

UNITED STATES PATENT AND TRADEMARK OFFICE

AT&T SERVICES, INC. AND STREAMWIDE INC.

Petitioners

v.

BK TECHNOLOGIES, INC.

Patent Owner

CASE: IPR2026-00348

U.S. PATENT NO. 11,997,568

DECLARATION OF DR. JACOB SHARONY

I, Dr. Jacob Sharony, hereby declare as follows:

I. BACKGROUND

1. I have been retained by Patent Owner BK Technologies, Inc. (“BK”) in connection with the above-captioned *inter partes* review (“IPR”) proceeding involving U.S. Patent No. 11,997,568 (the “’568 Patent”) (EX1001).

2. I have been asked by BK Technologies to offer opinions regarding the ’568 Patent and the grounds on which Petitioners AT&T Services, Inc. and StreamWide Inc. (collectively, “Petitioners”) challenge Claims 1-21 (the “Challenged Claims”) of the ’568 Patent, as set forth in the Petition for IPR (Paper 1). This declaration sets forth the opinions I have reached to date regarding these matters.

3. I am being compensated by BK at my standard hourly consulting rate of \$700 per hour for my time spent on this matter. My compensation is not contingent on the outcome of the IPR or on the substance of my opinions.

4. I have no financial interest in BK.

II. BACKGROUND AND EDUCATION

5. I received a Bachelor’s Degree (1979) and Master’s Degree (1984) in Electrical Engineering from Tel Aviv University. I have M.Phil. (1991) and Ph.D. (1993) Degrees in Electrical Engineering from Columbia University. I also have an MBA Degree (1989) from Tel Aviv University.

6. I am an IEEE Life Senior Member and have over thirty five years of experience in information and communications technologies, including wireless networks, mobile devices and applications, data capture, and sensing. I have worked across the full spectrum of wireless communications technologies, including Wi-Fi, 4G LTE, 5G, WiMAX, mesh networking, Voice over Internet Protocol (“VoIP”), mobile radio systems, and push-to-talk (“PTT”) communications over Internet protocol (IP). Throughout my career, I have focused extensively on the convergence of cellular and radio communications technologies.

7. I am the founder and principal consultant of Mobius Consulting, an advisory firm I founded in 2004 that provides professional consulting services in mobile wireless strategy, technologies, systems, and applications. In that capacity, I have served as a Trusted Advisor to large clients in the telecommunications, enterprise, and government sectors, and I have participated in a lead role in several medium-to-large projects in various vertical, enterprise, and government/military markets. My areas of expertise include, among others, Wi-Fi (802.11n/ac/ax/be), 4G LTE and 5G, picocell/femtocell systems, distributed antenna systems (“DAS”), mesh networking, Internet of Things (“IoT”), machine-to-machine (“M2M”) communications, VoIP, and mobile applications and services.

8. I have also held academic positions in the field of electrical engineering and wireless communications. Since 2010, I have served as an Adjunct Professor at

Columbia University, where I teach graduate-level courses on advanced wireless technologies, including millimeter-wave wireless communications and applications for 5G/6G, and wireless sensing covering topics such as RFID, real-time location systems (“RTLS”), M2M communications, smart grid/energy, smart infrastructure, intelligent transportation, and mobile health. I have also taught courses on Auto ID and Data Capture technologies at the State University of New York at Stony Brook.

9. Earlier in my career, I served as Director of the Network Technologies Research Division at the Center of Excellence in Wireless and Information Technology at the State University of New York, Stony Brook, from 2006 to 2010. In that role, I led network technologies research, development, and commercialization efforts, served as an industry liaison, and worked on smart energy, wireless healthcare, and intelligent transportation solutions. I also deployed a mobile WiMAX pico/femto solution as part of a 4G-campus initiative and was a key contributor to the Long Island Broadband Wireless Access Initiative using Wi-Fi and 4G technologies.

10. From 1997 to 2005, I held senior leadership positions at Motorola (formerly Symbol Technologies), including Senior Director of Technology Strategy and Development and Senior Director of Research and Development. In those roles, I initiated and led research and development programs in wireless LAN technologies, including intelligent access points, reliable multicast video streaming,

mobile device management and security, and spatial wireless switching. I conceived, investigated, and developed a novel wireless switching architecture based on MIMO technology. I also guided the company's technology roadmap, explored new families of products based on multi-point MIMO architecture in mesh wireless networks, and investigated VoIP capacity in 802.11a/b/g networks. I participated actively in IEEE 802.11, 802.15, and 802.16 standards meetings and was awarded several patents during my tenure.

11. Prior to Motorola, I served as a Research Scientist at BAE Systems from 1994 to 1997, where I led the advanced mobile networking group. In that role, I developed tactical mesh-based wireless network systems for the Department of Defense and worked on advanced antenna techniques including beam steering and switching. I was awarded several patents for this work. Before that, I was a Research Fellow at the NEC Research Institute in Princeton, New Jersey, from 1992 to 1994, where I worked on optical interconnects for parallel processing and multi-dimensional switching networks. I also served as a Research Associate at the IBM Research Center in Hawthorne, New York, from 1990 to 1992, where I developed and prototyped a gigabit switch and built a testbed of a multi-wavelength optical network.

12. I have been named as an inventor on over thirty issued United States patents and numerous international patents, many of which relate to wireless

communications, wireless network architecture, location tracking, and mobile device technologies. I am the author of numerous publications in peer-reviewed proceedings and conference papers relating to wireless communications, mobile networking, and optical networks. A comprehensive list of my patents and publications is contained in my attached curriculum vitae.

13. Attached as Appendix A is a copy of my current C.V. further elaborating on my professional background and qualifications.

III. MATERIALS CONSIDERED

14. In forming my opinions, I have reviewed the '568 Patent and its prosecution history. I have reviewed and considered the references cited by the Petitioners, the Petition itself, and other documents and information as set forth in this declaration.

15. In reaching my opinions, I have relied upon my experience in the field and also considered the viewpoint of a person of ordinary skill in the art ("POSITA") at the time of the earliest claimed priority date of the '568 Patent. As explained below, I am familiar with the level of a person of ordinary skill in the art regarding the technology at issue as of that time. I understand that solely for purposes of this IPR, BK Technologies is adopting Petitioners' proposed POSITA definition, that a POSITA "would be a person having, as of January 19, 2022, (1) at least an undergraduate degree in computer sciences, engineering, or a closely related field,

or similar advanced post-graduate education in this area; and (2) one or more years of experience with wireless communication devices and networks, with more education substituting for less experience and vice versa.” Pet. at 21. In view of my qualifications, experience, and understanding of the subject matter of the claimed invention, I believe that I meet the above-mentioned criteria and consider myself a person with at least ordinary skill in the art pertaining to the ’568 patent.

IV. OVERVIEW OF THE TECHNOLOGY

16. Emergency situations often require coordination among individuals from different agencies, jurisdictions, and technical disciplines. Police officers, firefighters, emergency medical personnel, utility operators, engineers, public works personnel, military personnel, and other specialists may all be called upon to participate in a response effort. Effective response requires that these participants be able to communicate quickly and reliably, often under rapidly evolving circumstances.

17. Communications among responders have ordinarily relied on land mobile radio (“LMR”) systems. However, different organizations frequently operate with different communications services or systems depending on their needs. Different communications services may be different subscription-based offerings from different providers, with different capabilities and/or operations. Different

communications systems may include different components or features such as devices, channels, and networking hardware.

18. While interoperability between communications systems can sometimes be established through advance planning and technical integration, such arrangements may not always be practical during a developing emergency. In many situations, responders and support personnel who ultimately need to participate in incident communications are not known in advance, making pre-configuration of communications systems difficult or impossible.

19. Moreover, critical participants in an emergency response may not have access to any responding agency's communications services. For example, an incident may require participation by utility personnel, engineers, facility operators, subject matter experts, contractors, medical specialists, or other individuals whose expertise becomes necessary only after the nature and scope of an incident are understood. Such individuals are unlikely to have previously shared their credentials with any agencies or possess a device configured for accessing an agency's communications systems, yet their immediate involvement may be essential to the response effort.

A. The '568 Patent

20. The '568 Patent is entitled "System and Method for Managing Access to a Push-To-Talk-Over-Cellular Communication Network." It includes 21 claims.

Petitioners have challenged every claim. Claims 1, 8, and 15 are independent. Claims 1 and 8 recite “a method of managing access to a push-to-talk-over-cellular (POC) talkgroup,” and claim 15 recites a “non-transitory computer-readable storage medium comprising computer-executable instructions that, when executed by a computer, cause the computer to perform” various functions corresponding to the method steps of claims 1 and 8.

21. Claim 1 (below) is representative of the method according to claim 8 and the functions performed by the computer according to claim 15:

1. A method of managing access to a push-to-talk-over-cellular (POC) talkgroup, the method comprising:

providing a control device configured to:

provide a POC service; and

manage a first POC talkgroup;

granting a first non-subscriber device access to the POC service and the first POC talkgroup such that the first non-subscriber is permitted to join the first POC talkgroup and communicate via the first POC talk group using the POC service; and

transmitting, from the control device to the first non-subscriber device, a first communication including a link to download a POC software application configured to join the first POC talkgroup and communicate via the first POC talkgroup using the POC service.

22. Each of the challenged claims is directed to managing access to a POC service and a POC talkgroup. Each of the claims recites a control device configured

for providing a POC service and managing a POC talkgroup, granting a non-subscriber device access to the POC service and POC talkgroup, and transmitting to a non-subscriber device a first communication including a link to download a POC software application configured to join the POC talkgroup using the POC service.

