

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of)	
)	
Telecommunications Relay Services and Speech-)	
to-Speech Services for Individuals with Hearing)	CG Docket No. 03-123
and Speech Disabilities)	
)	
Comment Sought on Application of VTCSecure,)	
LLC, for Certification to Provide Internet Protocol)	
Captioned Telephone Service)	
)	
Comment Sought on Application of)	
MachineGenius, Inc., for Certification to Provide)	
Internet Protocol Captioned Telephone Service)	
)	
Comment Sought on Application of Clarity)	
Products, LLC, for Certification to Provide Internet)	
Protocol Captioned Telephone Service)	

REPLY COMMENTS OF ULTRATEC, INC.

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I. INTRODUCTION AND EXECUTIVE SUMMARY

Ultratec, Inc. (“Ultratec”) submits these Reply Comments in response to other parties’ filings addressing three related Public Notices¹ issued in the above-referenced proceeding by the Consumer and Governmental Affairs Bureau (“CGB”) of the Federal Communications Commission (“Commission” or “FCC”).

¹ *Comment Sought on Application of VTCSecure, LLC, for Certification to Provide Internet Protocol Captioned Telephone Service*, Public Notice, CG Docket No. 03-123, DA 19-818 (CGB rel. Aug. 26, 2019); *Comment Sought on Application of MachineGenius, Inc., for Certification to Provide Internet Protocol Captioned Telephone Service*, Public Notice, CG Docket No. 03-123, DA 19-819 (CGB rel. Aug. 26, 2019); *Comment Sought on Application of Clarity Products, LLC, for Certification to Provide Internet Protocol Captioned Telephone Service*, Public Notice, CG Docket No. 03-123, DA 19-820 (CGB rel. Aug. 26, 2019) (collectively, the “Public Notices”).

As discussed during the initial comment phase, Ultratec has been, and continues to be, an active innovator of both captioned telephone services (“CTS”) provided over the public-switched telephone network and internet protocol (“IP”) CTS.² Ultratec continually devotes substantial, industry-leading resources to the further development and testing of IP CTS technologies and has conducted over 20 years of research and development on the use of automated speech recognition (“ASR”) engines and technology. Ultratec’s history and expertise ideally position the company to respond to the Public Notices’ request for comment on IP CTS certification applications (collectively “Applications”) filed by three entities proposing to provide IP CTS through the exclusive use of ASR-only technology,³ Clarity Products, LLC (“Clarity”), MachineGenius, Inc. (“MachineGenius”), and VTCSecure, LLC (“VTCSecure”) (collectively “Applicants”).⁴

As explained in more detail below, there is broad consensus in the record that the Applicants’ requests are premature. Neither the ASR-only technologies proposed by the Applicants nor the Commission’s regulatory framework are ready at this time to be used to ensure functionally equivalent service to people reliant on IP CTS for their telephone communication needs. Commenters also agree that CGB should refrain from certifying ASR-only IP CTS until the agency adopts a regulatory framework by which the functional equivalence of these services can

² See generally Comments of Ultratec, Inc., CG Docket No. 03-123 (filed Sept. 25, 2019) (“Ultratec Comments”).

³ These comments use the terms “ASR-only” and “ASR-only IP CTS” to refer to captions generated by speech recognition technology without the presence of a human communications assistant (“CA”) on the call.

⁴ See generally MachineGenius, Inc., Internet-based TRS Certification Application, CG Docket No. 03-123 (filed Oct. 13, 2017) (“MachineGenius Application”) (proposing ASR-only IP CTS); VTCSecure, LLC, Internet-based TRS Certification Application, CG Docket No. 03-123 (filed May 26, 2017) (“VTCSecure Application”) (proposing to provide IP CTS solely using ASR engines on some calls but using CAs on other calls); Clarity Products, LLC, Internet-based TRS Certification Application, CG Docket No. 03-123 (filed Apr. 24, 2019; received ECFS June 5, 2019) (“Clarity Application”).

be evaluated and guaranteed and to ensure that the Telecommunications Relay Service (“TRS”) program’s mandatory minimum standards are met. In addition, commenters agree that heavy redactions in the Applications and an apparent lack of independent testing severely constrain the public’s ability to evaluate whether the specific, proposed offerings will deliver functionally equivalent service.

