

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MOTOROLA SOLUTIONS, INC.,

Petitioner,

v.

STA GROUP LLC,

Patent Owner.

IPR2023-01294

U.S. Patent No.: 8,831,664 B2

**DECLARATION OF DAVID HILLIARD WILLIAMS IN SUPPORT
OF PETITION FOR *INTER PARTES* REVIEW OF CLAIMS 1-20 OF
U.S. PATENT NO. 8,831,664 B2**

TABLE OF CONTENTS

	Page
I. INTRODUCTION	1
II. PROFESSIONAL BACKGROUND AND QUALIFICATIONS	2
III. MATERIALS CONSIDERED	11
IV. LEGAL STANDARDS.....	18
A. Claim Construction.....	19
B. Obviousness.....	20
V. LEVEL OF ORDINARY SKILL IN THE ART	25
VI. OVERVIEW OF THE '664 PATENT	26
A. Priority Date	26
B. The Subject Matter of the Challenged Patent	26
C. The Challenged Claims of the '664 Patent	31
D. Prosecution History	34
E. Level of Ordinary Skill in the Art	35
F. Claim Construction of Terms in the Challenged Claims	37
VII. TECHNOLOGY BACKGROUND AND STATE OF THE ART	38
A. Communication Management Centers	39
B. Monitoring Media Streams.....	41
C. Receiving an Alert.....	45
1. Header Packet	45
2. Control Packet.....	48
D. Elevating the Priority of a Media Stream Receiving an Alert	49

1.	Changing Volume	51
2.	Changing Channel and/or Spatial Direction	52
VIII.	SUMMARY OF PRIOR ART	56
A.	Downs (Ex[1004])	56
1.	Status of Downs	56
2.	Overview of the Disclosure of Downs.....	57
B.	EDACS Standard (Ex[1005]).....	60
1.	Status of EDACS Standard	60
2.	Overview of the Disclosure of EDACS Standard.....	61
C.	Childress (Ex[1031])	64
1.	Status of Childress	64
2.	Overview of the Disclosure of Childress	64
D.	Hancock (Ex[1006])	65
1.	Status of Hancock	65
2.	Overview of the Disclosure of Hancock.....	66
E.	Reich (Ex[1007]).....	68
1.	Status of Reich	68
2.	Overview of the Disclosure of Reich.....	68
F.	Kim (Ex[1008])	71
1.	Status of Kim	71
2.	Overview of the Disclosure of Kim	71
G.	Ishibashi (Ex[1009]).....	74
1.	Status of Ishibashi	74
2.	Overview of the Disclosure of Ishibashi.....	75

H.	Goss (Ex[1010])	77
1.	Status of Goss.....	77
2.	Overview of the Disclosure of Goss	77
IX.	APPLICATION OF THE PRIOR ART TO THE CHALLENGED CLAIMS	79
A.	Grounds of Unpatentability	80
B.	Ground 1: Claims 1-6, 8-9, and 11-20 are obvious over Downs in view of the EDACS Standard.....	80
1.	A POSITA Would Have Combined Downs with the EDACS Standard with a reasonable expectation of success.	80
2.	Claim 1	85
a.	1[Pre]: A method, comprising:	85
b.	1[a]: monitoring media streams associated with channels in a communication environment;.....	85
c.	1[b]: receiving an alert in one of the media streams; and...88	
d.	1[c]: elevating a priority associated with the media stream receiving the alert, such that an adjustment is made to how the media stream is provisioned to an endpoint in the communication environment.	91
3.	Claim 2: The method of claim 1, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert.....	96
4.	Claim 3: The method of claim 1, wherein elevating the priority comprises changing a spatial direction for rendering the media stream receiving the alert.....	98
5.	Claim 4: The method of claim 1, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert and changing a spatial direction for rendering the media stream receiving the alert.....	100

Declaration of David H. Williams
IPR of USP 8,831,664

6.	Claim 5: The method of claim 1, wherein elevating the priority comprises rendering the media stream receiving the alert to a priority spatial direction.....	100
7.	Claim 6: The method of claim 1, wherein elevating the priority includes identifying a primary channel and rendering the alert message to the primary channel.....	102
8.	Claim 8: The method of claim 1, wherein the alert is received in a header of a packet of the media stream.....	104
9.	Claim 9: The method of claim 1, wherein the alert is received in a control packet of the media stream.	105
10.	Claim 11: Non-transitory readable media that includes code for execution and when executed by a processor operable to perform operations comprising: monitoring media streams associated with channels in a communication environment; receiving an alert in one of the media streams; and elevating a priority associated with the media stream receiving the alert.....	107
11.	Claims 12-15	109
12.	Claim 16: An apparatus, comprising: a memory element; a processor; and a management element stored in the memory element and configured to interface with the processor such that the apparatus is configured for: monitoring media streams associated with channels in a communication environment; receiving an alert in one of the media streams; and elevating a priority associated with the media stream receiving the alert.	110
13.	Claims 17-20	111
C.	Ground 2: Claim 1 is obvious over Downs and the EDACS Standard in further view of Childress.....	112
1.	A POSITA Would Have Combined Downs (as modified by the EDACS Standard) with Childress with a reasonable expectation of success.	113
2.	“receiving an alert in one of the media streams”	114
D.	Grounds 3 and 4: Claims 3-5, 13, 14, 18 and 19 are obvious over Downs and the EDACS Standard in further view of Hancock.....	115

1.	A POSITA Would Have Combined Downs (as modified by the EDACS Standard) with Hancock with a reasonable expectation of success.	115
2.	Claim 3: The method of claim 1, wherein elevating the priority comprises changing a spatial direction for rendering the media stream receiving the alert.	121
3.	Claim 4: The method of claim 1, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert and changing a spatial direction for rendering the media stream receiving the alert.	124
4.	Claim 5: The method of claim 1, wherein elevating the priority comprises rendering the media stream receiving the alert to a priority spatial direction.	125
5.	Claims 13-14	127
6.	Claims 18-19	127
E.	Grounds 5 and 6: Claims 7 and 10 are obvious over Downs and the EDACS Standard in further view of Reich.	128
1.	A POSITA Would Have Combined Downs (as modified by the EDACS Standard) with Reich with a reasonable expectation of success.	128
2.	Claim 7: The method of claim 1, wherein elevating the priority includes turning a volume down on media streams not receiving the alert.	133
3.	Claim 10: The method of claim 1, wherein the alert is duplicated and rendered at a higher volume.	134
F.	Ground 7: Claims 1-2, 6-9, 11-12, 15-17, and 20 are obvious over Kim.	137
1.	Claim 1	137
a.	1[Pre]: A method, comprising.	137
b.	1[a]: monitoring media streams associated with channels in a communication environment.	137

c.	1[b]: receiving an alert in one of the media streams.....	140
d.	1[c]: elevating a priority associated with the media stream receiving the alert, such that an adjustment is made to how the media stream is provisioned to an endpoint in the communication environment	141
2.	Claim 2: The method of claim 1, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert.....	144
3.	Claim 6: The method of claim 1, wherein elevating the priority includes identifying a primary channel and rendering the alert message to the primary channel.....	147
4.	Claim 7: The method of claim 1, wherein elevating the priority includes turning a volume down on media streams not receiving the alert.....	148
5.	Claim 8: The method of claim 1, wherein the alert is received in a header of a packet of the media stream.....	148
6.	Claim 9: The method of claim 1, wherein the alert is received in a control packet of the media stream.	150
7.	Claim 11: Non-transitory readable media that includes code for execution and when executed by a processor operable to perform operations comprising: monitoring media streams associated with channels in a communication environment; receiving an alert in one of the media streams; and elevating a priority associated with the media stream receiving the alert.....	152
8.	Claims 12 and 15.....	153
9.	Claim 16: An apparatus, comprising: a memory element; a processor; and a management element stored in the memory element and configured to interface with the processor such that the apparatus is configured for: monitoring media streams associated with channels in a communication environment; receiving an alert in one of the media streams; and elevating a priority associated with the media stream receiving the alert.	154
10.	Claims 17 and 20.....	155

