



May 30, 2019

Ms. Marlene H. Dortch
Secretary, Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

RE: *Misuse of Internet Protocol (IP) Captioned Telephone Service, CG Docket No. 13-24; Telecommunications Relay Services and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities, CG Docket No. 03-123*

Dear Ms. Dortch,

Clarity Products, LLC ("Clarity") submits this letter in response to concerns raised by the Clear2Connect Coalition ("Clear2Connect" or the "Coalition") in its March 14, 2019 ex parte letter concerning Internet Protocol Captioned Telephone Service ("IP CTS") using automated speech recognition ("ASR") technologies.¹

Clear2Connect expressed concern that users of ASR-based IP CTS may not receive services that are functionally equivalent to telephone services available to consumers without hearing loss as required by the Americans with Disabilities Act. In particular, the Coalition suggested that ASR users could experience lower-quality services, increased privacy risks, and algorithmic bias. It further suggested that prior testing by the Commission was flawed, because the studies did not simulate real-world situations. Considering these concerns, Clear2Connect recommended the Commission delay approval of pending IP CTS applications utilizing ASR technologies exclusively pending additional testing and adoption of service quality metrics and standards.

Clarity agrees with Clear2Connect on the importance of providing functionally equivalent services to users with hearing loss. For this reason, and to address the very concerns detailed in the Coalition's letter, the Commission should promptly review and grant Clarity's pending application for certification to provide ASR-based IP CTS.² The number of Americans with hearing loss continues to grow, adding stress on existing IP CTS systems which place users in a processing queue until a Communications Assistant ("CA") is available to transcribe their call. Using ASR technologies, Clarity will drastically improve user experience and service quality compared to CA-based solutions while reducing cost and minimizing privacy and algorithmic bias risks.

Clarity welcomes the opportunity for ongoing testing of ASR technologies. However, such testing should not delay certification of services such as Clarity's which provide exceptional accuracy, speed, and usability. Delaying certification for IP CTS providers using ASR technologies would postpone needlessly the availability of life changing services to those with hearing loss. Similarly, Clarity does not oppose the

¹ See Ex Parte Letter of The Clear2Connect Coalition, CG Docket Nos. 03-213 and 13-24 (filed May 14, 2019) ("Clear2Connect Ex Parte").

² See Clarity Products, LLC, Application for Internet-Based TRS Certification, CG Docket No. 03-123 (filed Apr. 24, 2019).

Coalition's recommendation to adopt service quality metrics and standards, but any rulemaking proceeding should occur separately from the certification process and apply to all IP CTS systems. And any service quality metrics or standards should apply uniformly to ensure that users have access to functionally equivalent communications services from any IP CTS system.

In the sections that follow, Clarity explains how its CaptionMate solution provides high-quality and functionally equivalent services to users with hearing loss that in many respects improves upon existing IP CTS services. Clarity also addresses concerns expressed by Clear2Connect.

I. CLARITY'S CAPTIONMATE SERVICE

Clarity's IP CTS system, known as CaptionMate, is an app-based solution available on IOS and Android phones and tables, as well as via website.

CaptionMate offers competitive accuracy of transcription to traditional IP CTS services, while offering numerous advantages. Significant improvements include:

- *Faster Call Delivery.* CaptionMate routes user calls directly, and there is no waiting in a call center queue for a CA to become available to transcribe your call.
- *Quicker Captioning.* CaptionMate's ASR solution provides captioning in near real-time. There is no waiting for transcription by a CA. CaptionMate uses contextual clues to provide a highly accurate transcription with minimal latency.
- *More Consistent and Uninterrupted Service.* CaptionMate users can depend on consistently effective captioning for the duration of the call. Unlike human transcription, ASR systems do not become fatigued or require a break.
- *Improved Privacy.* CaptionMate offers users greater privacy. Call captioning is completely automated, and there is no third-party listening in on the call. Furthermore, CaptionMate and the speech engine it uses for transcription does not hold transcription or audio data once the call is complete. Clarity does not share user information with third-parties nor does it utilize customer information to enhance speech algorithms.
- *Greater Device Flexibility.* CaptionMate users have flexibility to choose how to place or receive a call and how to view captioning. For example, users can place a call from their landline and view the transcription on a computer, or place a call on their cell phone and comfortably view the transcription on a tablet.
- *Enables Remote Sharing of Captioning.* CaptionMate users have the option to allow the remote party to view his or her own transcription, enabling the remote party to verify transcription accuracy.
- *Offers Two-Sided Transcription.* CaptionMate allows users to view captioning of one or both sides of the conversation, increasing flexibility and understanding.