23. The '568 Patent explains that a non-subscriber device may be a device that does not subscribe to the service provided by the operator of a control device, such as the claimed control device. EX1001 at 3:11-13. The non-subscriber device may therefore be a device that “subscribe[s] to a different POC service . . . or . . . may not subscribe to any POC service at all and may not even have any POC software installed on the device.” *Id.* at 3:14-18.

24. The '568 Patent describes systems and methods that offer a solution for rapidly adding a non-subscriber device (whether a subscriber to another POC service or no POC service at all) to the POC talkgroup. For example, the claims of the '568 Patent recite providing a control device that is configured to provide the POC service and manage the POC talkgroup, and transmitting from the control device to the non-subscriber device a link to download a POC software application configured to directly join the “POC talkgroup” and communicate “using the POC service” without further intervention from an administrator or otherwise.

25. The rapid addition of non-subscriber devices to the POC talkgroup is accomplished by the control device transmitting the link directly to the non-

subscriber devices via “a text message, email message, or message sent via another suitable communication protocol.” *Id.* at 5:13-15. The control device also provides the POC service and transmits the first communication including the link to download the POC software application with configuration information for communicating via the first talkgroup. *Id.* at 5:15-19. Thus, it does not matter what existing or previous POC services, agencies, subscriptions, or applications a non-subscriber device operated with, including none. The POC software application is configured for allowing the non-subscriber device to join the POC talkgroup and communicate using the POC service upon downloading and running the POC software application.

26. FIG. 2 of the '568 Patent (below) shows the first subscriber device 114 which may be a smartphone, tablet, computer, or other device operated by an administrator such as a dispatcher, senior agency member, or otherwise with administrative privileges for creating or managing a talkgroup. EX1001 at 4:20-32. The first non-subscriber device 202 is generally a device configured to communicate via a broadband cellular network. *Id.* at 4:36-39.

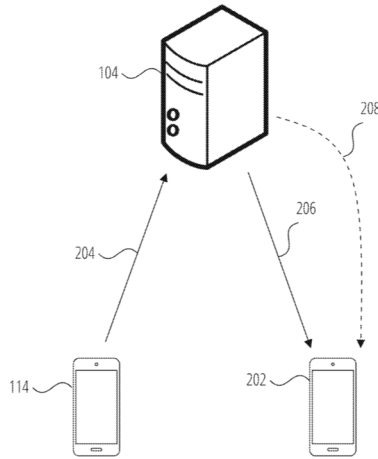


FIG. 2

27. The first subscriber device 114 has an application or other communications interface with the control device 104. *Id.* at 4:42-44. In an emergency, the administrator can create, or add responders to a talkgroup depending on the nature of the emergency. *Id.* at 4:33-36; 4:39-47. As an example, the first subscriber device 114 could send a command 204 to the control device 104 including contact information associated with the first non-subscriber device 202 and instructions to grant access to a talkgroup. *Id.* at 4:64 – 5:5. The contact information might be any identifying information linked to the first non-subscriber device 202, such as a telephone number or email address. *Id.* at 4:64-67. The command 204 from the first subscriber device 114 might also indicate a predetermined period of time for the non-subscriber device to have access to the talkgroup. The period of time

could be a default amount of time or it could be set via the first subscriber device 114. *Id.* at 5:1-7.

28. The '568 Patent explains that in response to the command 204, the control device 104 grants the first non-subscriber device 202 access to the first talkgroup and sends a first communication 206 such as a text message, email, or other suitable communication to the first non-subscriber device 202, notifying it that access has been granted to the first talkgroup. *Id.* at 5:8-15. The first communication 206 may include the configuration information and/or parameters that the first non-subscriber device will need for joining the first POC talkgroup. *Id.* at 5:15-19. The configuration information and/or parameters might be provided in the first communication 206 as a file for use by the POC software application on the first non-subscriber device 202, for instructing the software application to communicate via the first POC talkgroup, after the POC software application is downloaded and run. *Id.* at 5:15-23.

29. The first communication 206 according to the claims of the '568 Patent includes a link for downloading the POC software application. *Id.* at 5:23-25. The first non-subscriber device 202 can download and run the POC software application and communicate via the first POC talkgroup even if the first non-subscriber device 202 was not previously configured for POC communications. *Id.* at 5:25-30.

30. If the first non-subscriber device 202 was granted access to the first POC talkgroup for a predetermined period of time, the control device 104 can automatically revoke access of the first non-subscriber device 202 to the first POC talkgroup when the predetermined period of time expires. *Id.* at 5:31-36.

31. FIG. 3 (below) illustrates how the command 204 instructing the control device 104 to grant access to the first POC talkgroup could include a plurality of non-subscriber devices 302. *Id.* at 5:49-55. Each of the plurality of non-subscriber devices 302 may have its own cellular telephone number, for example. *Id.* at 5:55-58. The administrator might enter the multiple telephone numbers into the software application (i.e., communications interface) on the first subscriber device 114 and the command 204 would instruct the control device 104 to grant each of the plurality of non-subscriber devices 302 access to the first POC talkgroup, and might also include (as with a single non-subscriber device) a predetermined period of time for one or more of the plurality of non-subscriber devices 302 to have access to the talkgroup. *Id.* at 5:58-61, 6:7-12. The control device 104 would then send the first communication 206 to each of the plurality of non-subscriber devices 302 for joining the first talkgroup and communicating as I described for a first non-subscriber device 202. *Id.* at 6:7-17.

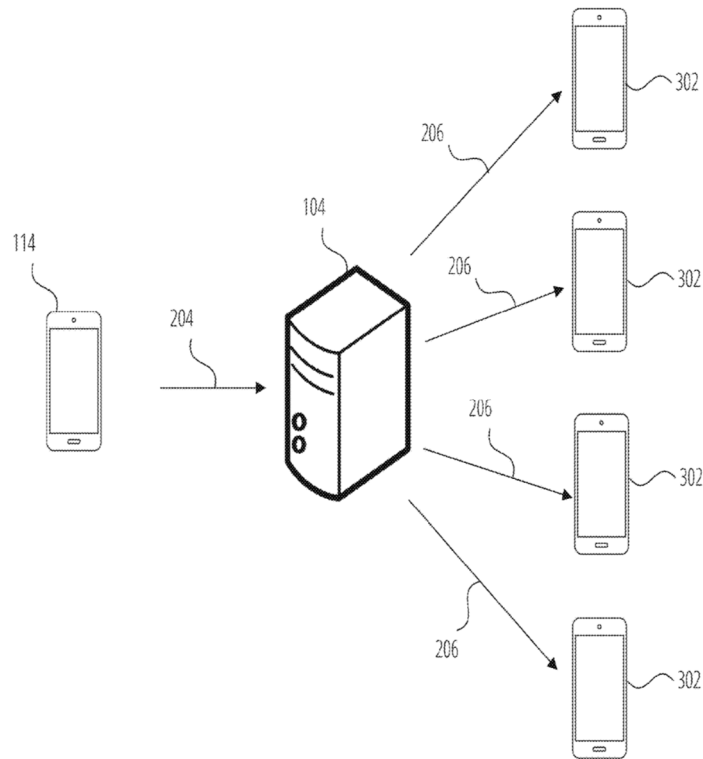


FIG. 3

32. In another aspect, the '568 Patent explains that the first talkgroup may be one of a plurality of talkgroups the control device 104 manages. *Id.* at 6:21-22. In that case, the first communication 206 from the control device 104 might include configuration information for each talkgroup in the plurality of talkgroups, and the control device 104 can grant access to one or more of the plurality of talkgroups for the first non-subscriber device 202 (or each of the plurality of non-subscriber devices 302). *Id.* at 6:21-30. The multiple talkgroups may also be linked together as part of a single virtual incident. *Id.* at 6:30-32. They may correspond to different types of responders or the geographical location of responders, as two examples. (*Id.* at 6:35-41). Also, “[e]ach individual talkgroup may be configured to facilitate

communication between particular groups [(e.g., fire, police, medical)] during an incident.” *Id.* at 6:32-34. As with the one or more non-subscriber devices, access to other talkgroups could be for a predetermined period of time after which access is automatically revoked. *Id.* at 6:42-44.

33. FIG. 7 (below) shows how LMR device users could also be invited to and join POC talkgroups 504 managed by the control device 104. *Id.* at 8:23-26. A predefined group of LMR users using LMR devices such as mobile LMR devices (512a, 512b) and handheld LMR devices (514a-514c) might be in communication via an LMR repeater system 516. *Id.* at 7:43-48. The LMR repeater system 516 might also be in communication with a communications gateway such as “a P25 core 702 [serving] as the LMR gateway to the IP network 506,” where “[t]he term P25 refers to the Project 25 suite of standards for interoperable digital two-way radio products.” *Id.* at 8:15-19. The P25 core 702 might be in communication with a radio gateway 508 which is in communication with the IP network 506. *Id.* at 8:1-8.