G.	Ground 8: Claims 3-5, 13-14, and 18-19 are obvious over Kim in view of Ishibashi.	156
1.	A POSITA Would Have Combined Kim with Ishibashi with a reasonable expectation of success.....	156
2.	Claim 3: The method of claim 1, wherein elevating the priority comprises changing a spatial direction for rendering the media stream receiving the alert.....	160
3.	Claim 4: The method of claim 1, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert and changing a spatial direction for rendering the media stream receiving the alert.....	162
4.	Claim 5: The method of claim 1, wherein elevating the priority comprises rendering the media stream receiving the alert to a priority spatial direction.....	163
5.	Claims 13-14.....	165
6.	Claims 18-19.....	165
H.	Ground 9: Claim 10 is obvious over Kim in view of Goss.....	166
1.	A POSITA Would Have Combined Kim with Goss with a reasonable expectation of success.....	166
2.	Claim 10: The method of claim 1, wherein the alert is duplicated and rendered at a higher volume.....	169
X.	SECONDARY CONSIDERATIONS	169
XI.	CONCLUSION	170

I, David Hilliard Williams, declare as follows:

I. INTRODUCTION

1. I have been retained on behalf of Motorola Solutions, Inc. (“MSI” or “Petitioner”) in connection with the above-captioned *inter partes* review (“IPR”) of Claims 1-20 of U.S. Patent No. 8,831,664 (the “’664 Patent” or “Challenged Patent”), entitled System and Method for Providing Channel Configurations in a Communications Environment,” by named inventors Shmuel Shaffer and Steven Christenson. I understand that the ’664 Patent is assigned to STA Group LLC (the “Patent Owner”). I have been asked to provide technical review, analysis, insights, and opinions regarding the ’664 Patent and the prior art references that form the basis for the grounds of invalidity set forth in the Petition for *Inter Partes* Review of the ’664 Patent (the “Petition”). I have been asked to provide a declaration regarding my opinions on the validity of Claims 1-20 of the ’664 Patent.

2. This declaration sets forth the opinions I have formed in this IPR and provides the bases and reasons for those opinions. This declaration is based on information currently available to me. I declare that I have personal knowledge of the facts set forth in this declaration and, if called to testify as a witness, could and would do so competently.

3. I am being compensated at my usual consulting rate of \$485 per hour for my work on this matter. I am also being reimbursed for any incurred expenses.

My compensation is in no way dependent upon my opinions or testimony or the outcome of this proceeding. I have no other interests in this proceeding or with Petitioner or Patent Owner.

II. PROFESSIONAL BACKGROUND AND QUALIFICATIONS

4. In formulating my opinions, I have relied upon my training, knowledge, and experience in the relevant art. A copy of my current curriculum vitae is provided as Appendix A to this declaration, and it provides a comprehensive description of my academic and employment history over the last 40 years.

5. I have nearly 40 years of experience in wireless communications services, including experience designing, implementing, and managing numerous mobile/wireless and wireline communications networks, technologies, applications, and associated infrastructure, involving working in many fields within the wireless services ecosystem including communications frequencies, channel management, bandwidth management, handset and user interface design, messaging/messaging types and prioritization mechanisms, alerts/alert types and triggers, and all aspects of location technologies, applications, and infrastructure, as well as numerous aspects of associated Information Technology systems including identification, authentication, privacy, security, and other related capabilities such as network planning, engineering and operations, including call centers.

6. I am currently the President of the company E911-LBS Consulting, and I have been with the company since 2002. As the President of E911-LBS Consulting, I provide services across the entire wireless value chain, particularly with respect to technology and business strategic planning and product design and development associated with wireless communications services, including various forms of messaging and communications bandwidth-intensive services including location-based services (LBS), including emergency services and associated networks, technologies, user interfaces, infrastructure, and systems and methods. During this time and for almost two decades prior I have been extensively involved with many forms of communications networks, including various types of land mobile radio systems and other wireless networks, as well as various wireline networks, covering a wide range of underlying technologies, infrastructure, and topologies, and involving a wide range of voice, SMS/MMS, data, video, and other services, utilizing a wide array of user interfaces to interact with users.

7. For example, in the 1983-1985 timeframe, I was a Microprocessor system design engineer on the digitization project of the F-15 fighter jet radar system. Specifically, I designed a system for converting analog signals (radar pings, sensor measurements, *etc.*) to digital form, and for feeding the converted signals to various parties and subsystems remotely (*e.g.*, carriers, other aircraft, ground control) and locally, particularly pilots and their heads-up display (HUD)

interfaces. The converted signals corresponded to data relating to navigational and directional information, aircraft status, the location of other aircraft/targets relative to the pilot's position, and associated images. The HUD interface was integrated with the pilot's helmet or with a screen facing the pilot and allowed the pilot to look at and through the data integrated in the interface without requiring them to look down at their instrument panel, while sharing their visual, sensor, and associated information with other parties.

8. During the 1987 to 2002 timeframe, I was extensively involved in the design and implementation of communications networks and associated computing architectures for connecting computers/devices, including utilizing the Internet. For example, from 1987 to 1989 I led the design and implementation of the network and associated computer control systems for integrating hundreds of hotel and restaurant Point-of-Sale (POS) and local management systems into a brand-new data center architecture. In the early to mid-1990s, I was extensively involved in the design of next-generation intelligent network capabilities (both voice and data) for GTE, with a similar effort for Sprint shortly thereafter. In the mid to late 1990s, I led a variety of engagements helping AT&T's long-distance unit launch its local services networks and helped what was then Bell Atlantic (later Verizon) launch its long-distance network. I also worked internationally for Canadian phone

companies AGT and Bell Canada in modifying their system, processes, and organizations to move from a voice-centric footing to a data-centric one.

9. From 1998 to 2000, as an Associate Partner in Accenture's Communications & High Technology practice, I led the design of Nextel's first-generation location services network and developed IT capabilities for supporting location services. This involved extensive integration work with other parts of Nextel's network infrastructure and handset strategies and leveraging core capabilities such as Nextel's Push-To-Talk (PTT) capabilities. This work also included leading the development of the underlying network and Information Technology architectures that would be required to support the LBS applications product strategy and roadmap and leveraging of/integration with Nextel's E911 infrastructure.

10. In the early 2000s I advised a T-Mobile predecessor company on their post-acquisition network integration strategy and worked with numerous startup companies to develop their product, network, and user interface strategies for a variety of dot-com startups. I launched my own company focused on wireless technologies, systems, and applications in 2002.

11. A number of engagements followed involving significant experience related to E911 emergency systems. For example, in 2003-2004, I consulted with AT&T Wireless on their implementation of E911 systems and processes.

Specifically, I led the development of implementation and monitoring of systems in AT&T Wireless Western Region as part of their deployment of terrestrial E911 network location infrastructure to meet the wireless E911 location requirements mandated by the FCC. This work included the development of systems, processes, and reporting infrastructure to manage and track the deployment of key wireless network infrastructure technologies. I managed the testing and Federal Communications Commission reporting of network location inaccuracies, with a particular focus on detecting and troubleshooting out-of-norm technology deployment and inaccurate location conditions.