The record also demonstrates that there is a real danger to deaf and hard-of-hearing persons and communities if the Commissions certifies the Applicants at this time—a reality borne out by Ultratec’s own testing. Ultratec has been evaluating the use of ASR technologies for the provision of IP CTS for many years. Based on this extensive experience, Ultratec agrees with those who have raised concerns that cultural biases resulting from the way that general ASR engines have been developed could result in harm to certain populations of users that rely on IP CTS. Until these issues with general commercial ASR engines are resolved, the Commission should require the Applicants to demonstrate how their services mitigate ASR bias to deliver a functionally equivalent service for IP CTS users. The Commission cannot approve an ASR-only approach to IP CTS that provides inferior service to the majority of users due to its inherent bias in its ability to caption their speech.

For these reasons, it is premature at this stage to certify the three Applicants for the provision of ASR-only IP CTS service.

II. COMMENTERS RAISE GRAVE CONCERNS ABOUT THE READINESS OF ASR-ONLY IP CTS TO PROVIDE FUNCTIONALLY EQUIVALENT SERVICE

As Ultratec explained in its initial comments,⁵ and as supported by other commenters to this proceeding, each of the ASR-only IP CTS offerings proposed by the Applicants are inherently

⁵ Ultratec Comments at 4.

reliant on a new and unproven technology that has not yet been demonstrated to be capable of providing functionally equivalent service in accordance with the Commission's rules. For example:

- Clear2Connect Coalition asserts that “the testing of ASR technologies to date does not demonstrate that they can satisfy the mandate of the Americans with Disabilities Act that telecommunications relay services, like IP CTS, enable ‘functionally equivalent’ communications by telephone.”⁶ The Coalition also questions whether the proposed ASR-only technology functions properly “when a user speaks quickly with an accent [o]r quickly with business-specific jargon?”⁷
- The Consumer Groups note that “[t]he Commission and the public need substantial evidence that ASR technology will live up to the promises made by applicants. Unfortunately, the current applications from the ASR providers do not contain enough information to evaluate whether the end product will be adequate to serve the needs of consumers. [...] Marketing pitches are not enough.”⁸
- CaptionCall explains that “[g]iven the current state of ASR ... it is unclear if ASR-only providers are able to generate captions that are at least comparable to currently available CA-assisted IP CTS, especially with respect to difficult calls.”⁹
- Sprint echoes this argument, explaining how it would be “premature for the Commission to take any further action on the Applications” at this time, given the need to address the newness of ASR-based IP CTS as a technology.¹⁰

⁶ Letter from Loretta Herrington, World Institute on Disability, representing the Clear2Connect Coalition, to Marlene H. Dortch, Secretary, FCC, CG Docket Nos. 03-123, 05-231, at 1-2 (filed Oct. 1, 2019).

⁷ Comments of the Clear2Connect Coalition, CG Docket Nos. 03-123, 05-231, at 4 (filed Sept. 25, 2019) (“Clear2Connect Coalition Comments”).

⁸ Comments Applications for Certification as Providers of ASR-Based IP CTS of the Hearing Loss Association of America, et al., CG Docket Nos. 13-24, 03-123, at 8 (filed Sept. 25, 2019) (“Consumer Groups Comments”).

⁹ Comments of CaptionCall, LLC on the Applications *et al.*, CG Docket No. 03-123, at 4 (filed Sept. 25, 2019) (“CaptionCall Comments”) (internal citations, quotations omitted).

¹⁰ Comments of Sprint Corporation, CG Docket No. 03-123, at 11 (filed Sept. 25, 2019) (“Sprint Comments”).

- The Telecommunications Equipment Distribution Program Association (“TEDPA”) also asserts the importance of “understand[ing] more about how accuracy, completeness, synchronicity, and speed are going to be consistent and in line with the recommendations made by the subcommittee of the DAC October 2018 open meeting.” TEDPA goes on to request the FCC to “authorize an independent study of the speed, accuracy, completeness and delay produced via ASR prior to FCC authorization of this technology,” and further recommends that study participants not be compensated to prevent swaying the opinions of the study’s participants.¹¹
- Hamilton Relay observes that an ASR-only approach is, in fact, so technologically far removed from the longstanding approach to IP CTS that each Application is forced to “seek[] waiver of numerous important mandatory minimum standards.”¹²

While Ultratec remains hopeful that ASR-only technologies can be incorporated into IP CTS in the future, as discussed below, the consistent views expressed by these commenters confirm that at present ASR-only technology is not ready to be used to provide IP CTS. The Applicants have not introduced sufficient evidence into the public record to demonstrate that the technology each proposes to use can perform in a manner that will allow the Commission to fulfill its obligation under Section 225 to ensure the provision of functionally equivalent telephone service.