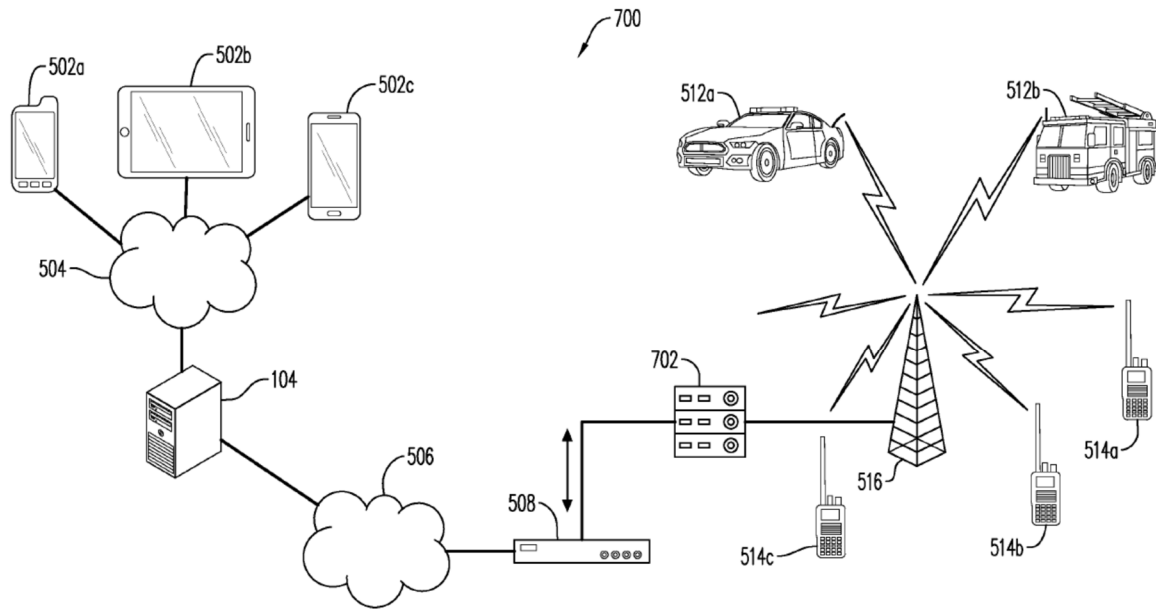


FIG. 7

34. In the case shown in FIG. 7, the administrator could enter identifying information of the LMR gateway (i.e., the P25 core), such as an IP address, for identifying the LMR gateway. *Id.* at 8:29-32. In other words, the LMR gateway is a non-subscriber device identified by an IP address. Once the IP address of the LMR gateway is entered, any LMR devices on the corresponding LMR network will have access to the POC talkgroups 504 via the control device 104. *Id.* at 8:32-35.

B. Prosecution History

35. I understand that the '568 Patent was assigned US App. No. 17/844,488 ("the '488 Application") when it was filed on June 20, 2022, and that it claims priority to US Provisional App. No. 63/300,899 filed January 19, 2022. EX1002 at 432. Prosecution of the '568 Patent included multiple Office Actions (*id.* at 135-59, 214-35, 291-305, 348-62), and the Applicant responded to each with remarks and

claim amendments. *Id.* at 123-34, 194-207, 273-90, 323-35. The Applicant also spoke with the Examiner during interviews. *Id.* at 98-99, 211-12, 341-42. To resolve rejections the Examiner was making based on prior art, the prosecution history includes pre-appeal reviews by a panel of examiners, including the application's Examiner and their Supervisory Examiner (*id.* at 101-12, 250-57) and an Appeal Brief (*id.* at 45-91). Throughout prosecution, the Examiner was assessing the claims and the Applicant's amendments against various prior art references, including the claim limitations about the POC service, the non-subscriber device, and the method by which a non-subscriber device is granted access to join and communicate via a POC talkgroup. *See id.* at 135-59, 214-35, 291-305, 348-62.

36. Applicant's February 2, 2024 Appeal Brief emphasized that the claims require granting a non-subscriber device access to join a POC talkgroup and communicate via the POC talkgroup using the POC service, including transmitting a first communication containing a link to download a POC software application configured for joining the POC talkgroup and communicating via the POC talkgroup using the POC service. *Id.* at 61-84. Applicant further explained that the claimed methods and instructions executed by a computer address the need to quickly and efficiently manage access to push-to-talk ("PTT") talkgroups, including in emergency-response settings where rapid onboarding may be required and complicated administrative procedures may be impractical. *Id.* at 60-61.

37. Applicant also provided information regarding the “non-subscriber device.” *Id.* at 285, 434-35. Applicant explained that according to the ’488 Application, such a device does not subscribe to the service provided by the operator of the control device. *Id.* Instead, the non-subscriber device may subscribe to a different POC service, subscribe to no POC service at all, or lack POC software altogether before receiving the first communication from the control device and downloading the POC software application. *Id.* I find this consistent with and agree that the ’568 Patent refers to non-subscriber devices as falling under any of those categories. In my opinion, a “non-subscriber device” according to the ’568 Patent is not merely a device participating through a different communications environment.

38. Some of the prior art in the Examiner’s rejections against the claims of the ’488 Application discussed communication with a non-subscriber device but did not permit the non-subscriber device to join a POC talkgroup and communicate via that POC talkgroup using the POC service. *See, e.g., id.* at 64-73. Other prior art discussed subscriber POC clients, multimedia attachments, or already-loaded applications, but not transmitting to a non-subscriber device a link to download a POC software application configured to join and communicate via the POC talkgroup. *See, e.g., id.* at 73-80.

39. I understand that the Examiner allowed the claims after Applicant submitted the Appeal Brief. The Notice of Allowability says that claims 1-9, 11-17,

and 19-23 were allowable “for the reasons as stated in Applicant’s arguments (dated 02/02/2024).” EX1002 at 31.

40. In sum, the prosecution history shows that the claims of the ’568 Patent went through a rigorous examination and were allowed based on Applicant’s arguments with respect to the claimed POC access-management framework.

V. THE CITED PRIOR ART

A. Mazzarella

41. U.S. Patent No. 9,794,761 (“Mazzarella”) (EX1004) is directed to the formation and management of dynamic PTT talkgroups¹ among agencies participating in an incident response. EX1004 at 3:64 – 4:4. Users may be invited to join talkgroups through processes administered by the participating agencies, including downloading an agency client PTT application, providing User Identity & Credentials information, and being added to a talkgroup by an agency administrator. *Id.* at 5:55-66, 10:11-36. FIG. 1 of Mazzarella (below, annotated) illustrates Mazzarella’s system 100 in which each agency (Agency A, Agency B) has its own agency server 107, 125 and “interoperability gateway” 170, 175 through which the agencies, according to Mazzarella, “have established secure communications over a network such as IP Network 135,” and “[a] secure community or agency includes a

¹ Mazzarella uses the two-word “talk group” phrase while the ’568 Patent uses a single word (“talkgroup”). For simplicity, I refer to a “talkgroup”—single word—except when “talk group” appears in direct quotes.

collection of communication resources having an administrator that maintains control over the agency.” *Id.* at 5:46-52, 6:19-24. Each agency system also has a database 109, 180 along with the agency server 107, 125 and interoperability gateway 170, 175, and together they define each agency’s system (Agency A System 105, Agency B System 120). *Id.* at 5:46-50.

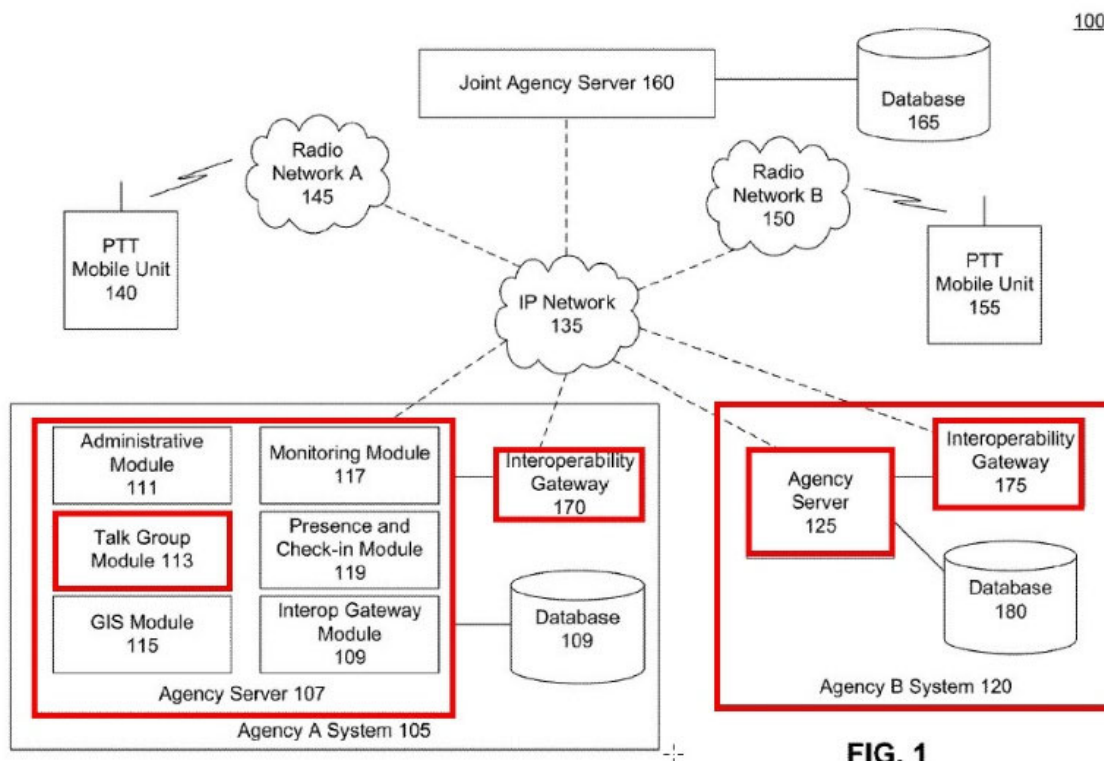


FIG. 1

42. FIG. 1 also shows a “joint agency server 160” and Mazzarella explains that “[a] joint agency application server [160] is a multi-agency node that is a peer to each agency (e.g., not a central command control) that can invite one or more agencies to make more information visible (e.g., may request a change to a dynamic

access permission) [but e]ach agency is in logical and physical control of their resources and information.” *Id.* at 5:19-26.