- *Greater Language Selection.* CaptionMate is multilingual, allowing users to choose from up to 25 different languages for transcription. Over 75 additional languages could be added easily upon user demand.

Helping those with hearing loss live their fullest lives, Clarity's CaptionMate service offers clear advantages to traditional IP CTS services.

II. ASR SERVICE QUALITY

The Coalition need only look to independent studies completed at the request of the Federal Communications Commission to allay concerns that ASR-based IP CTS solutions may not meet CA-assisted service quality. ASR technologies were competitive several years ago when the Commission first examined their capabilities, and such capabilities have improved leaps and bounds since. Independent testing by the MITRE Corporation commissioned by the FCC found in March of 2016 that one of three automatic speech-to-text ("STT") systems in its analysis provided service with superior accuracy, speed, and usability than three of the four tested IP CTS providers.³

Provider 3 and STT-1 ranked above average in accuracy, speed, and usability (the ease of learning and using a new system). Provider 1 and Provider 2 both ranked above average in accuracy and usability, and below average on caption speed. Provider 4 ranked above average in speed and usability, and below average on accuracy. STT-2 ranked below average on all metrics. STT-3 ranked above average on speed and well below average on accuracy and usability.⁴

MITRE Corporation's conclusion—that ASR technologies can provide comparable, if not improved, accuracy, speed, and usability—is based on testing from more than two years ago. ASR capabilities have advanced enormously since 2016. Progress made by automated speech engines has been nothing short of phenomenal.

Clarity is fully ready and, indeed, eager to prove that its CaptionMate service will surpass all existing IP CTS providers in speed, accuracy, and ease of use. In addition, CaptionMate offers a new, unique ability to ensure accuracy that existing IP CTS providers do not provide. CaptionMate allows the user to share captioning with the remote party through a secure, one-time use URL address. This enables the remote party to review, and if necessary correct, a specific transcription. Say, for example, that the remote party is providing directions to a specific location or giving an address, or perhaps even stock quote. Accuracy in these situations is of the utmost importance. Using Clarity's technology, the user can quickly and easily share the transcription with the remote party, so that the remote party can confirm that his or her words were captioned precisely.

³ The MITRE Corporation, Internet Protocol Caption Telephone Service (IP CTS) – Summary of Phase 2 Usability Testing Results, Version 0.5, Task Order No. FCC15D0002 (Mar. 23, 2016), <https://ecfsapi.fcc.gov/file/10411287298464/MITRE%20Corporation%20Summary%20of%20Phase%202.pdf>.

⁴ *Id.* at iii.

Clarity rejects the Coalition's suggestion that "relying on market forces to ensure captioning service quality is an ineffective strategy . . . resulting in significant economy-wide harms."⁵ The Coalition claims that users will stop using IP CTS altogether if they experience lower quality on ASR-based IP CTS platforms, thereby exacerbating health consequences "including dementia, isolation, depression, and hospitalizations, as well as decreased wages and productivity and increased healthcare costs."⁶ We respectfully disagree. First, as explained above, ASR technologies provide access to services functionally equivalent to those available to persons without hearing loss, while also offering clear advantages to exiting IP CTS solutions.

Second, although Clarity acknowledges that some users may be reluctant to change IP CTS providers if dissatisfied, we believe that ASR IP CTS are savvy enough to try different, competitive technologies should they be dissatisfied with a particular product. Clear2Connect's threat of "significant economy-wide harms" if the Commission certifies ASR-based IP CTS providers is specious and unworthy of comment. Even if this were true, more narrowly tailored solutions exist to remedy this concern. For example, the FCC could regularly inform registered users that such alternatives exist, highlighting differences in technology, satisfaction ratings, and how to contact providers. Alternatively, the Commission could require IP CTS providers to make customers aware of competitive solutions. Clarity would welcome such an initiative and would be happy to comply with such a request.

Finally, transaction costs associated with transfer between IP CTS providers are due mostly to the resulting change in expensive, customized equipment and its installation. ASR-based solutions like CaptionMate are accessible from customers' existing Internet-connected devices, thereby eliminated such transaction costs.

Denying availability of ASR-based IP CTS offerings like CaptionMate would senselessly prevent those with hearing loss from enjoying the tremendous benefits made possible by exciting developments in ASR technologies, including access to the most accurate and rapid captioning to date.

III. PRIVACY CONSIDERATIONS

Clarity agrees with Clear2Connect that the Commission should consider privacy concerns. User privacy is a paramount concern, and so it should be. Assurance of user privacy is an important feature of functional equivalency. Unfortunately, privacy claims made in the Coalition's ex parte letter are wholly inaccurate and misleading with respect to Clarity's ASR-based IP CTS offering.