III. THE RECORD CONFIRMS THAT THE COMMISSION LACKS BOTH AN APPROPRIATE REGULATORY FRAMEWORK AND SUFFICIENT INFORMATION TO EVALUATE THE APPLICATIONS

Every commenter responding to the Public Notices made clear the need for the Commission to establish a regulatory framework for ASR-only IP CTS certification prior to acting on the Applications. Doing so will assure all stakeholders that the Applicants can provide

¹¹ Letter from Sandra McNally, Chair, Telecommunications Equipment Distribution Program Association, to Marlene H. Dortch, Secretary, FCC, CG Docket Nos. 13-24, 03-123, at 2 (filed Oct. 4, 2019) (“TEDPA Letter”).

¹² Comments of Hamilton Relay, Inc., CG Docket No. 03-123, at 3 & n.7 (filed Sept. 25, 2019) (“Hamilton Relay Comments”).

functionally equivalent ASR-only IP CTS.¹³ An appropriate framework is not simply a matter of good policy. Section 225 of the Communications Act of 1934, as amended (the “Act”), statutorily *requires* the Commission to ensure that wire or radio communications available to people who are deaf, hard of hearing, and deaf-blind are “functionally equivalent” to those available to hearing individuals.¹⁴ This mandate for functional equivalency includes a statutory obligation to “prescribe regulations” that “establish functional requirements, guidelines, and operations procedures” for the benefit of the deaf, hard-of-hearing, and deaf-blind communities.¹⁵ “As the D.C. Circuit has confirmed ... the Commission’s ‘primary objective’ under Section 225 must be to ensure that individuals with speech and hearing [disabilities] have access to effective communications by telephone.”¹⁶

Since the inception of the nationwide TRS program in 1991, and as different forms of relay services have evolved, the Commission consistently adopted and, as necessary, revised the mandatory minimum TRS standards governing the program to ensure the continued availability of functionally equivalent telephone services for the served populations. For example, the agency prescribed everything from the necessary linguistic skills and typing speed of CAs,¹⁷ to speed-of-

¹³ See, e.g., Ultratec Comments at 9-13; Hamilton Relay Comments at 8-10; Consumer Groups Comments at 2-6; Clear2Connect Coalition Comments at 9-10; CaptionCall Comments at 3-5; Sprint Comments at 3-7; Letter from Sherri Collins, Executive Director, Arizona Commission for the Deaf and the Hard of Hearing, to Marlene H. Dortch, Secretary, FCC, CG Docket Nos. 03-123, 05-231 (filed Oct. 8, 2019).

¹⁴ 47 U.S.C. § 225(a)(3).

¹⁵ *Id.* § 225(d)(1)(A).

¹⁶ CaptionCall Comments at 20 (citing *Sorenson Commc’ns, LLC v. FCC*, 897 F.3d 214, 227-28 (D.C. Cir. 2018)).

¹⁷ 47 C.F.R. §§ 64.604(a)(1)(ii), (iii).

answer requirements,¹⁸ confidentiality protections,¹⁹ and underlying technical facilities for IP CTS call centers.²⁰ When certain of these skills became unnecessary for new types of relay, such as the minimum typing speed for CTS/IP CTS, the Commission adjusted its regulations.²¹ Yet in the context of ASR-only IP CTS, the Commission has not prescribed regulations of similar specificity.²² Instead of defining how the functional equivalence statutory requirement should be applied to ASR-only IP CTS, the Commission has “created a paradox” by directing CGB “to approve providers of ASR-only IP CTS if they meet the mandatory minimum standards,” while “fail[ing] to articulate any standards by which [CGB] can conclude that fully automated ASR can satisfy the Commission’s requirements[.]”²³ The Commission should resolve this omission before CGB acts on the Applications by acting on Sprint’s Petition for Clarification, or in the Alternative, Reconsideration of the Commission’s June 2018 *Declaratory Ruling* authorizing ASR IP CTS and CTS.²⁴

¹⁸ *Id.* § 64.604(b)(2)

¹⁹ *Id.* § 64.604(a)(2).

²⁰ *Id.* § 64.604(b)(4).

