

**Recommendation of the FCC Disability Advisory Committee  
Methods for Assessing the Quality of IP Captioned Telephone Service (IPCTS)  
Adopted October 16, 2017**

*FCC Directive: Develop recommendations on criteria, metrics, and measurement methods for assessing the quality of IP Captioned Telephone Service (IPCTS), including the quality of interpretation and transcription (accuracy, synchronicity, etc.), interoperability, and continuity of service, with an eye toward integrating automatic speech recognition (ASR) into IPCTS.*

WHEREAS, the Disability Advisory Committee (“DAC”) recognizes that as the number of consumers using Internet Protocol Captioned Telephone Services (IP CTS) continues to grow, the need for additional minimum quality standards and best practices continues to grow;

WHEREAS, members of the IP CTS Working Group under the Relay and Equipment Distribution Subcommittee of the DAC have been provided the following information from the Federal Communications Commission (Commission):

- MITRE IP CTS: Summary of Phase 1 Activities
- MITRE IP CTS - Summary of Phase 2 Usability Testing Results
- MITRE IP CTS - Summary of Phase 3 Usability Test Plan

WHEREAS, any additional IP CTS research and testing to be performed by or for the Commission should consider measurement methodology and performance criteria as it relates to the user experience;

WHEREAS, members of the Relay and Equipment Distribution Subcommittee have identified the following areas in which changes to or additional research and testing are needed to determine potential minimum standards that should be established for IP CTS;

NOW, THEREFORE, IT IS –

RECOMMENDED that DAC be given access to any testing, surveys, or other research protocol regarding IP CTS including access to questions, scripts, recordings, and test plans prior to the collection of the research so that the DAC can provide input into questions and test plans before testing begins. In order to accomplish this task, adequate time would need to be added to the test plan in order to gather this type of feedback.

RECOMMENDED that the test plan be subject to peer review prior to conducting tests in order to facilitate compliance with the Data Quality Act.

RECOMMENDED that any further testing of IP CTS be conducted in a manner that mirrors the natural flow of telephone conversations. This includes finding an efficient and effective means to test and review telephone calls that, by nature, flow back and forth between at least two parties, where both parties are taking turns speaking each side of the conversation. Scripts and corresponding recordings used in testing should include:

- Representative call types (social, business transactions, medical, Interactive Voice Response, etc.)
- A range of caller accents, ages, and genders
- A range of speaker speeds or a standardized, targeted word per minute speaker speed. IP CTS cannot caption faster than the speaker's speaking speed.
- Test call length should be representative of IP CTS calls. Both longer and shorter calls should be tested.
- Appropriate complexity of language should be evaluated.

RECOMMENDED that any further testing of IP CTS include sample sizes that are large enough and representative of users to ensure validity and reliability of results.

RECOMMENDED that any further testing of IP CTS be conducted in such manner that gives both parties involved in the test access to the audio of telephone conversations.

RECOMMENDED that further testing of IP CTS seek to determine the following:

- Defining what a perfect/ideal call would consist of:
  - Latency/delay
  - Accuracy/Verbatim
  - Speed of captions
  - Other factors
- Using definitions provided in earlier studies by MITRE, determine at what point latency is problematic for understanding of a phone conversation by consumers using both the audio and captions provided by IP CTS.
- Using definitions of accuracy in earlier studies by MITRE, determine the baseline accuracy and completeness that all providers should reach to allow for understanding of conversations by consumers using IP CTS.
- Does the ability of the consumer understanding a conversation change as the number of errors increase in a given conversation?
- Does the ability of the consumer to understand a conversation change with the length of a conversation, despite the errors?
- Is weighing some words as more essential than others important to our definition of accuracy?
- Does proximity of errors contribute to users' experience of accuracy? For example, do multiple errors close together contribute to a greater sense of confusion and/or frustration?

RECOMMENDED that any further testing of IP CTS adapts a procedure that collects the type of information listed below. This is not an inclusive list of all information, but rather shared as an example of the type of information that would be valuable when analyzing test data to set relevant IP CTS metrics:

- Information regarding the user's hearing loss and vision loss if applicable
- Type of environment in which the research is performed
  - Typical office environment
  - Quiet room
  - Room with ambient noise (e.g. television in the background or in a car while driving with road noise)

- Types of connections used to perform the testing
  - Data
    - ✦ Cellular Service including use of Bluetooth by non-IPCTS user while driving a car, for example
    - ✦ WiFi
    - ✦ Hard wired internet connection
    - ✦ Real-world bandwidth throughputs
- High bandwidth, low data latency (i.e. a very good WiFi connection)
- Low bandwidth, high data latency (i.e. a poor cellular connection at 1X, EDGE or 3G)
- Varied upload/download speeds
  - Audio
    - ✦ High definition for caller audio
    - ✦ Analog telephone line for audio
  - Additional adaptive technologies or devices (e.g. braille displays)

RECOMMENDED that future IP CTS testing include the impact of Braille equipment in order to determine possible standards or metrics for different types of Braille and IP CTS call types and to determine how to best convey context of these conversations.

RECOMMENDED further that the Commission develop a way for consumers to provide feedback to the Commission on consumer satisfaction of IP CTS beyond simply relying on complaints filed by consumers.