12. In 2004-2006, I worked with NAVTEQ, a key provider of LBS and E911 and other emergency services location-related map data, in developing their application developer ecosystem and website, providing developers with access to all of NAVTEQ's product and technical resources for developing location-related applications, including data products involving emergency services GIS (Geographical Information Systems). Specifically, I designed and managed the site map and overall content, including the development of comprehensive technical and business web content for all NAVTEQ map product and service lines.

13. From 2007 to 2010 timeframe, I was intimately involved in the design, implementation, launch, and operational management and troubleshooting of AT&T Wireless' location-enabled network supporting their rollout of their initial location

application portfolio including AT&T Navigator, AT&T FamilyMap, Mobile Social Networking, 411 with LBS, and various Mobile Resource Management applications for monitoring and managing field workers and assets, as well as telematics devices and applications for monitoring and managing vehicle fleets.

14. Many of the above engagements, as well as other consulting engagements spanning this timeframe, involved the design of various computer architectures, including client/server, peer-to-peer, and mainframe-based architectures, to communicate using these various wireless and wireline networks in various network topologies (ring, star, mesh, *etc.*), including extensively using the Internet in enabling computer-to-human, human-to-computer, computer-to-computer, and human-to-human information transfer of voice and data in numerous forms, using a variety of methods and standards. Further, an extensive amount of the above experience utilized computers, devices, and networks to remotely monitor/control/manage other devices and systems—including their location—and in many cases also involved the design of those local—remote user control and management systems and their integration into the remote monitoring applications and associated networks. For example, the GTE “high-value network” work discussed above involved the development of its product and services strategies and designs for enabling its next generation network to facilitate the control of network terminating computers, systems, and devices, as well as internal control of company

networks leveraging GTE's capabilities. My work with Nextel's wireless location products utilized various mechanisms for monitoring and managing assets and workers. AT&T's E911 network architecture and associated systems interfaced with Public Safety Answering Points (PSAPs) to direct emergency resources to 911-callers and control their deployments.

15. The Nextel work involved balancing scarce network channel and bandwidth resources with the needs of various products and services (often bandwidth intensive such as video), and similarly in the later AT&T Wireless work. For this work, I served as the lead product realization manager in charge of implementing several location-based services with extensive remote monitoring and alert generation capabilities. This work involved extensive use of various forms of alerts, triggered by a variety of time elements and events, drawing on a variety of handset capabilities, utilizing and balancing available network infrastructure capabilities, enabling the sharing of location information, and using a variety of user interfaces to convey and display the associated information. These services included for example AT&T FamilyMap, where for example you could share your location with your child (and vice versa) and monitor if your child arrived at home (or not) at a certain time or under certain conditions and generate alerts accordingly. I also led the finalization of the design and implementation and launch of AT&T's Loopt mobile social networking application, where you could share your location

with friends (and vice versa), under a variety of conditions, to enable for example alerts to you if a friend was within a certain distance from you or a favorite establishment. In connection with the development of that application, I was the only non-employee to be an inventor on a patent covering controlling user location privacy (“Method and apparatus for providing mobile social networking privacy.” (U.S. Patent No. 8,613,109, issued on December 17, 2013)). I also managed a portfolio of fleet management device/application/system products for AT&T that involved sharing of location information in the monitoring/tracking/controlling of vehicle fleets, and other asset management offerings for tracking and managing capital asset inventories.

16. In addition, over the last decade plus I have worked on various locations sharing-related matters for clients such as Google’s Nest smart thermostats, VIVINT security systems, Genie garage door openers, Green Mountain Grill Wi-Fi connected grills, and Heil waste haulers, and numerous other engagements involving location-related privacy/security and alerts. Many of these engagements involved use of IoT sensors, networks, and interfaces involving location sharing and more broadly the use of sophisticated communications network channel and bandwidth management, utilizing a variety of data services including video/video streaming, SMS/MMS, and others.

17. Indeed, much of the above work, including the location-based services/applications work, involved my extensive involvement in user device application design and associated user interfaces, using a variety of real-time software development methodologies (as location services generally have extensive real-time analytical and user interface requirements), platforms (smartphones, feature phones, specialty devices, laptops, desktops, multiple operating systems, *etc.*), and programming languages, and utilizing the internet and wireless platforms in particular for communicating with the local control systems. It also involved numerous variations in and mechanisms for identifying, controlling, managing, and prioritizing data/data streams/messaging.

18. I have authored multiple books on wireless location, including:

- *The Definitive Guide to GPS, RFID, Wi-Fi, and Other Wireless Location-Based Services* (2005 and 2009 versions);
- *The Definitive Guide to Wireless E911*; and
- *The Definitive Guide to Mobile Positioning and Location Management* (co-author).

19. I received a B.S. degree in Electrical Engineering from Purdue University in 1983 with top honors. I received an MBA degree in Information Systems Management from The University of Texas at Austin in 1987, also with top honors. I have 8 patents (in addition to the AT&T one mentioned above), involving

various implementations involving communications networks, location, context, user interfaces, and privacy/security/access mechanisms.

20. My curriculum vitae contains further details on my education, experience, publications, and other qualifications to render an expert opinion.

III. MATERIALS CONSIDERED

21. The analysis that I provide in this declaration is based on my education, research, experience, and professional judgment, as well as the documents I have considered, including the '664 Patent (Ex[1001]) and its prosecution history (Ex[1003]). I have reviewed and am familiar with the specification of the '664 Patent. I have reviewed and am familiar with the file history of the '664 Patent.

22. In preparing this declaration, I have also reviewed and am familiar with the following prior art used in the Petition and in my declaration below:

- **Exhibit 1004** – U.S. Patent No. 5,754,960 to Stephen R. Downs et al., entitled “Display Console and User Interface for Multisite RF Trunked System” (“Downs”) was filed on February 14, 1992 and issued May 19, 1998, which is more than one year before the December 19, 2008 priority date of the '664 Patent.¹ I understand from counsel for

¹ As discussed further below, the '664 Patent was filed on August 16, 2011, and claims priority as a continuation of U.S. Patent Application No. 12/340,417, filed on December 19, 2008. Ex[1001], Cover.

Petitioner that Downs qualifies as prior art under at least pre-AIA 35 U.S.C. §§ 102(a), (b) and (e).

- **Exhibit 1005** – *A System and Standards Definition for a Digital Land Mobile Radio System, TSB69*, TIA/EIA Telecommunications Systems Bulletin (Nov. 1998) (“EDACS”) was published by the Telecommunications Industry Association and Electronic Industries Alliance in November 1998, which is more than one year before the December 19, 2008 priority date of the ’664 Patent. I understand from counsel for Petitioner that EDACS Standard qualifies as prior art under at least pre-AIA 35 U.S.C. §§ 102(a) and (b).
- **Exhibit 1031** – U.S. Patent No. 4,905,302 to Jeffrey S. Childress et al., entitled “Trunked Radio Repeater System” (“Childress”) was filed June 3, 1987, and issued February 27, 1990, which is more than one year before the December 19, 2008 priority date of the ’664 Patent. I understand from counsel for Petitioner that Childress qualifies as prior art under at least pre-AIA 35 U.S.C. §§ 102(a), (b) and (e).
- **Exhibit 1006** – U.S. Patent Application Publication No. 2006/0147028 A1 by Jerry T. Hancock, entitled “Multi-Mode, Multi-Channel Psychoacoustic Processing for Emergency Communications” (“Hancock”) was filed on January 5, 2005, and published July 6, 2006,

which is more than one year before the December 19, 2008 priority date of the '664 Patent. I understand from counsel for Petitioner that Hancock qualifies as prior art under at least pre-AIA 35 U.S.C. §§ 102(a), (b) and (e).