²¹ *Telecommunications Relay Services and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities*, Declaratory Ruling, 22 FCC Rcd 379 (2007) (authorizing compensation from the TRS fund for IP CTS and waiving non-relevant aspects of its TRS rules).

²² *See, e.g.*, Consumer Groups Comments at 5 (“[T]he Commission has not produced any requirements, guidelines, and minimum standards pertaining specifically to IP CTS providers providing ASR-based offerings.”); Hamilton Relay Comments at 2 (“To ensure that users are provided with functionally equivalent service and that TRS funding is used responsibly, the Commission must establish an appropriate regulatory framework with a reasonable ASR-only rate methodology and quality metrics. At this time, however, the Commission has not created that regulatory framework, or taken necessary steps to ensure functional equivalence and reasonable compensation for ASR-only IP CTS service.”).

²³ Hamilton Relay Comments at 3.

²⁴ Sprint Corporation, Petition for Clarification or, in the Alternative, Reconsideration, Inc., CG Docket Nos. 13-24, 03-123 (July 9, 2018) (seeking reconsideration of *Misuse of Internet Protocol (IP) Captioned Telephone Service, Telecommunications Relay Services and Speech-to-Speech*

For the Commission to adequately satisfy its statutory obligations, new, potential means of delivering relay must be subject to standards that are as thorough as the standards that were thoughtfully and deliberately promulgated to apply to present forms of relay. Failure to adopt such new standards may indeed, as the Consumer Groups assert, “violate[] the mandate set forth in Section 225.”²⁵ If it is necessary for the Commission to have “prescribe[d] regulations” of such exactitude for an older technology whose precise capabilities are understood, it is even more necessary to prescribe analogous regulations for a new technology whose precise capabilities remain the subject of vigorous debate.

Even if, *arguendo*, the public were to try to evaluate the Applications based on the current, ill-fitting mandatory minimum standards, the Applicants’ public filings do not provide sufficient information to enable the public to do so.²⁶ The Consumer Groups, which represent the communities most reliant on IP CTS, note that if the Applicants “cannot transparently demonstrate

Services for Individuals with Hearing and Speech Disabilities, Report and Order, Declaratory Ruling, Further Notice of Proposed Rulemaking, and Notice of Inquiry, 33 FCC Rcd 5800 (2018) (“*Declaratory Ruling*”)); *see also* Hamilton Relay Comments at 2-3 (urging the FCC to address Sprint’s “long-standing” petition).

²⁵ Consumer Groups Comments at 3 (“[F]ail[ure] to produce rigorous technology-neutral regulations and standards that would guide the services of providers across the entire IP CTS ecosystem ... violates the mandate set forth in Section 225.”); *see also* Clear2Connect Coalition Comments at 10-11 (“The Clear2Connect Coalition urges the Commission to refocus its efforts to develop service quality standards before approving the pending applications from VTCSecure, MachineGenius, and Clarity Products for ASR-only IP CTS.”); Sprint Comments at 9 (“By again putting the cart before the horse in failing to establish rules to govern ASR-based services, the Commission has both harmed the consumers who will suffer if ASR-based IP CTS is not functionally equivalent and established a difficult process for potential ASR-based providers, which must navigate the waiver request process before being certificated.”).

²⁶ *See, e.g.*, Consumer Groups Comments at 9-13 (detailing how “[e]ach of the three companies’ current applications fail to provide acceptable information regarding the quality of their offerings”); CaptionCall Comments at 13-30 (detailing the same, relying on confidential information).

through substantial evidence” how their ASR-only offerings meet existing standards, then the technology “likely cannot” satisfy such standards.²⁷ To fulfill its mandate under Section 225—as well as its own directives—it is critical for the Commission to gather a fuller “record ... on ASR more broadly before introducing ASR-based IP CTS services into the marketplace.”²⁸

At minimum, the Commission should require the Applicants to publicly file the materials required by the agency to demonstrate functional equivalence—with an additional opportunity for public review and comment on these attempted showings. In its *Declaratory Ruling*, the Commission explained that CGB may only certify a provider’s ASR-only IP CTS offering if CGB “determines that an applicant is able to provide IP CTS in accordance with the Commission’s mandatory minimum TRS standards designed to ensure functional equivalency.”²⁹ Further, the Commission established a mandate for all ASR-only IP CTS applicants to:

... support all claims regarding their use of ASR and its efficacy through documentary and other evidence. For example, this could include trials and quantitative test results demonstrating that the applicant’s service will afford a level of quality that is at least comparable to currently available CA-assisted IP CTS with respect to captioning transcription delays, accuracy, speed, and readability.³⁰

Ultratec agrees with the Consumer Groups that to the extent the Applicants provided information responsive to this requirement at all, such information was redacted.³¹ As a result, the “applications

²⁷ Consumer Groups Comments at 9.