43. Each agency server like 107 has a talkgroup module 113 that creates and manages talkgroups that “may include members from one or more agencies as well as members of different networks.” *Id.* at 6:12-16, 9:32-38. Mazzarella’s system therefore has an architecture in which participating agencies maintain their own agency-specific infrastructure for communications management including creating and managing talkgroups. This is because, as Mazzarella explains, one challenge for interoperability between agency communications is that an “organization responsible for the operation of its radio system(s) may be unable or unwilling to grant control of its resources either to peer organizations or to a higher-level organization.” *Id.* at 1:34-51.

44. Mazzarella seeks to address what it describes as the problem of “inadequate” published information regarding talkgroup members belonging to different agencies and the resulting difficulty of creating and managing incident-specific talkgroups. *Id.* at 3:34-38. For example, Mazzarella says that conventional PTT systems may require significant coordination among agencies and administrators and Mazzarella’s solution is to provide mechanisms for dynamically forming and managing talkgroups during incident response operations. *Id.* at 2:37-51, 3:64 – 4:4. But the systems in Mazzarella are directed to supporting PTT services

among members of the agencies responding to an incident, where “each agency includes an agency PTT application server that connects, routes, and exchanges voice and data messages among PTT application clients on computing devices whose users are members of a talk group.” *Id.* at 5:53-58. Agency server 107, for example, “directly receives and transmits PTT messages from talk group members that are associated with the same agency (e.g., agency A) [and] receives and transmits PTT messages from the remaining talk group members that are not associated with the same agency (e.g., not associated with agency A) via an interoperability gateway (e.g., interoperability gateway 170).” *Id.* at 6:16-24.

45. Mazzarella expressly describes a “PTT application” as “a two-way push to talk voice communication and data communications sharing application” used by members of a talkgroup. *Id.* at 5:58-60. Mazzarella describes a talkgroup as a “logically defined communications group” comprised of PTT users that are invited to join and accept the invitation to join the talk group. *Id.* at 5:60-66. According to Mazzarella’s methods, “[i]f the user accepts the talkgroup invitation, the user may download the agency’s client PTT application to their mobile computing device, enter User Identity & Credentials in an acceptance email, and electronically transmit the acceptance email response to the inviting agency’s agency PTT administrator.” *Id.* at 10:22-27. Mazzarella also notes that “several exchanges may take place between the agency PTT administrator and the accepting user to obtain the User

Identity & Credentials information.” *Id.* at 10:28-32. Then, the agency PTT administrator adds the User Identity & Credentials to their agency’s database and uses the talkgroup module to add the accepting user to the talkgroup. *Id.* at 10:39-42.

46. If a mobile computing device is not associated with an agency responding to an incident, Mazzarella describes:

[f]or example, Agency A PTT administrator or a PTT mobile unit user of Agency A with delegation authority may electronically transmit an invitation to a mobile computing device whose user is not associated with agencies responding to an incident (e.g., Agency C (not shown)[]) that has a complementary radio system (e.g., a cellular network) or that has a separate land mobile radio system (e.g., an emergency first responder radio network). The invitation may be an email message that includes a hyperlink to a web page that allows the user to download Agency A’s client PTT application to their mobile computing device (e.g., smart phone). The user enters required User ID & Credentials information along with any subscription information channel acceptances in an acceptance response sent to Agency A PTT administrator. Once the user is added to the talk group, the user may electronically transmit communications to and electronically receive communications from the talk group as well as electronically receive subscribed information.

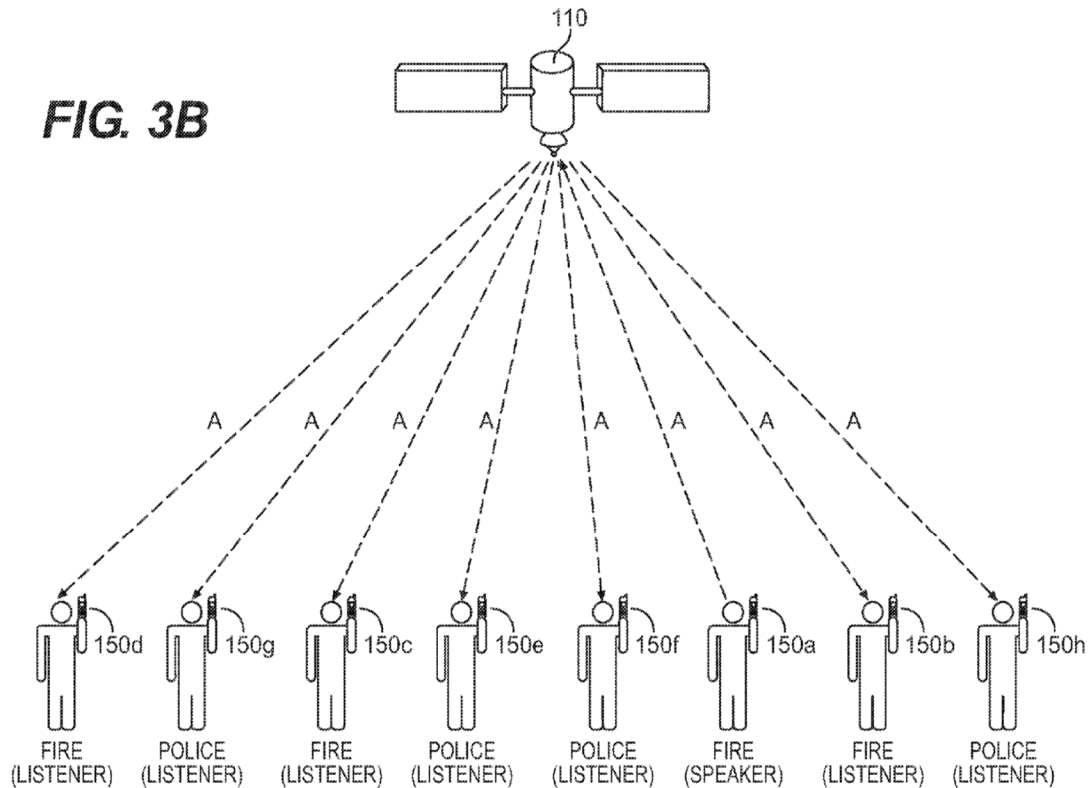
Id. at 10:48-65.

B. Tillet ’981

47. U.S. Patent No. 9,525,981 (“Tillet ’981”) (EX1005) is directed generally to sharing talkgroups between organizations, including emergency response agencies. EX1005 at 5:1-13. According to Tillet ’981, “one or more PTT

talkgroups may be assigned to a particular organization, a particular group of devices, a particular group of users or organizations, or some combination thereof However, situations may arise in which it may be useful for the organization to which the talkgroup is assigned to provide a user (or affiliated communication device) that is not a member of (or associated with) the organization with limited access to the talkgroup.” *Id.* at 7:54-67. Tillet ’981 describes, in such case, that an organization may share one or more of its assigned talkgroups with “a non-member or other user or device that may not otherwise have access to such talkgroup(s) [and s]uch sharing of a talkgroup may allow for opening of the membership of the talkgroup to members of one or more organizations other than the organization to which the talkgroup is assigned.” *Id.* at 8:2-7.

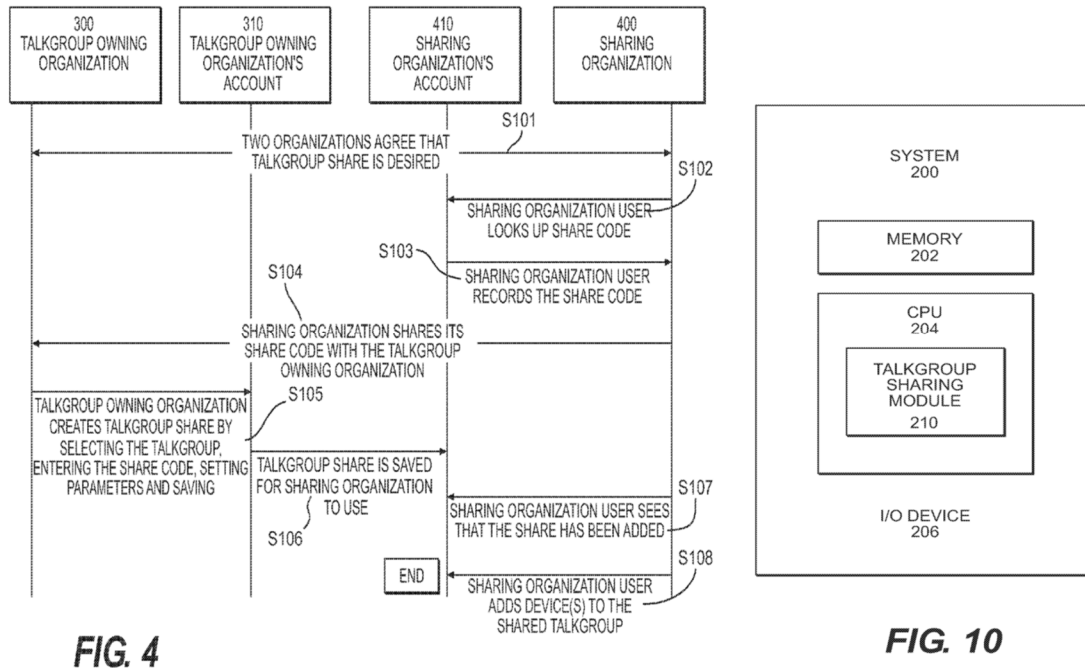
48. FIG. 3B (below) illustrates what Tillet ’981 describes as sharing in which “an organization shares a talkgroup assigned to it with another organization Specifically, . . . an example situation in which the fire-fighting organization shares talkgroup A, which is assigned for use by the firefighting organization, with users from the police-responder organization. In particular, the fire-fighting organization may share access rights to talkgroup A, such that one or more of communication devices 150e-h also may access talkgroup A.” *Id.* at 8:59 – 9:1.



