the opt-ins of a CTT.</li> </ul>	N	LI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Publicly accessible specification for handover mechanisms between the specific deployment and other jurisdictional/regional/national implementations and solutions.</li> <li>b. Specification of how ephemeral IDs from one CTA/CTT implementation can be meaningfully exchanged with other jurisdictional/regional/national implementations without compromising user privacy agreements and safeguards at the original point of deployment/agreement between the end user and the service provider.</li> <li>c. Traceability of data from input to output and vice-versa.</li> </ul>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G5.3—Parochialism/Localism</b>  Focus on the local/national CTA/CTT implementation that overlooks the need for technical and operational interoperability for interstate exchanges/travel.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Take into account the other regional/jurisdictional or national implementations of CTA/CTT to facilitate technical and operational interoperability.</li> </ul>	I	MI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records indicating identification and analysis of other regional/jurisdictional/national implementations of CTA/CTT to identify those with most privacy preserving features or ethical conformity.</li> <li>b. Records that signify the specifications and architectures from the most privacy preserving and ethically aligned regional/jurisdictional or national implementations of CTA/CTT have been taken into account in the specification, design, development, and operation of a local implementation to facilitate technical and operational interoperability.</li> </ul>	<p><b>Measurement:</b>  Multi-level on 1–5 scale such as:</p> <p>5—Excellent  4—Good  3—Average  2—Poor  1—Unacceptable</p>

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder			Required Evidence		Evidence Measurement and Benchmark
<b>G5.4—Interstate Biases</b>  Political situations that prevent the exchange of information and interoperability in CTA/CTT.	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Any inter-regional/jurisdictional/national bias that can prevent exchange of information between relevant CTA/CTT to be identified preferably prior to the design and deployment stages.</li> <li>b. CTT shall acknowledge that it does not preferentially exclude data from another region/jurisdiction/nation.</li> </ul>	I	MI	Integrator, Operator, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records indicating the existence of potential inter-regional/jurisdictional/national bias.</li> <li>b. Transparent actions taken to resolve such biases that can prevent exchange of information between relevant CTA/CTT implementing agencies.</li> </ul>		<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>		

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G5.5—Inconsistency of Autonomy by CTA/CTT User</b>  Inconsistency between CTA/CTT operation in different places/states (e.g., for women, children, and other social groups in some states), there could be restrictions on the degree of autonomy of the bearer of the mobile devices. Transparency can be an enabler of autonomy for the end user.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. Identify, assess the risks, and avoid inconsistencies between CTA/CTT operations in different or interoperable regions/jurisdictions/nations (e.g., for women, children, and other affected social groups).</li> <li>b. Identify and transparently avoid restrictions on the degree of autonomy of the bearer of the mobile devices in different or interoperable regions/jurisdictions/nations.</li> <li>c. The CTA/CTT shall not be deployed to nudge users.</li> </ul>	N	LI	Developer, Integrator, Operator, Maintainer, Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Records indicating proactive identification, risk evaluation, and treatment of risks arising from inconsistencies between CTA/CTT operations in different or interoperable regions/jurisdictions/states (e.g., for women, children, and other social groups).</li> <li>b. Records of transparent identification and treatment of risks to end user privacy and rights arising from restrictions on the degree of autonomy of the bearer of the mobile devices in different or interoperable regions/jurisdictions/nations.</li> </ul>	<p><b>Measurement:</b>  Multi-level on 1–5 scale such as:</p> <p>5—Excellent  4—Good  3—Average  2—Poor  1—Unacceptable</p>

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Ethical Concept and Reference	CTA/CTT Ethical Foundational Requirements	Norm/Inst	Cert Level LI, MI, HI	Stakeholder	Required Evidence	Evidence Measurement and Benchmark
<p><b>G5.1—Global Norms for CTA/CTT Development and Use</b></p> <p>The role for an independent global entity to develop norms/templates for the interoperability of CTA/CTT technologies to be adopted and further customized by nations and states.</p>	<p>The duty holder shall fulfill the following CTA/CTT requirement(s):</p> <ul style="list-style-type: none"> <li>a. An independent competent global organization to develop a standard or proposed best practice architecture for CTA/CTT applications to inform and lead the efforts of the public and private enterprises offering such services across regional/jurisdictional/national borders.</li> <li>b. A global template shall incorporate interoperability and optional features for customization in regional/jurisdictional/national implementations.</li> </ul>	I	MI	Regulator	<p>The following item(s) shall be presented as evidence for conformity against the CTA/CTT requirement(s) in this context:</p> <ul style="list-style-type: none"> <li>a. Formation of a competent panel of experts (epidemiologists, system and software developers, mobile phone app developers, data sharing and management experts, privacy law experts, philosophers, ethicists, civil society, cultural and religious representatives, etc.) with a relevant remit to devise a global standard/blueprint for interoperable CTA/CTT.</li> <li>b. Records of structured competence derivation and specifications for the requisite roles within the panel including criteria for interdisciplinary expertise.</li> <li>c. Incorporation of various implementation options for regional/jurisdictional/national implementations while maintaining the benefits of global interoperability between all CTA/CTTs.</li> </ul>	<p><b>Measurement:</b> Multi-level on 1–5 scale such as:</p> <p>5—Excellent 4—Good 3—Average 2—Poor 1—Unacceptable</p>

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**134 IEEE USE CASE—CRITERIA FOR ADDRESSING ETHICAL CHALLENGES IN TRANSPARENCY, ACCOUNTABILITY, AND PRIVACY OF CTA/CTT**



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