²⁸ Sprint Comments at 2.

²⁹ *Declaratory Ruling*, 33 FCC Rcd at 5832 ¶ 60.

³⁰ *Id.* at 5834 ¶ 63.

³¹ See Consumer Groups Comments at 8 (“[P]otentially important sections of all the applications are redacted”); Ultratec Comments at 7 n.11 (observing heavy redactions in MachineGenius Application at Exhibit A, VTCSecure Application at 3-4, and Clarity Application at Exhibits D & F).

from the ASR providers do not contain enough information to evaluate whether the end product will be adequate to serve the needs of consumers.”³² Importantly, “[n]one of the three applications discusses how their ASR-only systems will handle complex and varied calling situations that our members may experience.”³³ Even commenters able to review the redacted submissions found the Applications wanting for “documentary and other evidence” such as “trials and quantitative test results” in their filings.³⁴

The Commission should require the Applicants to file their test methodologies and results publicly because of the valid concerns around the capabilities of the new ASR-only technology that the Applicants intend to use. In addition, the Commission should require independent testing of the Applicants’ proposed ASR-only IP CTS offerings. At present, the “[c]ompanies report measures [such as accuracy, completeness, synchronicity, and speed], but these are not fully addressed and it does not appear that an independent study has been levied.”³⁵ Sprint correctly asserts that “[i]f the Commission were to rely solely on private, off-the-record testing, that would completely defeat the purpose of allowing public notice and comment on the Applications.”³⁶

³² Consumer Groups Comments at 8; *see also id.* at 6-7 (setting forth nearly 30 questions related to business model, quality, privacy, and 911 connectivity that remain unanswered by the Applicants that relate to whether the Applicants will be able to deliver a functionally equivalent service).

³³ Clear2Connect Coalition Comments at 8.

³⁴ *See, e.g.,* CaptionCall Comments at 13-14 (“[N]one of the pending applications meets [the *Declaratory Ruling’s*] standard or provides sufficient evidence that the provider’s offering will comply with the Commission’s rules.”).

³⁵ TEDPA Letter at 2.

³⁶ Sprint Comments at 5; *see also* Consumer Groups Comments at 8 (“It is not reasonable for applicants to omit details about their offerings that are critical for consumers to evaluate whether the offerings will suit their needs.”).

In summary, the Commission has not supplied CGB with a regulatory standard by which to evaluate the ASR-only technologies being proposed by the Applicants in a manner that is consistent with the TRS statute and its implementing regulations. But even if the Commission had done so, the Applications still would not be ripe for grant because the Applicants have failed to present the public with sufficient information about their proposed ASR-only services to determine the extent to which the new technology can properly perform in a functionally equivalent manner for the wide spectrum of the IP CTS user base under real-world conditions. By the Commission's own mandate, the public must be provided with an opportunity to review and comment on such evidence. To achieve this, Ultratec requests that the FCC require the Applicants' data to be filed publicly and for the Commission to open an additional comment round to enable the public to comment on such submissions.

IV. USING ASR-ONLY TO CAPTION IP CTS CALLS POSES UNACCEPTABLE RISKS TO USERS

Perhaps most critical to the Commission's current decision-making on the pending Applications is that these submissions fail to demonstrate that the proposed ASR-only IP CTS offerings will be safe and reliable on telephone calls that involve emergencies or that require the exchange of urgent or vital information.³⁷ IP CTS users, who tend to be older, depend on IP CTS not only to make calls to "engage in community life,"³⁸ but also to connect with doctors, attorneys, and 911 and other emergency services. Failed communication in such situations can lead to serious harm to such individuals, or even life-threatening outcomes. The Commission should require the

³⁷ See, e.g., Consumer Groups Comments at 14-15 (observing that the applications "do not contain sufficient information regarding the applicants' approaches to 911 connectivity"); Clear2Connect Coalition Comments at 5 ("There is no way to assess, for example, whether a hearing-challenged person can communicate with a 911 operator after the call is put through."); CaptionCall Comments at 19-20, 28-29.