- **Exhibit 1007** – U.S. Patent Application Publication No. 2007/0197248 A1 by Jason A. Reich and Douglas M. Crockett, entitled “System and Method for Multiple Simultaneous Communication Groups in a Wireless System” (“Reich”) was filed on February 17, 2006, and published on August 23, 2007, which is more than one year before the December 19, 2008 priority date of the '664 Patent. I understand from counsel for Petitioner that Reich qualifies as prior art under at least pre-AIA 35 U.S.C. §§ 102(a), (b) and (e).
- **Exhibit 1008** – International Patent Application Publication No. WO 2004/034350 A1 by Chang-Eui Kim, entitled “Television Set and Method for Notifying a Disaster Situation” (“Kim”) was filed on October 9, 2003, with priority to October 9, 2002, and published April 22, 2004, which is more than one year before the December 19, 2008 priority date of the '664 Patent. I understand from counsel for Petitioner that Kim qualifies as prior art under at least pre-AIA 35 U.S.C. §§ 102(a), (b) and (e).

- **Exhibit 1009** – Japanese Patent Application Publication No. 2006-340164 A by Yoshihiro Ishibashi, entitled “Emergency-Alert Broadcast Receiver and Method for Receiving Emergency-Alert Broadcasts” (“Ishibashi”) was filed on June 3, 2005, and published December 14, 2006, which is more than one year before the December 19, 2008 priority date of the ’664 Patent. I understand from counsel for Petitioner that Ishibashi qualifies as prior art under at least pre-AIA 35 U.S.C. §§ 102(a), and (b).
- **Exhibit 1010** – U.S. Patent No. 7,330,693 to Stephen Clifford Goss, entitled “Broadcast Channels for Wireless Telephony” (“Goss”) was filed on September 17, 1999, and issued February 12, 2008. I understand from counsel for Petitioner that Goss qualifies as prior art under at least pre-AIA 35 U.S.C. §§ 102(a) and (e).

23. In forming the opinions expressed in this declaration, I have considered the materials listed in the table below (which includes the materials identified above) as well as any other document cited in this declaration.

Ex[No.] ²	Description of Documents
1001	U.S. Patent No. 8,831,664 (“’664 Patent”)
1003	File History of the ’664 Patent
1004	U.S. Patent No. 5,754,960 to Stephen R. Downs et al., entitled “Display Console and User Interface for Multisite RF Trunked System” (filed Feb. 14, 1992, and issued May 19, 1998) (“ Downs ”)
1005	<i>A System and Standards Definition for a Digital Land Mobile Radio System, TSB69</i> , TIA/EIA Telecommunications Systems Bulletin (Nov. 1998) (“ EDACS ”)
1006	U.S. Patent Publication No. 2006/0147028 A1 to Jerry T. Hancock, entitled “Multi-Mode, Multi-Channel Psychoacoustic Processing for Emergency Communications” (filed Jan. 5, 2005, and published July 6, 2006) (“ Hancock ”)
1007	U.S. Patent Publication No. 2007/0197248 A1 to Jason A. Reich et al., entitled “System and Method for Multiple Simultaneous Communication Groups in a Wireless System” (filed Feb. 17, 2006, and published Aug. 23, 2007) (“ Reich ”)
1008	International Patent Publication No. WO 2004/034350 A1 to Chang-Eui Kim, entitled “Television Set and Method for Notifying a Disaster Situation” (filed Oct. 9, 2003, with priority to Oct. 9, 2002, and published Apr. 22, 2004) (“ Kim ”)

² Citations to issued patents (Exhibits 1001, 1004, 1010, 1017, and 1031) are made by column and line number. Citations to U.S., European, and Japanese patent application publications (Exhibits 1006, 1007, 1009, 1019-1021, and 1027-1028) and Exhibit 1014 are made by paragraph number. Citations to International patent application publications (Exhibit 1008) are made by page and line number. Citations to Exhibits 1005, 1015-1016, 1018, and 1022-1026 are to the original page numbering in the exhibits. Citations to Exhibit 1003 are to the page number added by the exhibit label.

Ex[No.] ²	Description of Documents
1009	Japanese Patent Publication No. 2006-340164 A to Yoshihiro Ishibashi, entitled “Emergency-Alert Broadcast Receiver and Method for Receiving Emergency-Alert Broadcasts” (filed June 3, 2005, and published Dec. 14, 2006) (Original Japanese Application, Translation, and Translator’s Affidavit) (“ Ishibashi ”)
1010	U.S. Patent No. 7,330,693 to Stephen Clifford Goss, entitled “Broadcast Channels for Wireless Telephony” (filed Sep. 17, 1999, and issued Feb. 12, 2008) (“ Goss ”)
1011	Letter from James Shimota, Partner, K&L Gates to Natalie Gonzales, Partner, Baker Botts L.L.P., RE: Plaintiff’s Infringement Contentions (Mar. 30, 2023).
1012	Opposition to Motion to Dismiss in <i>STA Group LLC v. Motorola Solutions, Inc.</i> , No. 2:22-cv-00381 (E.D. Tex. filed Jan. 17, 2023)
1013	Reply to Motion to Dismiss in <i>STA Group LLC v. Motorola Solutions, Inc.</i> , No. 2:22-cv-00381 (E.D. Tex. filed Feb. 7, 2023)
1014	Declaration of Sylvia D. Hall-Ellis, Ph.D. dated Aug. 7, 2023
1015	Ericsson, <i>Maintenance Manual, EDACS ® C3 Maestro™ Console System with Enhanced Audio Enclosure</i> (Mar. 1995) (“ C3 Manual ”)
1016	Department of Defense, <i>Department of Defense Design Criteria Standard: Human Engineering</i> , MIL-STD-1472F (Aug. 23, 1999) (“ DoD ”)
1017	U.S. Patent No. 5,081,669 to Laura L. Slaninka et al., entitled “Assignable Speakers for Channels at a Trunked Console Operator Position” (filed Aug. 27, 1990, and issued Jan. 14, 1992) (“ Slaninka ”)
1018	Motorola Inc., <i>CENTRACOM Gold Series Classic CRT User’s Guide</i> (1998) (“ CENTRACOM ”)

Ex[No.] ²	Description of Documents
1019	U.S. Patent Publication No. US 2006/0184962 A1 to Scott Allan Kendall et al., entitled “Methods for Controlling Apparatuses Having an Emergency Alert Function” (filed Mar. 30, 2004, and published Aug. 17, 2006) (“ Kendall ”)
1020	U.S. Patent Publication No. US 2007/0107009 A1 to Jin Pil Kim, entitled “Emergency Alert Signaling Method and Digital Television Receiver” (filed Nov. 9, 2006, with priority to Nov. 9, 2005, and published May 10, 2007) (“ Kim ”)
1021	U.S. Patent Publication No. US 2006/0005219 A1 to Garry Owens, entitled “Standby Television Warning System” (filed July 2, 2004, and published Jan. 5, 2006) (“ Owens ”)
1022	Telex-Vega, Signaling Product Company, <i>Model C-Soft User Configurable Version USB and Parallel Key Versions Radio Control Console Includes P25 Control Options Version 2.8x, Technical Manual</i> (May 2005) (“ C-Soft ”)
1023	TIA Standard, <i>Project 25 Trunking Control Channel Messages – New Technology Standards Project – Digital Radio Technical Standards</i> , ANSI/TIA-102.AABC-B-2005 (Jan. 12, 2005) (“ P25 Standard ”)
1024	P25 Digital Wireless, <i>Project 25 Statement of Requirements</i> (Mar. 9, 2006) (“ P25 SoR ”)
1025	Telex Communications, Inc. and Vega Signaling Products <i>Price List</i> (effective Apr. 1, 2003), https://web.archive.org/web/20030401105942/http://vega-signaling.com/) (“ C-Soft Price List ”)
1026	<i>Motorola Annual Report 1975</i> (1975) (“ 1975 Report ”)
1027	U.S. Patent Publication No. US 2004/0070515 A1 to Raymond Burkley et al., entitled “First Responder Communications System” (filed July 2, 2003, and published Apr. 15, 2004) (“ Burkley ”)