The Coalition incorrectly assumes that because ASR-based technologies are continuously learning, all ASR-based IP CTS solutions must therefore involve "humans listening to recordings to correct ASR-based captions after calls are completed," "developing engines that train themselves through recordings during calls," or some variation thereof.⁷ Such privacy claims may be true for speech engines used for free by consumers in the open marketplace. ASR engines do, in fact, depend upon the collection of data to improve speech recognition capabilities. This is how they continuously improve voice recognition across languages, dialects, ages, and cultural expressions. Additionally, the Coalition's privacy claims may also be true of other pending ASR-based IP CTS certification applications on file with the FCC. We are not

⁵ Clear2Connect Ex Parte at 13 (internal citations omitted).

⁶ *Id.*

⁷ *Id.* at 4.



privity to the details of their solutions and therefore cannot speak to the way in which they address, or do not address, this privacy issue.

However, Clear2Connect's privacy claims are patently untrue in the case of Clarity's IP CTS offering. The speech engine used to support CaptionMate *does not* save transcripts or audio from any user call, nor does it utilize user information in any way to enhance speech algorithms. Clarity pays a premium to its ASR-technology provider for this extra layer of privacy. Evidence to this effect has been submitted to the FCC as part of Clarity's application for certification, parts of which are confidential and therefore redacted for public inspection.

In fact, because Clarity does not use transcriptionists or re-voicers, and because it does not archive audio or transcripts, the privacy protections provided by its CaptionMate service are vastly stronger than those of any current IP CTS provider that relies on CAs to listen in on and transcribe or re-voice users' communications. For those users truly, and rightfully, concerned about privacy, Clarity offers the only completely private solution.

Clarity shares the Coalition's view that privacy is extremely important, and without it, functional equivalency is not met. The FCC should therefore deny any application for IP CTS certification that—unlike Clarity—cannot provide functionally equivalent services with respect to privacy.

IV. MITIGATING BIAS RISKS

Clarity agrees with the Coalition that the FCC should take steps to mitigate risks posed by bias and strive for equal access to high-quality IP CTS offerings for all consumers. FCC certified IP CTS providers should serve all Americans to the greatest extent possible, incorporating research that accounts for speech variations from consumer age, gender, accent, cultural background, and more. This principle should extend equally to CA- and ASR-based IP CTS solutions.

It would be disingenuous to assume that none of the CA transcriptionists or re-voicers currently working in the IP CTS field have difficulties in correctly transcribing speech from persons with unfamiliar accents. It would likewise be imprudent to assume that ASR has more problems than the existing CA solutions. We believe it more likely that today's ASR technologies will not only perform better than CA-based IP CTS offerings, but also improve over time. ASR technologies used by Clarity have been trained to maximize performance for fourteen different English accents. Clarity believes such technological capabilities almost certainly surpass the capabilities of CA solutions, and we would welcome evidence to the contrary.

Moreover, CA quality is variable and subject to disparities in personnel training. ASR technologies are a single solution that will be applied consistently and improving constantly without the need to train new staff. ASR technologies also offer several advantages to CA-based IP CTS solutions, which struggle with their own inherent biases including:

- Bias against users who regularly speak with remote parties that prefer a language other than English and Spanish.

Clarity's CaptionMate service is multilingual. Although users may currently select from 25 different languages for transcription, more than 75 additional languages could be added easily. One of the great benefits of ASR technologies is that they can make IP CTS available to users speaking any number of languages and dialects. Clarity understands that the FCC does not currently reimburse IP CTS providers

for minutes captioning speech in a language other than English or Spanish from the TRS Fund. Clarity therefore intends to self-fund captioning of other languages until it petitions the Commission for rule waiver based on the tremendous public interest benefits available at no additional cost to consumers. Multilingual services made possible by ASR technologies will go a long way toward ensuring that IP CTS is available to all.

- Bias against users who do not have a landline phone, those who primarily use a mobile phone, and those who own only a flip phone for telephonic communication.

Clarity's solution allows users to communicate using the phone of their choice while viewing captioning from any Internet-connected device. This may, in the case of smartphones, even be the same device. By comparison, most IP CTS solutions available today require use of expensive and customized landline equipment. Some users may prefer traditional offerings, but we believe it is in the best interests of those with hearing loss to have as many options available as possible.

- Bias against users who have low vision.

Clarity's ASR-based solution offers improved access for IP CTS user such as the elderly that may also have vision loss. Most traditional IP CTS solutions rely on landline equipment with a single screen that may be difficult for some users to read. Clarity's ASR-based solution makes it possible for users to talk on the telephone while viewing captions on larger devices, such as a smart TVs or computer monitors.