³⁸ Clear2Connect Coalition Comments at 3.

Applicants to answer open questions related to how their technologies will ensure the safety and wellbeing of IP CTS users before certifying any of the Applications.

Health and wellbeing concerns related to ASR-only technologies become acute in 911 emergency situations, and the Applications have not adequately demonstrated whether or how the specific technologies each proposes can provide functionally equivalent service during 911 calls.³⁹

As a threshold issue, the Commission should require the Applicants to address publicly the list of questions on 911 connectivity set forth by the Consumer Groups:

1. How, generally, does your application handle 911 calls?
2. How do you handle 911 call completion?
3. How do you handle 911 disconnects?
4. How do you ensure that the 911 call center is able to call the consumer back in the case of a dropped call?
5. What assurance does the caller have that the call will reach the appropriate public safety answering point (“PSAP”)?⁴⁰

To date, the Commission’s rules have assumed the presence of a CA on a relay call. With this assumption has come the understanding that the CA will be able to assist the caller, as necessary, if the call involves an emergency.⁴¹ Ultratec agrees with Sprint that such reliance on a CA in these situations is appropriate, because the CA “provide[s] some understanding of the context of the emergency situation and communications needs of the consumer is critical in an

³⁹ See, e.g., CaptionCall Comments at 28-29 (“Clarity must explain how it will route 911 calls to the appropriate PSAP and provide the required location and callback information. And Clarity’s plan for providing functional equivalence for captioning 911 calls is not at all clear from its application.”).

⁴⁰ Consumer Groups Comments at 7.

⁴¹ See Hamilton Relay Comments at 5-6; Clear2Connect Coalition at 5 (“There is no way to assess, for example, whether a hearing-challenged person can communicate with a 911 operator after the call is put through. It is similarly unclear how the minimum standards, which currently address human-based services, would apply to automated ones.”).

emergency.”⁴² Further, safety-of-life calls are inherently and especially problematic for ASR engines because stress on the part of the hearing party to an emergency IP CTS call can make the party’s speech even harder to caption, which will further degrade ASR performance just when the accuracy of captions matters most.⁴³ A clear understanding of how each Applicant’s technology not only handles but performs during 911 calls is critical because, as summarized by Professor Stern, “there is insufficient evidence that the current ASR technology is at a level that is necessary for use in IP CTS without the real-time participation of human [CAs].”⁴⁴

As a general matter, third-party testing, as well as Ultratec’s own testing, shows that today’s ASR engines will not provide accurate captions in many instances.⁴⁵ Without a CA at least overseeing the captioning of a call, in most cases there will be no hearing person on a call to confirm that the ASR engine is providing accurate captions to the user.⁴⁶ As discussed above, the

⁴² Sprint Comments at 6 (quoting Letter from American Speech-Language-Hearing Association, to Marlene H. Dortch, FCC Secretary, CG Docket Nos. 03-123 and 13-24, at 2 (Apr. 15, 2019)).

⁴³ Comments of Professor Richard M. Stern Paper at 14 (Sept. 25, 2019) (“Professor Stern Paper”), attached as App. A to CaptionCall Comments; *see also* CaptionCall Comments at 19-20, 28-29 (asserting that the Applications do not adequately address the handling of emergency calls).

⁴⁴ Professor Stern Paper at 2.

⁴⁵ *See* Professor Stern Paper at 22-24 (discussing the results of the MITRE Phase I study); World Federation of the Deaf and International Federation of Hard of Hearing People, *WFD and IFHOH Joint Statement: Automatic Speech Recognition in Telephone Relay Services and in Captioning Services*, at 1 (Mar. 28, 2019), <https://www.deafcouncil.org.uk/wp/wp-content/uploads/2019/05/IFHoHWFD.pdf> (“ASR for a telephone service has difficulty in providing consistently good recognition accuracy”); Sprint Comments at 8 (quoting VITAC that “ASR systems routinely fail to present names and technical terms properly, they stumble on accented or mumbled speech or background noises, omit punctuation, and can have difficulty determining the differences between what a speaker ‘said’ and what they actually ‘meant’”).