Ex[No.] ²	Description of Documents
1028	European Patent Application No. EP 1,613,105 A1 to Ryan Crawford, entitled “Transmission of Content in a Push-to-Talk System” (filed June 29, 2004, and published Jan. 4, 2006) (“ Crawford ”)
1029	Docket Control Order, <i>STA Group LLC v. Motorola Solutions, Inc.</i> , No. 2:22-CV-0381-JRG-RSP, ECF No.35 (E.D. Tex. Feb. 3, 2023)
1030	Katherine K. Vidal, <i>Memorandum: Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation</i> (June 21, 2022)
1031	U.S. Patent No. 4,905,302 to Jeffrey S. Childress et al., entitled “Trunked Radio Repeater System” (filed June 3, 1987, and issued Feb. 27, 1990) (“ Childress ”)
1032	Parties’ Local P.R. 4-2 Disclosure of Preliminary Proposed Constructions of Claim Terms and Preliminary Identification of Extrinsic Evidence
1033	Plaintiff’s First Amended Disclosure of Asserted Claims and Infringement Contentions and Document Production Accompanying Disclosure Pursuant to P.R. 3-1 & 3-2, No. 2:22-CV-0381-JRG-RSP (E.D. Tex. June 15, 2023).

IV. LEGAL STANDARDS

24. Although I am not an attorney, I have a general understanding of the applicable legal standards pertaining to the patentability issues presented in this proceeding. My understanding of legal principles as described in this section is based on communication of those principles to me by Petitioner’s legal counsel. The analysis in this declaration is in accordance with the legal principles outlined below.

25. I understand that, in this IPR, Petitioner has the burden of proving that each challenged claim is unpatentable by a preponderance of the evidence.

A. Claim Construction

26. I understand that the first step in determining whether a patent claim would have been anticipated or obvious is to ascertain how a person of ordinary skill in the art (“POSITA”) would have understood the claim terms.

27. I understand that a patent may include two types of claims: independent claims and dependent claims. An independent claim stands alone and includes only the limitations it recites. A dependent claim can depend from an independent claim, or it can further depend from another dependent claim. I understand that a dependent claim includes all the limitations that it recites, in addition to all the limitations recited in the claim(s) from which it depends.

28. It is my understanding that in proceedings before the USPTO, the claims of a patent are to be construed under what is referred to as the “*Phillips* standard.” I understand that this means that claim terms of a patent are given the ordinary and customary meaning the terms would have to a POSITA, in view of the description provided in the patent itself and the patent’s file history.

29. I understand that to determine how a POSITA would understand a claim term, one should look to those sources available that show what a POSITA would have understood the disputed claim language to mean. I understand that, in

construing a claim term, one looks primarily to the intrinsic patent evidence, including the words of the claims themselves, the remainder of the patent, and the patent's prosecution history. I understand that extrinsic evidence, which is evidence external to the patent and the prosecution history, may also be useful in interpreting patent claims.

30. I understand that words or terms should be given their ordinary and accepted meaning unless it appears that the inventors were using them to mean something else. In making this determination, the claims, the remainder of the patent, and the prosecution history are of paramount importance. Additionally, the patent and its prosecution history must be consulted to confirm whether the patentee has acted as its own lexicographer (i.e., provided its own special meaning to any disputed terms), or intentionally disclaimed, disavowed, or surrendered any claim scope.

B. Obviousness

31. I understand that a patent claim is unpatentable if, at the time of the invention, it would have been obvious to one of ordinary skill in the art to combine the teachings of the prior art to yield the patent claim. I also understand that it is not required (although it is acceptable) that each element of a patent claim be found in a single reference in order to find a patent claim obvious. This means that even if all of the requirements of the claim cannot be found in a single prior art reference

that would anticipate the claim, the claim can still be invalid. For a patent claim to be found obvious, all the elements of the patent claim may be found in a combination of references at which a POSITA would have been reasonably expected to arrive.

32. I understand that the following factors should be considered in analyzing obviousness: (1) the scope and content of the prior art; (2) the differences between the prior art and the claims; (3) the level of ordinary skill in the pertinent art; and (4) other objective considerations identified below. I understand that an invention is obvious when the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious to a POSITA at the time the invention was made. I also understand that a POSITA is not an automaton but is a person having ordinary creativity.

33. For example, I understand that two or more prior art references (*e.g.*, prior art articles, patents, or publications) that each disclose fewer than all elements of a patent claim may nevertheless be combined to render a patent claim obvious if the combination of the prior art collectively discloses all elements of the claim and a POSITA at the time would have been motivated to combine the prior art in such a way. I understand that this motivation to combine need not be explicit in any of the prior art but may be inferred from the knowledge of a POSITA at the time the patent was filed.

34. I further understand that one or more prior art references, articles, patents, or publications that disclose fewer than all of the elements of a patent claim may render a patent claim obvious if including the missing element would have been obvious to a POSITA (*e.g.*, the missing element represents only an insubstantial difference over the prior art or a reconfiguration of a known system). For example, I understand that a claim may be deemed invalid for obviousness in light of a single prior art reference, without the need to combine references, if the elements of the claim that are not found in the reference can be supplied by the knowledge or common sense of a POSITA.

35. I understand that a POSITA is assumed to have knowledge of all prior art references. I also understand that when considering the obviousness of a patent claim, one may consider whether a teaching, suggestion, or motivation to combine the references exists so as to avoid impermissibly applying hindsight when considering the prior art. I understand this test should not be rigidly applied, but that the test can be important to avoiding such hindsight.

36. I understand that even if a *prima facie* case of obviousness is established, the final determination of obviousness must also consider objective indicia of nonobviousness, which I understand are also referred to as “secondary considerations,” if presented. I understand that these objective indicia can be

important evidence as to whether a patent is obvious or nonobvious. These secondary considerations of non-obviousness may include, for example:

- a long felt but unmet need in the prior art that was satisfied by the claimed invention;
- commercial success of processes claimed by the patent;
- unexpected results achieved by the invention;
- praise of the invention by others skilled in the art;
- the taking of licenses under the patent by others; and
- deliberate copying of the invention.

37. I further understand that secondary considerations evidence is only relevant if the offering party establishes a connection, or nexus, between the evidence and the claimed invention.

38. It is also my understanding that there are additional considerations that may be used as further guidance as to when the above factors will result in a finding that a claim is obvious, including the following:

- the claimed subject matter is simply a combination of prior art elements according to known methods to yield predictable results;
- the claimed subject matter is a simple substitution of one known element for another to obtain predictable results;

- the claimed subject matter uses known techniques to improve similar devices or methods in the same way;
- the claimed subject matter applies a known technique to a known device or method that is ready for improvement to yield predictable results;
- the claimed subject matter would have been “obvious to try” choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- there is known work in one field of endeavor that may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to a POSITA;
- there existed at the time of the invention a known problem for which there was an obvious solution encompassed by the patent’s claims; and
- there is some teaching, suggestion, or motivation in the prior art that would have led a POSITA to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed subject matter.

39. I also understand that “obviousness” is a legal conclusion based on the underlying factual issues of the scope and content of the prior art, the differences between the claimed invention and the prior art, the level of ordinary skill in the prior art, and any objective indicia of non-obviousness. For that reason, my

testimony addresses the underlying facts and factual analysis that would support a legal conclusion of obviousness, and when I use the term obvious, I am referring to the perspective of a POSITA at the time of invention.