49. Tillet '981 describes “access” and “sharing access” to a talkgroup allowing “members of the police-responder organization may use communication devices 150e-h to listen to communications from the member of the fire-fighting organization speaking into communication device 150a or vice versa, for example.” *Id.* at 9:7-11.

50. FIG. 4 and FIG. 10 (below) of Tillet '981 show what Tillet '981 describes is “a method for enabling the sharing of a talkgroup between two different organizations . . . as being performed by system 200 of FIG. 10.” *Id.* at 9:46-49. An “operation hub” according to Tillet '981 might include PTT service subscriber accounts for different organizations or groups. *Id.* at 9:50-54. “For example,

operation hub 130 may maintain a first account (e.g., talkgroup owning organization's account 310) for a first organization (e.g., talkgroup owning organization 300) and a second account (e.g., sharing organization's account 410) for a second organization (e.g., sharing organization 400).” *Id.* at 9:55-60.



51. Following the process shown in FIG. 4, at step S101, the “talkgroup sharing organization 400 may request that talkgroup owning organization 300 share a talkgroup that is assigned to talkgroup owning organization 300 with talkgroup sharing organization 400 to enable members of talkgroup sharing organization 400 to communicate with members of the talkgroup owning organization 300 within a shared talkgroup.” EX1005 at 10:13-21. In S102, the talkgroup sharing organization 400 accesses the system 200 and requests a sharecode that identifies the talkgroup sharing organization 400, from the sharing organization’s account 410. *Id.* at 10:29-

32. In S103, the talkgroup sharing module 210 generates and sends the sharecode to talkgroup sharing organization 400. *Id.* at 10:39-45. The talkgroup sharing organization 400 then shares the sharecode with the talkgroup owning organization 300 (at S104) and the talkgroup owning organization 300 instructs the talkgroup sharing module 210 to initiate sharing of one or more talkgroups assigned to the talkgroup owning organization 300 with the talkgroup sharing organization 400. *Id.* at 11:25-30.

52. The talkgroup owning organization 300 may “set a time period so as to limit the sharing of the talkgroup(s) to a defined time period . . . during which the talkgroup(s) will be shared [*sic*] talkgroup sharing organization 400.” *Id.* at 12:15-23. Further, “the talkgroup sharing module 210 may notify talkgroup sharing organization 400 that members of talkgroup sharing organization 400 may participate in the shared talkgroup(s),” for example, for the set time period. *Id.* at 13:44-47. In one example, Tillet ’981 describes “talkgroup sharing organization 400 may request that talkgroup sharing module 210 add a number of communication devices associated with talkgroup sharing organization 400 . . . to a shared talkgroup,” and “[i]n response, talkgroup sharing module 210 may cause the specified communication devices associated with the talkgroup sharing organization 400 to be provisioned to be able to access the shared talkgroup(s).” *Id.* at 14:28-42. Specifically, “communication devices may be able to access and participate in the

shared talkgroup(s). For example, graphical user interfaces (GUIs) rendered on the specified communication devices may identify the shared talkgroup(s) as talkgroups that are accessible from the specified communication devices and enable users of the specified communication devices to participate in the shared talkgroup(s).” *Id.* at 14:42-49.

53. In other words, Tillet ’981 describes adding devices to a shared talkgroup as causing the devices to be provisioned to be able to access the shared talkgroup during the defined time period. After the defined time period, the talkgroup is no longer shared with the talkgroup sharing organization 400 and the devices of talkgroup sharing organization 400 may no longer participate in the shared talkgroup.

C. Tillet ’066

54. U.S. Patent No. 9,763,066 (“Tillet ’066”) (EX1006) is generally directed to satellite-coordinated control channels for talkgroups defined in different geographic regions. EX1006 at Abstract. “In certain implementations, for example, a device 120 connected with management center 130 may function as a management center and may manage [sic] a plurality of talkgroups . . . assigned to a plurality of devices, such as communication devices 150 . . . or organizations. In such implementations, the device 120 may establish, for example, connection orders for such talkgroups, priority settings for such talkgroups, home settings for such

talkgroups, security settings or keys for such talkgroups, or other protocols for talkgroups.” *Id.* at 7:6-16.

55. With respect to FIG. 4 below, Tillet ’066 describes a method of providing a “warm” talkgroup in a satellite-based PTT system. *Id.* at 16:15-17.

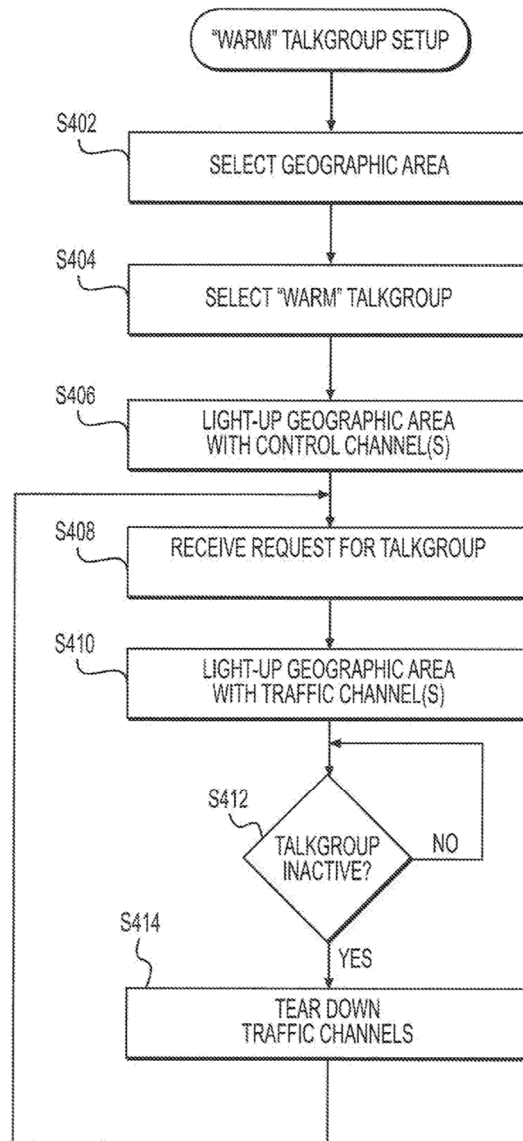


FIG. 4

56. “In S402, one or more geographic areas are selected as the coverage area for a talkgroup, for example, by an administrator at a management center . . .

(e.g., an operations hub). One or more communication devices . . . may be provisioned to communicate on network . . . using the talkgroup, for example.” *Id.* at 16:29-34. In S404, the administrator may define the particular talkgroup as a “warm” talkgroup if the administrator determines, for example, “a need for reduced latency associated with instantiation of the particular talkgroup and, as a result, may determine that the particular talkgroup should be maintained as a ‘warm’ talkgroup.” *Id.* at 16:40-45. At S406, “satellite(s) . . . that is/are currently providing beams covering the coverage area may establish control channel(s) for the particular talkgroup, such that the control channel(s) for the talkgroup are active throughout the entire coverage area defined for the particular talkgroup, for example, even without a communication device provisioned to participate in the talkgroup having requested the instantiation of the talkgroup.” *Id.* at 16:50-60.

57. At step S408, a device may request that the “warm” talkgroup be instantiated, and at S410 the request is passed to the management center and an administrator may control the satellite to allocate traffic channel(s) for the “warm” talkgroup within the beams that are covering the defined coverage area for the talkgroup. *Id.* at 17:14-22, 17:28-38. For example, “[o]ne or more devices 120 may connect with management center 130,” (*Id.* at 6:63-64), and “[the] device 120 connected with management center 130 may function as a management center and

may manage [sic] a plurality of talkgroups [] assigned to a plurality of devices, such as communication devices 150 [] or organizations” (*Id.* at 7:6-11).

58. Tillet ’066 further describes that the administrator “may establish, for example, connection orders for such talkgroups, priority settings for such talkgroups, home settings for such talkgroups, security settings or keys for such talkgroups, or other protocols for talkgroups.” *Id.* at 7:11-16. Later, at S412, the administrator may determine that a talkgroup has become inactive and at S414 will instruct the satellites providing the traffic channels to “tear down (e.g., reallocate or terminate) the traffic channels for the particular talkgroup.” *Id.* at 17:49-66.