⁴⁶ *See* Professor Stern Paper at 17 (“IP CTS systems operate in ‘open loop’ fashion, with no opportunity for automated systems to request confirmation or clarification unless an uncertain input is detected. And even when an uncertain input is detected, an ASR-only system does not have a human from whom to request confirmation or clarification.”); CaptionCall Comments at 29

Applicants failed to file in the public versions of their Applications even basic functional equivalence testing to demonstrate the efficacy of their proposed ASR-only service offering. As a result, users are deprived of an opportunity to review this testing to determine whether they consider the proposed ASR-only services to be effective for telephone communications. Providing users with access about the performance of the specifically proposed ASR engines is especially important because there are several types of captioning errors that can occur. For example, some errors may not always be apparent to a user, which can result in potentially harmful consequences to all parties to a call.⁴⁷

Although one of the Applicants suggests that concerns around accuracy could be solved by relying on the captioned party to simultaneously view captions,⁴⁸ such a “solution” would not be functionally equivalent to a hearing call, which does not require the other party to read along and verify the accuracy of the call transmission. Such multitasking, which is never done during non-relay-assisted telephone calls, would likely be disruptive to the flow of a call. Moreover, even if it is effective at reducing some errors, this awkward procedure would undoubtedly lead to longer call times, and thus increased minutes compensated, because the captioned party will likely have to delay their conversation to review the transcript.

(“Clarity’s application does not describe an adequate failover strategy for providing accurate captions when its ASR engine may be struggling.”).

⁴⁷ Ultratec Comments at 14 (discussing “invisible errors” in captions that may seem correct when read but nevertheless are not a faithful representation of the speech); *see also* Clear2Connect Coalition Comments at 4 (using two grammatic sentences to illustrate that missing a word “can invert the whole meaning of a sentence”).

⁴⁸ Letter from Seymour James van den Bergh, CEO, Clarity Products, LLC, to Marlene H. Dortch, Secretary, FCC, CG Docket No. 03-123, at 2 (filed May 30, 2019) (“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.”).

Merely routing 911 calls away from ASR-only captioning platforms to CAs⁴⁹ to avoid the above difficulties is not adequate to ensure effective telephone communication in the event of an emergency. This is because many IP CTS calls *not* placed to 911 nevertheless involve emergencies or significant and exigent health and safety matters. Some such calls are placed to family members or doctors, and other calls become an emergency during the course of the call. In instances in which emergency calls are not made directly to a PSAP, there would be no way for an ASR engine to recognize the emergency or urgent situation. Nevertheless, accuracy on such calls is as critical to consumers as the accuracy of calls placed to 911. For example, the exchange of information about a prescription drug with a medical professional, if not entirely accurate during a call, could have dire consequences. Similarly, directives from an attorney about an urgent child custody matter or the conditions under which parental visitation rights must be exercised could involve complex legal concepts. The accuracy with which such legal concepts are captioned might be critical to prevent harm to the parties involved. As noted by Professor Stern, if ASR engines are trained with a finite vocabulary, the limitations of ASR can be “exacerbated when a conversation is about a topic in a particular technical domain such as medicine, law, or engineering ...”⁵⁰

Ultimately, given the unproven accuracy of ASR-only IP CTS and the absence of a CA to act as a safeguard, the services proposed by the Applications place at risk the health, safety, and wellbeing of users.

⁴⁹ VTCSecure, LLC Request for Waiver, CG Docket No. 03-123, at 3 (filed Sept. 13, 2019) (proposing to have “agent come on during an emergency call”).

⁵⁰ Professor Stern Paper at 16.

V. CURRENT ASR TECHNOLOGY SUFFERS FROM BIAS AGAINST THE MAJORITY OF IP CTS USERS

Ultratec’s testing confirms Commenters’ assertions that ASR suffers from an inherent performance bias that could adversely affects senior citizens, females, people of different ethnicities with accents, and the less affluent. This is because ASR engines overwhelmingly are trained using the speech of affluent white men.⁵¹ In combination, these under-represented groups make up the majority of IP CTS users.