V. LEVEL OF ORDINARY SKILL IN THE ART

40. I understand that my assessment of the claims of the '664 Patent and the teachings of the prior art and my analysis and opinions herein must be undertaken from the perspective of what would have been known or understood by a person having ordinary skill in the art, reading the '664 Patent on its priority date and in light of the specification and file history of the '664 Patent. I refer to such a person as a "POSITA."

41. I further understand that in determining the level of ordinary skill in the art, I may consider factors including:

- (a) the type of problems encountered in the art or field of invention,
- (b) prior art solutions to those problems,
- (c) the rapidity with which innovations are made,
- (d) sophistication of the technology, and
- (e) the educational level of active workers in the field.

42. I understand that a person of ordinary skill in the art is not a specific real individual, but rather a hypothetical individual having the qualities reflected by the factors above. This hypothetical person has knowledge of all prior art in the

relevant field and takes from each reference what it would teach to a person having the skills of a POSITA.

43. I understand that a POSITA is a person of ordinary creativity, but not an automaton, and that a POSITA can often fit multiple patents or prior art references together like pieces of a puzzle as a result of this ordinary creativity. I also understand that I may consider the inferences and creative steps that a POSITA would employ. In addition, I understand that a POSITA would necessarily have been capable of understanding the scientific and engineering principles applicable to the pertinent art.

VI. OVERVIEW OF THE '664 PATENT

A. Priority Date

44. The '664 Patent was filed as Application No. 13/210,967 on August 16, 2011. The '664 Patent claims priority as a continuation of Application No. 12/340,417, filed on December 19, 2008, now U.S. Patent No. 8,041,378 ("'378 Patent"). Ex[1001], Cover. For purposes of this proceeding, I have assumed the priority date of the '664 Patent is the filing date of the '378 Patent (December 19, 2008) and have applied this date in considering the prior art and the viewpoint of a POSITA.

B. The Subject Matter of the Challenged Patent

45. The '664 Patent is titled "Method and System for Managing Communications in Emergency Communication System" and concerns a well-

known technique used by dispatchers for years before the priority date: when an important message arrives with an alert (*e.g.*, “officer down”), elevate the message’s priority by adjusting how it is provided (*e.g.*, “turn up the volume”).

46. Figure 1, shown below, is a diagram of the system of the purported invention. The specification does not purport to have invented any change to the infrastructure or the physical components of the system that performs the claimed functionality. Instead, this figure depicts various known communication devices, such as radios and telephones, interconnected with “management center 38.” Ex[1001], Fig. 1 (annotated):

All conventional components

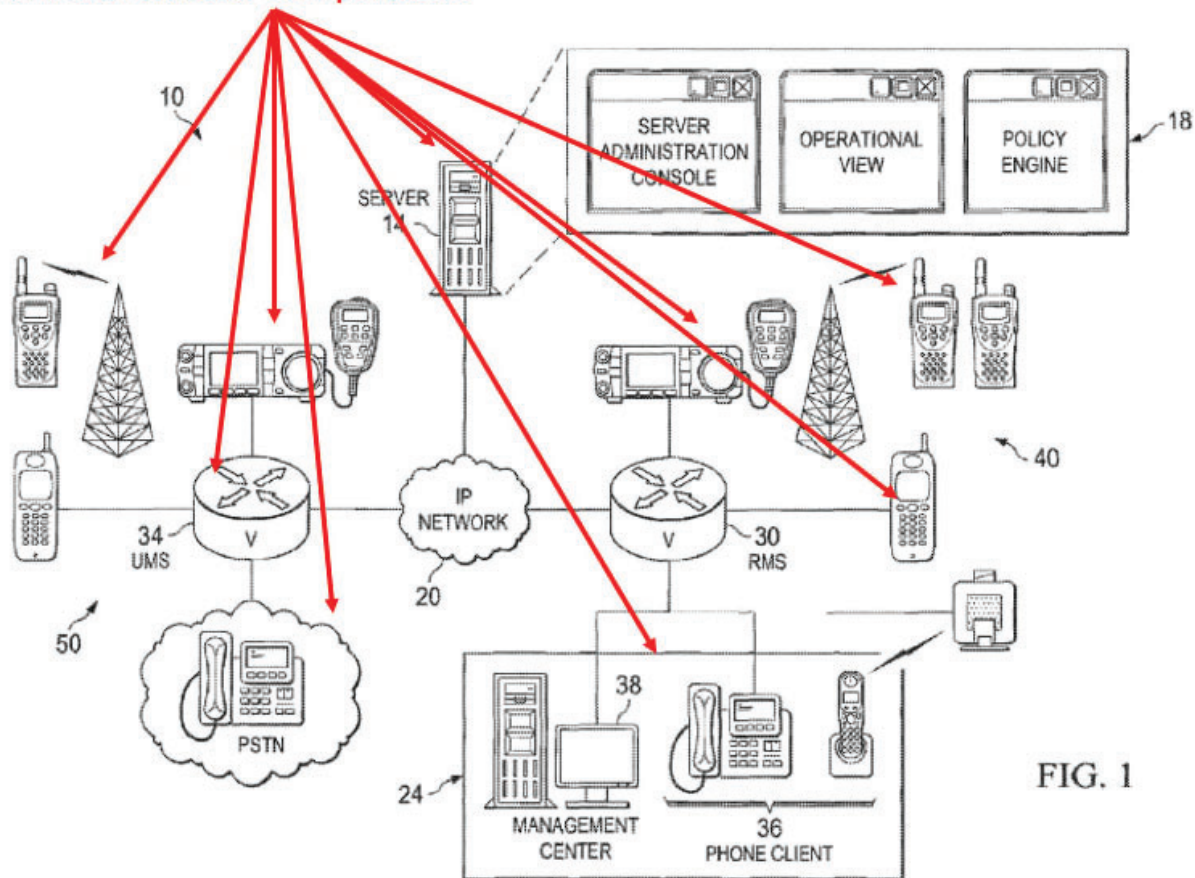
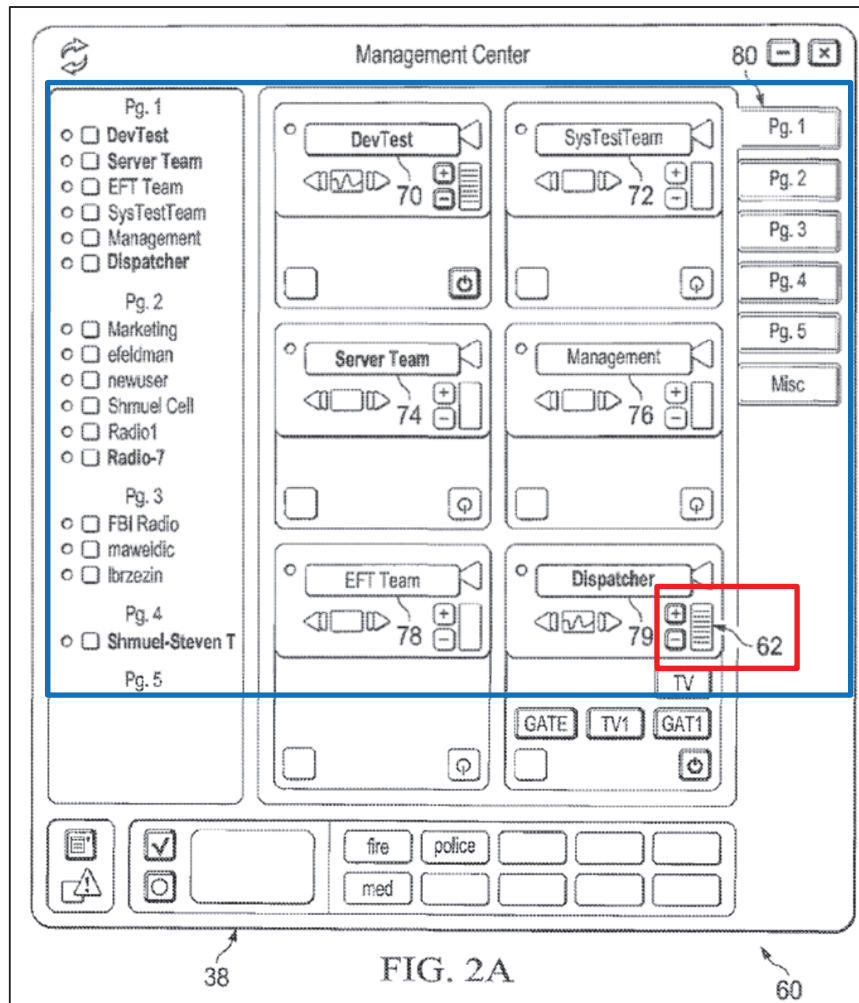
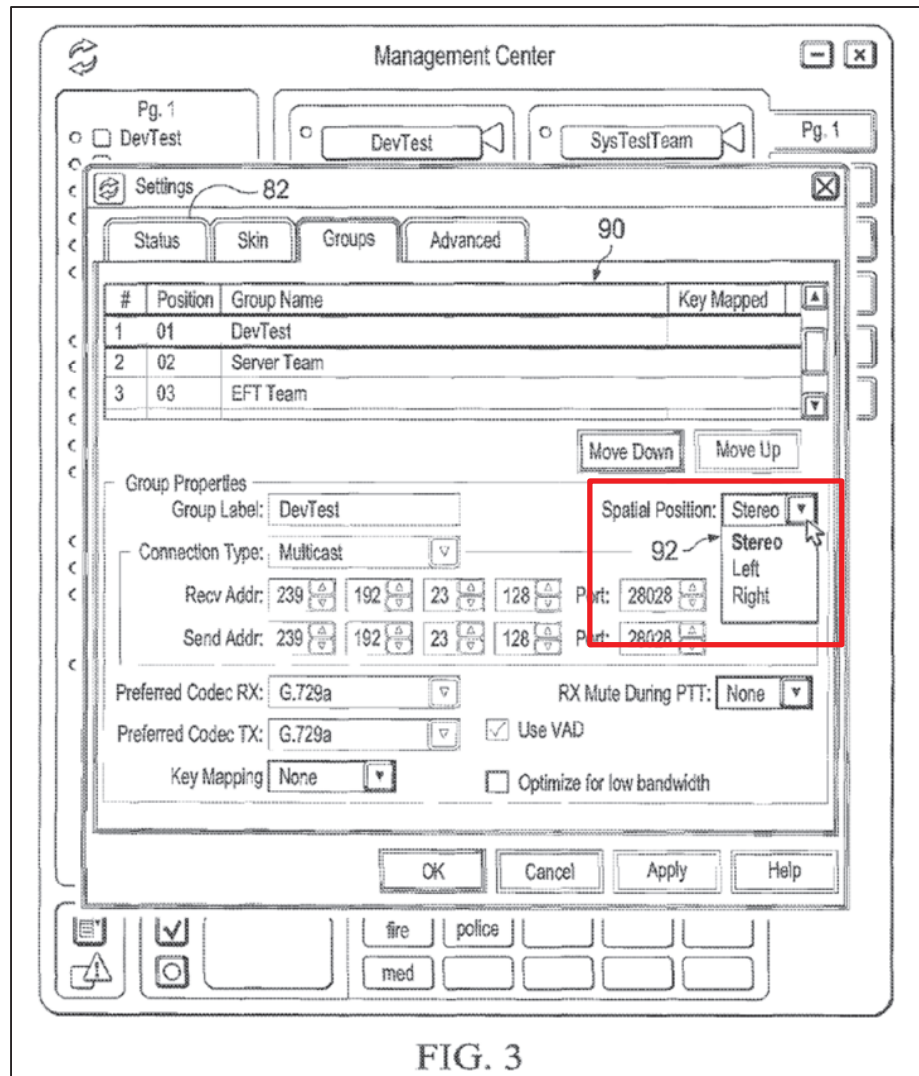