VI. CONSTRUCTION OF CLAIM TERMS

59. I understand that claim terms in an IPR should be accorded their ordinary and customary meaning as understood by one of ordinary skill in the art at the time of the invention in light of the patent specification and the prosecution history pertaining to the patent.

VII. PETITIONERS’ ASSERTED GROUNDS OF UNPATENTABILITY OF THE CHALLENGED CLAIMS

60. Each of the two grounds in the Petition includes Mazzarella. However, Mazzarella does not disclose at least the following claim elements of the ’568 Patent: (1) a control device such as a computer configured for providing a POC service; (2) transmitting, from a control device to a first non-subscriber device, a first communication; and (3) a first communication including a link to download a POC

software application configured to join a POC talkgroup. Tillet '981 and/or Tillet '066 (collectively, the “Tillet References”) also do not disclose those features and the Petition does not cite either Tillet Reference with respect to those features.

61. Regarding Ground 2, a POSITA would not have sought to combine Mazzarella with either or both Tillet References. In addition, the proposed combination would not disclose the subject matter of what the Petition calls “The Revoking Claims.”² For example, the combination of Mazzarella and the Tillet References does not disclose automatically revoking access of a first non-subscriber device to a first talkgroup.

A. Mazzarella Does Not Anticipate Claims 1, 3, 5-8, 11-15, or 18-21 (Ground 1)

62. Mazzarella does not disclose the claimed control device configured to provide a POC service or transmit communications to a first non-subscriber device, or the claimed POC software application configured to join a POC talkgroup. Mazzarella instead describes an agency-centered PTT architecture in which agency administrators, agency servers, and interoperability gateways are used to create and manage talkgroups among participating agencies.

63. In Mazzarella, agency-specific servers directly receive and transmit PTT messages among talkgroup members associated with the same agency—i.e.,

² The Petition defines Claims 2, 4, 9, 10, 16, and 17 as “the Revoking Claims.” Pet. at 43.

subscriber devices. EX1004 at FIG. 1, 6:16-24. PTT messages from talkgroup members not associated with the same agency—i.e., non-subscriber devices—are transmitted via interoperability gateways communicating over an IP network. *Id.*

64. To add a non-subscriber device to a talkgroup, Mazzarella’s invitation processes require the device to download the inviting agency’s client PTT application and provide User Identity & Credentials information, potentially through multiple communications with the inviting agency’s server. *Id.* at 10:18-32. Then the agency administrator adds the non-subscriber device to the talkgroup, after the non-subscriber device provides the User Identity & Credentials information. *Id.* at 10:39-42.

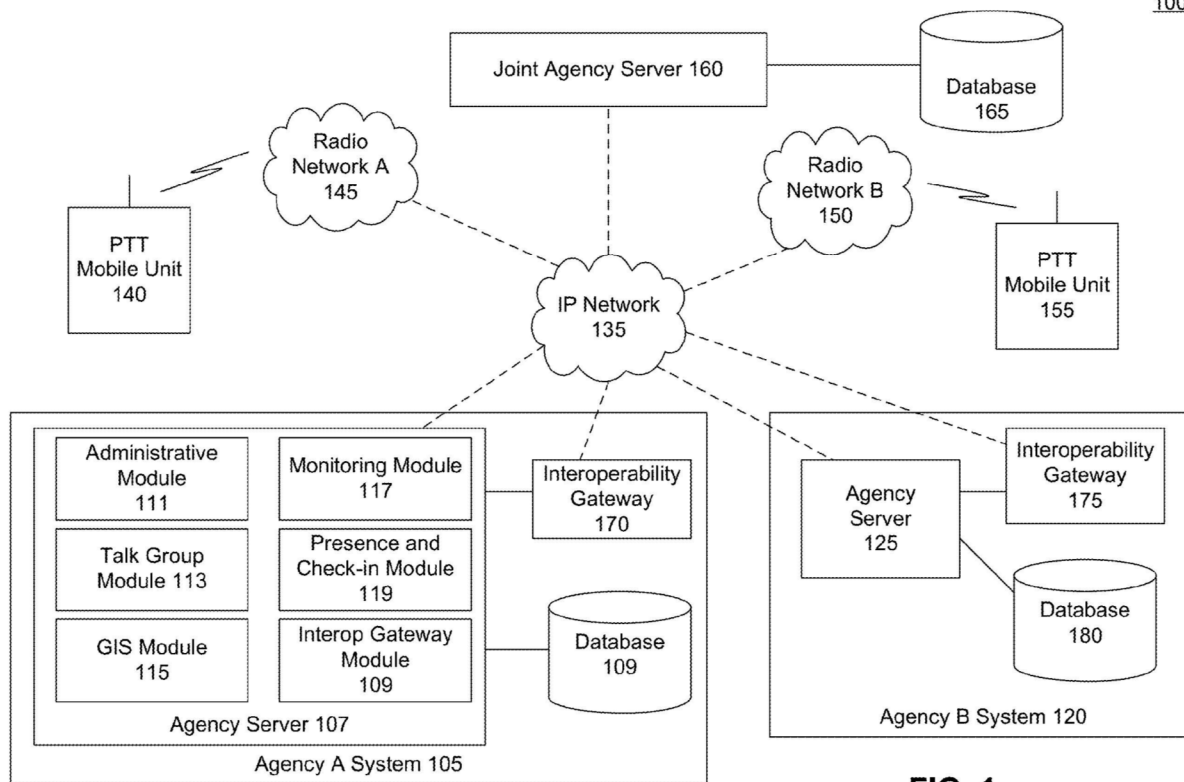
65. The Petition applies Mazzarella’s agency-administered PTT system with respect to the claimed POC service. But Mazzarella’s use of IP-based or cellular-network communications alone does not satisfy the specific claim limitations. For example, Mazzarella does not disclose a control device or communications for providing a POC service and transmitting the first communication including the link to download the POC software application according to the challenged claims.

1. Mazzarella fails to disclose “a control device configured to provide a POC service”

66. The Petition discusses Mazzarella’s agency servers and/or joint agency server as corresponding to the claimed “control device configured to provide a POC

service.” Pet. at 23-24. However, the Petition does not cite any portion of Mazzarella disclosing a device configured to provide the claimed POC service.

67. FIG. 1 of Mazzarella (below) shows that if Mazzarella’s agency server 107 is considered a control device according to the claims, the agency server 107 does not provide an operator-subscriber POC service and rather connects, routes, and exchanges voice and data messages between members of a talkgroup via IP network 135 and radio network A 145. EX1004 at 6:2-4. Mazzarella discloses no operator-subscriber service relationship for PTT and its talkgroups are assigned to radio channels. *Id.* at 9:46-49. On the other hand, the ’568 Patent refers to “a device that subscribes to a service provided by an operator of the control device 104.” EX1001 at 3:6-8.

**FIG. 1**

68. Also, the joint agency server 160 (peer, not a central command control) cannot be the control device because it provides no communications service. Mazzarella's joint agency server 160 is a "peer" of each agency system, for inviting agencies to make talkgroup or user information visible to the other agencies. It does not serve as a central command control or exercise any control over the agency systems or communications.

69. While the agency servers 107, 125 and joint agency server 160 transmit certain communications over an IP network 135, the claims require a control device configured to provide a POC service. The Petition does not cite any portion of Mazzarella disclosing that an agency server or the joint agency server performs the

claimed method step of providing a POC service. None of the agency servers 107, 125, the joint agency server 160, or any other component that communicates via the IP network 135—e.g., the interoperability gateways 170, 175—is a control device as claimed because no component in Mazzarella provides a POC service, manages a talkgroup, and transmits a first communication to a non-subscriber device.

70. Also, Mazzarella's information flow functions are split across agency server 107, interoperability gateway 170, database 109, a human administrator, and joint server 160.

71. In sum, Mazzarella does not disclose a control device configured to provide a POC service, as the claims require.

2. Mazzarella fails to disclose “transmitting from a control device to the first non-subscriber device a first communication”

72. Mazzarella also does not disclose “transmitting, from the control device to the first non-subscriber device, a first communication.” Mazzarella does not disclose a control device that transmits any communications to a non-subscriber device. In the case where an agency (e.g., Agency A) according to Mazzarella is inviting a non-subscriber device, i.e., a device “associated” with a different agency responding to an incident (e.g., Agency B) or to an agency that is not responding to an incident (e.g., Agency C), to join a talkgroup, PTT communications between the

non-subscriber device and the talkgroup are via the interoperability gateway 170. EX1004 at 6:19-24, 10:48-55.

73. Again, if the agency server 107 in Mazzarella is a control device according to the claims, Mazzarella does not disclose that the agency server 107 ever communicates with a device that is not associated with Agency A (i.e., a non-subscriber device). The agency server 107 communicates PTT messages with talkgroup members not associated with Agency A via interoperability gateway 170. *Id.* at 6:16-24. Also, any “link to download a POC software application” (as part of the first communication) is not sent by agency server 107 and/or joint agency server 160. Mazzarella’s invitation carrying the hyperlink is transmitted by “Agency A PTT administrator or a PTT mobile unit user of Agency A with delegation authority” EX1004 at 10:48-50, and “may be sent via other communications networks or means, including email, short message service (SMS)...” *Id.* at 9:50-57. Each agency’s server directly communicates only with PTT mobile units associated with that agency (i.e., subscriber devices). The Petition does not cite any portion of Mazzarella that discloses a control device transmitting the first communication to the non-subscriber device.