The problems with commercial ASR engines are well-publicized.⁵² Just last month, Arizona State University Assistant Professor Visar Berisha explained that ASRs struggle with “atypical” speech, such as speech that is strongly accented, unusually slow or unusually fast.⁵³ Similarly, a recent article in the *Harvard Business Review* articulates that automated “[s]peech

⁵¹ See Clear2Connection Coalition Comments at 6 (expressing concern that the MITRE ASR “was not thorough enough, failed to include a sufficient testing size, and used only male voices”); CaptionCall Comments at 9 (“The next generation of artificial-intelligence technologies must be trained with representative data, or else they will perform less well for certain under-represented and minority groups.”); Hamilton Relay Comments at 9 (“[I]t remains unclear whether ASR-only can comply with verbatim requirements outside of testing beds.”); Sprint Comments at 8 (quoting VITAC that “ASR systems routinely ... stumble on accented or mumbled speech”); Professor Stern Paper at 2-3, 11-13 (reviewing several research studies showing ASR performance issues with respect to the gender, age, race, dialect, and accent of speakers).

⁵² See, e.g., Joan Palmiter Bajorek, *Voice Recognition Still Has Significant Race and Gender Biases*, HARVARD BUS. REV. (May 10, 2019), <https://hbr.org/2019/05/voice-recognition-still-has-significant-race-and-gender-biases> (“Bajorek Article”) (reporting on research showing that commercial ASR engines captioned men more accurately than women); *Computer Says No: Irish Vet Fails Oral English Test Needed to Stay in Australia*, GUARDIAN (Aug. 8, 2017), <https://www.theguardian.com/australia-news/2017/aug/08/computer-says-no-irish-vet-fails-oral-english-test-needed-to-stay-in-australia> (noting that an Irish woman who is a highly educated native English speaker failed a computer-administered English proficiency test).

⁵³ See Statement of Visar Berisha, Assistant Professor, Arizona State University, presentation to the 2019 National Association for State Relay Administration Conference at 8, attached to Letter from Holly M. Bise, Chair, National Association for State Relay Administration, to Marlene H. Dortch, Secretary, FCC, CG Docket Nos. 13-24, 03-123 (filed Oct. 10, 2019).

recognition has significant race and gender biases.”⁵⁴ Hence, as Professor Stern noted, there is a lack of

data, test results, or evidence indicating that ASR-only providers have overcome the well-documented problems that arise with respect to the speech of multiple classes of speakers[,] including women, the elderly, young children, members of minority groups and individuals who speak in dialects, non-native speakers, speakers under stress, hearing-impaired speakers, and individuals suffering from various types of neurological impairment including Parkinson’s disease, cerebral palsy, etc.⁵⁵

Professor Stern adds that “IP CTS is a far more difficult task and operational domain than that of any commercial system that has ever been deployed up to now” because the captioned parties are not constrained during actual IP CTS calls to a particular specialty of the commercial ASR.⁵⁶

Ultratec agrees that “it is critically important that the systems be trained with a broad range of data that incorporates all of the potential variabilities in speech production that would be encountered when a given ASR system is put into practice.”⁵⁷ Until these issues with general commercial ASR engines are resolved, the Applicants should be required to demonstrate how their services mitigate ASR bias to deliver a functionally equivalent service for IP CTS users. It would be inappropriate, and impermissible under the law, for the Commission to approve an IP CTS technology that provides inferior service to the majority of users (*i.e.*, anyone other than white men) due to its inherent bias in its ability to caption their speech.

VI. CONCLUSION

Approval of the Applicants’ proposed ASR-only IP CTS offerings will create significant risks to users—even outside emergency situations (and the communication rights of users should

⁵⁴ See Bajorek Article.

⁵⁵ Professor Stern Paper at 2.

⁵⁶ *Id.* at 17 (emphasis omitted).

⁵⁷ *Id.* at 18.

not be contingent on their life being in danger). The hurdles many classes of IP CTS users face in communicating with others are already substantial. Exacerbating the differential treatment of such persons, even in simple day-to-day communications, by prematurely inculcating these technologies into the IP CTS regime cuts directly against the precept of functional equivalency.

Commenters uniformly express concern with the ability of the Applicants to demonstrate and ultimately deliver a functionally equivalent ASR-only IP CTS service. The record identifies significant gaps in the Commission's regulatory framework that must be addressed before IP CTS can be driven solely by ASR technologies without the direct involvement of a CA. The Applicants bear the burden of publicly demonstrating that their ASR technologies can be incorporated into IP CTS in a manner that ensures functional equivalence, and they have not done so. Without further confirmation as to the effectiveness of the specific ASR technologies proposed by the current Applicants, and without further guidance from the Commission as to how such technologies should be evaluated and perform to achieve functional equivalence, it is premature to certify any of the pending ASR-only IP CTS Applications at this time.

Respectfully submitted,

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