FIG. 1

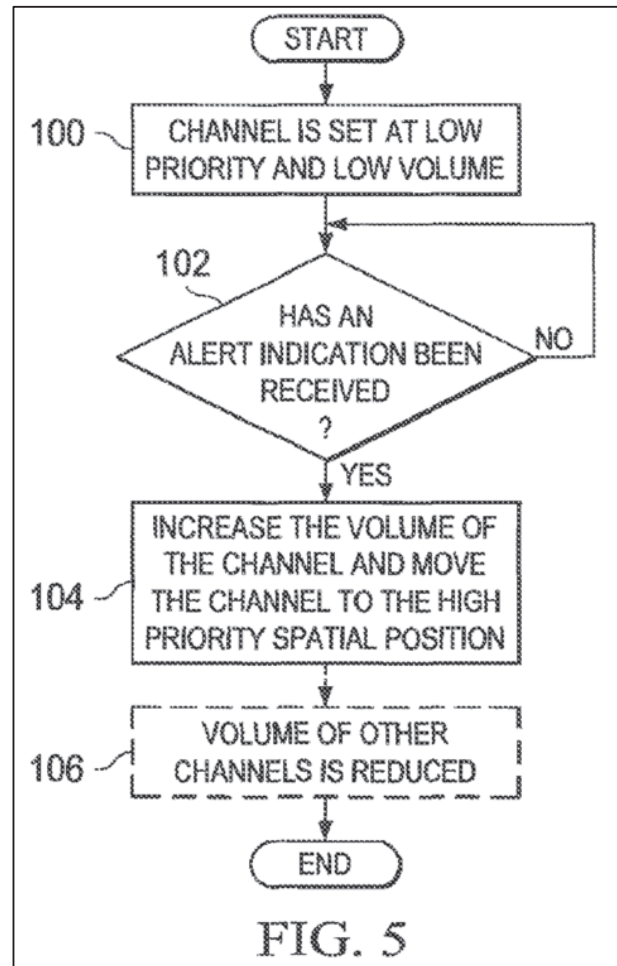
47. Management Center 38 is further depicted in Figures 2A and 3, below. This interface enables a user to monitor “one or more groups for which a particular end-user is subscribed.” Ex[1001], 2:62-63, Fig. 2A (shown in blue). Additionally, “each of the channels can have its own volume adjustment” and “can support a plurality of channels, where important channels are rendered to one ear (e.g., the right) and the less important channels are sent to the other ear (e.g., the left).” *Id.*, 3:3-5, 3:21-24, Figs. 2A, 3 (shown in red).





48. As described in the specification, the allegedly inventive aspect of the '664 Patent relates to monitoring media streams (calls) on radio channels and modifying them based on these options when receiving an alert (which could just be a “simple conversational exchange[]”). Ex[1001], 7:41-48. For example, in response to an alert, the dispatcher “elevat[es] a priority” such that an adjustment is made to how the media stream is provided by “simply turn[ing] up the volume” or sending the call to a particular ear. *Id.*, 3:56-64. As shown in Figure 5 below and

Figures 2A and 3 above, this can be performed “by the dispatcher” themselves. *Id.*, 6:16-19.



49. The patent purports to be an improvement on prior systems because it “offers an effective coordination for channels in a communications environment” by allowing channels to be “configured optimally.” Ex[1001], 1:38-46.