74. In sum, Mazzarella fails to disclose transmitting from a control device to a first non-subscriber device a first communication.

3. Mazzarella fails to disclose a first communication “including a link to download a POC software application configured to join the POC talkgroup”

75. Mazzarella does not disclose any communication “including a link to download a POC software application configured to join the POC talkgroup.” Mazzarella instead describes providing a link for downloading a PTT software application as part of an onboarding process in which the user provides User Identity & Credentials information to the inviting agency administrator before the agency administrator adds them to a talkgroup, using the talk group module 113 of the agency server 107. EX1004 at 10:39-42. Mazzarella discloses that “several exchanges may take place” for obtaining the User Identity & Credentials. *Id.* at 10:28-32.

76. Mazzarella describes at least two distinct steps—(1) downloading the agency PTT application and (2) providing User Identity & Credentials information—before an agency administrator adds the non-subscriber device to a talkgroup.

77. This is a significant distinction because the challenged claims require a first communication “including a link to download a POC software application configured to join the first POC talkgroup and communicate via the first POC talkgroup.” EX1001 at Claim 1. A non-subscriber device according to the claims is “grant[ed] . . . access to the POC service and the first POC talkgroup” such that upon

downloading and running the POC software application, the non-subscriber device is joined to the first POC talkgroup and communicates via the first POC talkgroup. Mazzearella describes an opposite workflow in which the user first receives a download link for an agency's PTT application for inputting and transmitting User Identity & Credentials information to the agency administrator, and, second, the user is added to the PTT talkgroup (e.g., granted access) by the agency administrator.

78. This distinction reflects the difference between the objective of the '568 Patent—to facilitate rapid participation by users who may not already be enrolled in the communications environment—and Mazzearella's goal of providing interoperability through agency-centric systems that allow different agencies to retain control of their own resources.

79. In sum, Mazzearella does not disclose a first communication including a link to download a POC software application configured to join the POC talkgroup.

B. Ground 2: Mazzearella in view of the Tillet References does not Render Any of Claims 2, 4, 9, 10, 16, or 17 Unpatentable

80. Mazzearella fails to anticipate the independent claims, claims 1, 8, and 15, for at least the reasons above. Neither of the Tillet References discloses the features discussed with respect to Ground 1. In addition, Mazzearella in view of the Tillet References does not disclose the following limitations: (1) “automatically revoking access of the first non-subscriber device to the first POC talkgroup after a predetermined period of time has elapsed” as required by claims 2, 9, and 16, (2)

“setting a predetermined period of time via the first subscriber device” as required by claims 4, 10, and 17 and (3) “automatically revoking access of the first non-subscriber device to the first POC talkgroup after the predetermined period of time has elapsed” as required by claims 4, 10, and 17.

81. A POSITA also would not have combined Mazzarella with either Tillet Reference because Mazzarella does not suggest limiting a device’s access to a talkgroup.

1. Mazzarella in view of Tillet ’981 does not disclose “automatically revoking access of the first non-subscriber device to the first POC talkgroup after a predetermined period of time has elapsed” as required by claims 2, 9, and 16

82. Tillet ’981 does not disclose any automatic revocation of access of a first non-subscriber device to a first POC talkgroup after a predetermined period of time has elapsed. Claims 1, 8, and 15 each recite that “access to the POC service and the first POC talkgroup [is] such that the first non-subscriber is permitted to join the first POC talkgroup,” among other things. Accordingly, “revoking access” as required in claims 2, 9, and 16 includes revoking a non-subscriber device’s access “to join the first POC talkgroup.” Tillet ’981 does not disclose “revoking access of the first non-subscriber device” at least because Tillet ’981 does not disclose that a non-subscriber device is ever joined to a POC talkgroup or has any access to revoke.

83. Tillet '981 instead describes talkgroup sharing by which devices from a sharing organization (members of organization(s) other than the owning organization) are provided with access to communicate with members of a talkgroup assigned to an owning organization. "Such sharing [] may allow for opening of the membership of the talkgroup." EX1005 at 8:4-7. That sharing is arranged between the organizations themselves: "For example, talkgroup sharing organization 400 may request that talkgroup owning organization 300 share a talkgroup [] to enable members of talkgroup sharing organization 400 to communicate with members of the talkgroup owning organization 300 within a shared talkgroup, and the talkgroup owning organization 300 may agree. This request and consent may occur out-of-band or otherwise outside of the PTT communication system." *Id.* at 10:15-24. This means that Tillet '981's sharing is negotiated between two organizations outside the system, not a control device granting device access to a talkgroup. After a defined time period, the talkgroup is no longer shared by the owning organization and the devices from the sharing organization cannot access it. But what ends is the sharing between the organizations, not any particular device's access. Further, Tillet '981 does not disclose automatically revoking a particular non-subscriber device's access by a control device. The Petition does not cite any portion of Tillet '981 that discloses a control device automatically revoking access of a first non-subscriber device to a first POC talkgroup after a predetermined period of time.

2. Mazzarella in view of the Tillet references does not disclose “setting a predetermined period of time via the first subscriber device” and “automatically revoking access of the first non-subscriber device to the first POC talkgroup after the predetermined period of time has elapsed” as required by claims 4, 10, and 17

84. Mazzarella in view of Tillet '981 does not disclose “automatically revoking access of the first non-subscriber device to the first POC talkgroup after the predetermined period of time has elapsed,” as discussed above with respect to claims 2, 9, and 16. Tillet '066 does not disclose that feature either. The Petition does not cite any portion of Tillet '066 disclosing that a first subscriber device (mapped to device 120) sets a predetermined period of time, as required by claims 4, 10, and 17. Tillet '066 also does not disclose “control[ling] revocation of access to talkgroups by non-subscriber communication devices.” Pet. at 54-55. The administrator “may, for example, use a device 120 connected to management center 130” to select the coverage area. EX1006 at 16:34-36.

85. Tillet '066 instead discusses termination or reallocation of talkgroup traffic channels by a satellite network infrastructure when the device 120 at the management center 130 determines that a “warm” talkgroup is inactive. *Id.* at 17:49-51. In other words, Tillet '066 discloses management of the access available to devices (by tearing down traffic channels if a talkgroup becomes inactive) but does not disclose revoking one or more devices’ access to a talkgroup.

86. Tillet '066 also does not disclose that “a predetermined amount of time” is a parameter that an administrator may set for providing access to a talkgroup. The Petition cites a portion of Tillet '066 describing “connection orders for such talkgroups, priority settings for such talkgroups, home settings for such talkgroups, security settings or keys for such talkgroups, or other protocols for talkgroups.” Pet. at 52-53 (citing EX1006 at 7:7-16).

3. A POSITA would not be motivated to combine Mazzarella with either Tillet Reference, alone or in combination

87. The Petition indicates that “Mazzarella anticipates all of the '568 patent claims except specifically those claims directed to revoking access based on time.” Pet at 44. The petition cites two lines from Mazzarella to justify motivation to combine the Tillet references. Pet 44-45. The two lines state: “[a]lso, a PTT user may also electronically receive or view less information when a different rule is satisfied.” EX1004 at 9:1-2. This passage concerns dynamic access permission changes that may change the type or amount of information a PTT user may receive or view (e.g., info from another PTT user’s location synchronization) while retaining talkgroup access. It does not address revoking a device’s access and does not distinguish between subscriber and non-subscriber devices.

88. Mazzarella’s dynamic access permissions govern the information available to users coordinating a response based on criteria such as location and

authorization. While Mazzarella may suggest varying the information available to different participants based on permissions criteria, none of those is time-based. Mazzarella does not disclose “automatically revoking access of a first non-subscriber device to a first POC talkgroup after a predetermined period of time has elapsed.”

89. A POSITA would not understand the cited passage—directed to a user’s receipt or viewing of less information—as suggesting that Mazzarella be modified to revoke a device’s talkgroup access. A POSITA therefore would have had no reason to modify Mazzarella to add time-based parameters.

I hereby declare that all statements of my knowledge made in this declaration are true and that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Dated: August 6, 2026

A handwritten signature in dark ink, appearing to read "J. Sharony", enclosed within a horizontal oval shape. The signature is positioned above a solid horizontal line.

Dr. Jacob Sharony

APPENDIX

A

Seasoned professional with over 35 years experience and expertise in information communications technologies (ICT), wireless networks, mobile devices/applications, data capture and sensing; visionary, creative and innovative with strong technology and business skills.

EXPERIENCE

MOBIUS CONSULTING, Huntington Station, NY

2004 –

Founder, Principal Consultant

- Professional consulting services in mobile wireless strategy, technologies, systems and applications.
- “Trusted Advisor” role facing large clients in telecom, vertical enterprises and government, building trust and relationships.
- Expertise includes WiFi (802.11n/ac/ax/be), 4G LTE and 5G, WiMAX, picocell/femtocell, DAS, mesh networking, Internet of Things (IoT), M2M, RFID, RTLS, smart antennas, OFDM/OFDMA, MU-MIMO/beamforming, cloud computing, mobile crowd sourcing/sensing, enterprise mobility, security protocols, mobile embedded devices, device management, mobile applications/services, LBS, VoIP, video streaming, Zigbee, Bluetooth, sensor networks, RTLS, smart grid, m-health, m-learning, smart home networking.
- System and network protocol analysis, modeling and simulations of wireless systems (e.g., WiFi, LTE) for network performance assessment and optimization.
- Participated in a lead role in several medium-large projects in various vertical, enterprise and government/military markets, e.g., smart grid, mobile health, WiFi and 4G deployments.
- Selected consulting engagements are listed below: Lattice Semiconductor, SiBEAM, Powerwave Technologies, Time Warner Cable, and Corning-MobileAccess.