It is nearly impossible to guard against all biases in any single solution. That said, all IP CTS providers should do their utmost to identify and mitigate bias risks. Clarity has worked to address potential algorithmic biases in its ASR-based system, and it believes that CaptionMate's ability to serve users speaking multiple languages and various dialects will better serve IP CTS users than existing solutions. Availability of multiple technologies and solutions in the marketplace will enable consumer choice and help ensure that users of IP CTS have the best opportunity to find a solution most tailored to meet their needs.

V. TESTING AND SERVICE QUALITY STANDARDS

Clarity welcomes the opportunity to conduct additional testing and for FCC consideration of service quality standards for IP CTS. However, such efforts should not delay Commission certification of qualifying ASR-based IP CTS providers like Clarity that are prepared to make life-changing services available to those with hearing loss. Any new testing or service quality standards, furthermore, should apply equally to all forms of IP CTS.

Clarity shares Clear2Connect's view that the FCC should "support additional testing to address specific issues and that the Commission work with IP CTS providers and other stakeholders to develop testing, measuring, and scoring procedures."⁸ We welcome such testing, and believe that it will be central to the ongoing success of the IP CTS program.

However, Clarity disagrees with the Coalition's suggestion that ASR-based services are not yet capable of delivering functionally equivalent communications and that prior studies to this effect were "faulty" or

⁸ *Id.* at 11.

“did not mimic real-world calls.”⁹ Clarity’s CaptionMate service is, in fact, ready, and Clarity is encouraged by the testing it has done on both speed and accuracy.

The FCC should therefore reject Clear2Connect’s suggestion to delay review and grant of qualified ASR-based IP CTS certification applications pending additional testing. The FCC has already set a precedent of certifying IP CTS providers without such testing. It would not be reasonable to apply this standard only to ASR-only solutions now. It would also be unreasonable to delay Commission review and approval considering the results of prior robust and independent studies confirming that ASR technologies can provide users comparable, if not improved, accuracy, speed, and usability. If new testing methodologies are created, the FCC should apply them to all forms of IP CTS equally.

To the extent the Coalition continues to have concerns, we suggest that the only reasonable path forward at this juncture is to allow the market to decide. Clarity is confident that getting ASR technologies into the hands of the end-user is the only option that will provide the “real world” testing that is vital to assessing the accuracy, speed, and usability of ASR solutions. In addition, given the lack of existing testing that the Coalition finds acceptable, the disputes amongst even speech scholars about the best way to quantifiably measure speech to transcription,¹⁰ and immense time, effort, and cost associated with testing, the best measurement of IP CTS offerings will be through user satisfaction surveys completed electronically, by phone, and in person.

Clarity is willing to help fund and to participate in research into customer satisfaction, which we recommend be completed regularly, across all IP CTS providers, and by an objective third-party. Clarity has already taken steps to begin collecting feedback from CaptionMate users. After every CaptionMate call, users are given the option to “rate their call” on a one-to-five-star scale. Any rating lower than five stars gives the user an opportunity to select from a menu of reason codes, such as “Inaccurate captioning” or “Text is difficult to read”. Clarity will provide this data to the FCC, and it challenges existing and future providers of IP CTS to do the same so that all solutions can be compared on the same baseline.

Clarity similarly supports proposals to adopt service quality metrics and standards, so long as their development does not delay deployment of ASR-based IP CTS solutions. Applications for ASR-based IP CTS solutions should be evaluated using the same criteria applied to CA-based IP CTS offerings. Likewise, any new service quality metrics or standards should apply uniformly to all IP CTS solutions to ensure users of existing and future technologies alike receive high-quality services functionally equivalent to those available to those without hearing loss.

VI. CONCLUSION

Clarity appreciates the opportunity to respond to concerns expressed by the Clear2Connect Coalition. As explained above, Clarity’s CaptionMate service provides high-quality and functionally equivalent services to users with hearing loss. And by using advanced ASR technologies, CaptionMate also offers several advantages over existing IP CTS services, including greater privacy and bias risk mitigation measures.

⁹ *Id.* at 2.

¹⁰ Pablo Romero-Fresco, Quality Assessment in Interlingual Live Subtitling: The NTR Model, (Jan. 2017), https://www.researchgate.net/publication/323178683_Quality_assessment_in_interlingual_live_subtitling_The_NTR_Model (citing three different methods of assessing the quality and accuracy of speech captioning).



Accordingly, the Commission should expeditiously grant rather than postpone Clarity's application for IP CTS certification. Clarity looks forward to working with the Federal Communications Commission and all interested stakeholders to facilitate prompt certification of its application.

Sincerely,

A handwritten signature in black ink, appearing to read "SJB", written over a horizontal line.

Seymour James van den Bergh, CEO
Clarity Products, LLC