COLUMBIA UNIVERSITY, New York, NY

2010 –

Adjunct Professor

- Professor of Electrical Engineering. Teaching graduate courses on advanced wireless technologies: mmWave Wireless Communications and Applications for 5G/6G, Wireless Sensing (RFID, RTLS, M2M communications, smart grid/energy, smart infrastructure, intelligent transportation, m-health).

LATTICE SEMICONDUCTOR, Sunnyvale, CA

2014 – 2016

CTO Office Senior Advisor

Developing 5G solutions using mmWave and Phased Array Antenna technologies. Applications include ‘wireless fiber’ backhaul/front-haul, connected cars, in-home connectivity.

SIBEAM, Silicon Valley

2014 – 2016

Technology Strategy Senior Consultant

Developing intelligent millimeter wave (60 GHz) technologies for wireless communications (802.11ad) and fixed access solutions for 5G.

POWERWAVE TECHNOLOGIES, Santa Ana, CA

2011 – 2013

CTO Office Senior Principal Consultant / VP Innovation

- Leading innovation, strategy and development of HetNets, DAS and small cells (picocell) solutions using 4G LTE and WiFi technologies to enhance coverage and capacity of wireless network infrastructure.

CENTER OF EXCELLENCE IN WIRELESS & IT, SUNY, Stony Brook, NY

2006 – 2010

Director, Network Technologies Research Division

- Leading network technologies research, development and commercialization efforts
- Industry liaison, working on smart energy, wireless healthcare and intelligent transportation solutions.
- Deployed mobile WiMAX pico/femto solution as part of the 4G-campus initiative.
- Key contributor to the Long Island Broadband Wireless Access Initiative using WiFi and 4G.

- TIME WARNER CABLE**, Stamford, CT **2007 –2008**
Wireless Strategy & Development Senior Consultant
- Worked on a large wireless project involving WiFi, WiMAX and 3G with advanced mobile devices.
 - Developed concept and product requirements documents, architecture and RF design, and test plans.
 - Supported the business development group on femtocells models, MVNO's models and services, etc.
- MOBILE-ACCESS (Acquired by Corning)**, Vienna, VA **2006 –2008**
CTO Office DAS Strategy & Development Senior Consultant
- Worked with the CTO and senior engineers to develop WiFi DAS systems.
 - Developed detailed analysis and novel method to support MIMO (802.11n) in DAS systems.
- MOTOROLA (formerly Symbol Technologies)**, Holtsville, NY **1997 – 2005**
Senior Director, Technology Strategy and Development **2003 – 2005**
- Served as “the eyes of the company” – Charter was to identify and evaluate emerging/disruptive technologies, and conduct technology/business due diligence of possible partners/acquisitions. Team leader.
 - Guided the company technology roadmap by generating Technology Position Statements (TPS). Selected topics include: 802.11a/b/g migration strategy, 802.11e (QoS), Broadband Wireless Access - 802.16d/e fixed and mobile WiMAX, mesh networks, RFID, RTLS, and MIMO. These TPS were fact based and relied on results obtained through modeling, analysis and simulations.
 - Explored a new family of products based on multi-point MIMO architecture in mesh wireless networks.
 - Investigated VoIP capacity in 802.11a/b/g networks and initiated work on admission control algorithms/policies.
 - Researched and developed new mobile applications delivering multimedia-rich content to heterogeneous networked mobile devices.
 - Developed strategic alliances and led technology initiatives with technology/business partners.
 - Participated actively in IEEE 802.11, 802.15 and 802.16 standards meetings.
 - Awarded several patents.
- Senior Director, Research and Development** **1997 – 2003**
- Initiated and led several R&D programs in wireless LAN technologies: intelligent access point, reliable multicast video streaming, mobile device management/security and spatial wireless switching.
 - Conceived, investigated and developed a novel wireless switching architecture based on MIMO technology.
 - Conducted innovative research in WLAN QoS, Bluetooth interference mitigation, multicast video streaming, mobile security, RFID, RTLS - location tracking (RSSI/TDOA), VoIP and smart antennas.
 - Participated in strategic planning and impacted the technology/business direction of the company.
 - Awarded several patents.
- BAE SYSTEMS**, Greenlawn, NY **1994 – 1997**
Research Scientist
- Led the advanced mobile networking group.
 - Developed tactical mesh-based wireless network systems for DoD.
 - Worked on advanced antenna techniques including beam steering/switching.
 - Awarded several patents.
- NEC RESEARCH INSTITUTE**, Princeton, NJ **1992 – 1994**
Research Fellow
- Worked on optical interconnects for parallel processing.
 - Investigated multi-dimensional switches using wavelength, space and time.
 - Designed a wavelength router/switch using free-space optics.
- IBM RESEARCH CENTER**, Hawthorne, NY **1990 – 1992**
Research Associate
- Developed and prototyped a gigabit switch.
 - Built a testbed of multi-wavelength optical network.
 - Developed algorithms for WDMA using AO tunable filters.
- BK Technologies, Inc. IPR2026-00348
Ex. 2012
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Head of Fiber-optics Systems Engineering

- Pioneered security products using fiber optic sensors.
- Conducted research & development in fiber optic sensors.
- Co-developed and deployed a large fiber optic data communications network.

EDUCATION

COLUMBIA UNIVERSITY, New York, NY

- Ph.D., Electrical Engineering, 1993.
- M.Phil, Electrical Engineering, 1991.

TEL AVIV UNIVERSITY, Tel Aviv, Israel

- MBA, Recanati Business School, 1989.
- MSc., Electrical Engineering, 1984.
- BSc., magna cum laude, Electrical Engineering, 1979.

PUBLICATIONS / PATENTS / OTHER

- Numerous publications in proceedings and conference papers.
- Numerous US and international patents issued.
- Served on several government agencies expert panels (NSF, NIH).
- IEEE Life Senior Member.
- Featured speaker on several industry sponsored webinars.
- Served as an expert witness/consultant in District Court, IPR, PGR, ITC, FRAND, PCA, AAA cases.

COURSES TAUGHT

- Introduction to Auto ID and Data Capture (AIDC) Technologies (State University NY, Stony Brook)
- Wireless Sensing Networks (Columbia University)
- mmWave Communications and Applications for 5G/6G (Columbia University)

RECENT EXPERT WITNESS CONSULTING¹

- 2025: Brightsky LLC v. Plover Bay Technologies LTD. et al. (Litigation)
- 2025: Samsung Electronics v. KPN (IPR)
- 2025: Pegasus Wireless v. Verizon Wireless et al. (Litigation)
- 2024: Cisco Systems Inc. v. Video Solutions (IPR)
- 2024: S.M.R Innovations LTD and Y.M.R Tech LTD v. Apple (Litigation)
- 2024: Zebra Technologies v. OnAsset Intelligence (Litigation)
- 2023: Varia Holdings v. Apple (Litigation)
- 2023: Maxell Ltd. v. Samsung Electronics (Litigation)
- 2023: Ericsson Inc. and Oracle Corporation v. Telecom Network Solutions (IPR)
- 2023: OZMO Licensing v. Dell Technologies (Litigation/IPR)
- 2022: Howlink Global v. AT&T (Litigation)
- 2022: Cleveland Medical Devices v. ResMed Corp (Litigation/IPR)
- 2022: Lone Star Systems v. Zebra Technologies (Litigation/IPR)
- 2022: Telecom Network Solutions v. AT&T, Verizon, and T-Mobile (Litigation/IPR)
- 2021: BillJCo v. Apple (Litigation/IPR)
- 2021: BillJCo v. Cisco Systems et al. (Litigation)
- 2021: Zebra Technologies v. OnAsset Intelligence (ITC)
- 2021: CellSpin Soft v. Under Armour (Litigation)

¹ Represented parties are underlined.

- 2021: CellSpin Soft v. Nike (Litigation)
- 2021: Intellectual Ventures v. Hewlett Packard Enterprise (Litigation/IPR)
- 2021: AEGIS v. Hisense (Litigation)
- 2020: Soter Technologies v. IP Video Corp. et al (Litigation)
- 2020: Intellectual Tech v. Zebra Technologies (Litigation)
- 2020: Uniloc v. Apple (Litigation)
- 2020: American Patents v. Juniper Networks (Litigation)
- 2020: Proxicom Wireless v. Target Corporation (Litigation)
- 2020: Sol IP v. AT&T et al. (Litigation)
- 2019: Cellular Evolution v. AT&T et al. (Litigation)
- 2019: Philips v. HTC (Litigation, UK)
- 2019: Ericsson v. Tishman Interiors (AAA Arbitration)
- 2019: Uniloc v. Samsung, Huawei (Litigation)
- 2018: Intel et al. v. Hera Wireless (IPR)
- 2018: Deutsche Telecom v. The Republic of India (UNCITRAL Arbitration, Paris Tribunal)
- 2017: Devas v. The Republic of India (UNCITRAL Arbitration, The Hague Tribunal)
- 2017: RPX Corp. et al. v. Iridescent Networks (IPR)
- 2017: Intellectual Ventures v. FedEx (Litigation)
- 2017: FedEx v. Intellectual Ventures (IPR)

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