C. The Challenged Claims of the '664 Patent

50. Claims 1-20 of the '664 Patent (“Challenged Claims”) are set forth below. Some of the claim elements have been further subdivided for ease of

reference. I will refer throughout this declaration to the elements of the claims with reference to the number and letter designations that have been added in the left column (e.g., “1[Pre],” “1[a],” “1[b],” *etc.*).

Claim Element	Claim Language from the '664 Patent
1[Pre]	A method, comprising:
1[a]	monitoring media streams associated with channels in a communication environment;
1[b]	receiving an alert in one of the media streams; and
1[c]	elevating a priority associated with the media stream receiving the alert, such that an adjustment is made to how the media stream is provisioned to an endpoint in the communication environment.
2	The method of claim 1, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert.
3	The method of claim 1, wherein elevating the priority comprises changing a spatial direction for rendering the media stream receiving the alert.
4	The method of claim 1, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert and changing a spatial direction for rendering the media stream receiving the alert.
5	The method of claim 1, wherein elevating the priority comprises rendering the media stream receiving the alert to a priority spatial direction.
6	The method of claim 1, wherein elevating the priority includes identifying a primary channel and rendering the alert message to the primary channel.
7	The method of claim 1, wherein elevating the priority includes turning a volume down on media streams not receiving the alert.
8	The method of claim 1, wherein the alert is received in a header of a packet of the media stream.
9	The method of claim 1, wherein the alert is received in a control packet of the media stream.
10	The method of claim 1, wherein the alert is duplicated and rendered at a higher volume.
11[Pre]	Non-transitory readable media that includes code for execution and

	when executed by a processor operable to perform operations comprising:
11[a]	monitoring media streams associated with channels in a communication environment;
11[b]	receiving an alert in one of the media streams; and
11[c]	elevating a priority associated with the media stream receiving the alert.
12	The non-transitory readable media of claim 11, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert.
13	The non-transitory readable media of claim 11, wherein elevating the priority comprises changing a spatial direction for rendering the media stream receiving the alert.
14	The non-transitory readable media of claim 11, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert and changing a spatial direction for rendering the media stream receiving the alert.
15	The non-transitory readable media of claim 11, wherein elevating the priority includes identifying a primary channel and rendering the alert message to the primary channel.
16[Pre]	An apparatus, comprising:
16[a]	a memory element;
16[b]	a processor; and
16[c]	a management element stored in the memory element and configured to interface with the processor such that the apparatus is configured for:
16[d]	monitoring media streams associated with channels in a communication environment;
16[e]	receiving an alert in one of the media streams; and
16[f]	elevating a priority associated with the media stream receiving the alert.
17	The apparatus of claim 16, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert.
18	The apparatus of claim 16, wherein elevating the priority comprises changing a spatial direction for rendering the media stream receiving the alert.
19	The apparatus of claim 16, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert and changing a spatial direction for rendering the media stream receiving the alert.

20	The apparatus of claim 16, wherein elevating the priority includes identifying a primary channel and rendering the alert message to the primary channel.
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D. Prosecution History

51. The application that ultimately issued as the '664 Patent was filed as Application No. 13/210,967 on August 16, 2011. Ex[1001], Cover. The '664 Patent claims priority as a continuation of Application No. 12/340,417, filed on December 19, 2008, now U.S. Patent No. 8,041,378 ("378 Patent"). *Id.* The '378 Patent was filed with 24 claims. On June 27, 2011, the Examiner allowed the pending claims as filed.

52. The '664 Patent was filed as a continuation of the '378 Patent with a preliminary amendment containing 20 claims numbered 25-44. Ex[1003], pp.667-673. The Examiner rejected claims 25-34 because they "do not qualify as a statutory process" and claims 35-39 because the claimed computer program codes are not stored on "NON-TRANSITORY COMPUTER READABLE MEDIUM". *Id.*, p.54. Claims 25-27, 31-37, 40-42 were rejected on the ground of non-statutory double patenting over the '378 Patent and claims 28-30, 38-39, 43-44 were objected to as being dependent upon a rejected base claim, but the Examiner noted they would be allowable if rewritten in independent form. *Id.*, pp.55-60. Following an Examiner Interview held on April 15, 2014, applicants amended claim 25 to add the requirement (underlined below) "such that an adjustment is made to how the media

stream is provisioned to an endpoint in the communication environment” and claims 35-39 to include “non-transitory readable media.” *Id.*, p.44. Additionally, applicant filed a terminal disclaimer to overcome the non-statutory double patenting rejection based on the ’378 Patent. On May 12, 2014, the Examiner allowed the pending claims. *Id.*, pp.12-15.

25. (Currently Amended) A method, comprising:
monitoring media streams associated with channels in a communication environment;
receiving an alert in one of the media streams; and
elevating a priority associated with the media stream receiving the alert, such that an adjustment is made to how the media stream is provisioned to an endpoint in the communication environment.

Id., p.42.

E. Level of Ordinary Skill in the Art

53. I have been asked to consider the level of ordinary skill in the field that someone would have had at the time the claimed invention of the ’664 Patent was made. My opinions regarding the level of ordinary skill in the art are based on, among other things, my nearly 40 years of experience in the field of networking and communication systems, as well as: the levels of education and experience of persons working in the field, the types of problems encountered in the field; and the sophistication of the technology.

54. Based on my review and analysis of the ’664 Patent, the prior art cited herein, and the ordinary skill factors described in Section V, in my opinion, a

POSITA in the field of the '664 Patent at the time of the earliest alleged priority date (December 19, 2008) would have had at least a bachelor's degree in computer science, electrical engineering, or a similar field, and would have had approximately two years industry experience in networking or communication systems. Additional education in the fields of electrical engineering or computer science such as a masters or doctorate degree may serve as a substitute for experience in the field. A person with less education but more relevant practical experience may also meet this standard. The prior art also evidences the level of skill in the art.

55. Based on my education and experience, I meet this definition of one of ordinary skill in the art, and I believe that I am qualified to provide opinions about how a POSITA at the relevant time would have interpreted and understood the '664 Patent and the prior art relied upon herein. Although my qualifications and experience exceed those of a POSITA, both in December 2008 and today, I have nevertheless applied the perspective of a POSITA in rendering my opinions below.

56. My opinions below explain how a POSITA would have understood the technology described in the '664 Patent and the prior art references I have identified herein around the December 19, 2008 timeframe. For purposes of this declaration, in general, and unless otherwise noted, my testimony below refers to the knowledge of one of ordinary skill in the art during the time period around the priority date of

the '664 Patent. I would have been a person with at least ordinary skill in the art at that time.

F. Claim Construction of Terms in the Challenged Claims

57. It is my understanding that in order to properly evaluate the '664 Patent, the terms of the claims must first be interpreted. It is my understanding that the claims are to be construed according to the same claim construction standard that district courts use. For most terms in the Challenged Claims, I have applied 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 specification and the prosecution history.

58. I have been informed by counsel for Petitioner that, in district court, Patent Owner and Petitioner have proposed constructions for several terms. Ex[1032]. For example, Patent Owner has argued that the claims of the '664 Patent should be construed to require *automatic* functionality, and I understand Petitioner disputes this construction. Additional proposals by both parties are set forth in the below table. I have considered both party's constructions, and my conclusions would not change under either party's proposal. *See, e.g., infra* §§IX.B, IX.D. In other words, under either party's proposal for these terms, I believe the prior art discloses the claim limitations, such that my opinions would not change.

<u>Term</u>	<u>Petitioner Proposal</u>	<u>Patent Owner Proposal</u>
Media stream[s]	A continuous sequence of audio or audio-and-video,	Plain and ordinary meaning

	which may include associated data, through a network	
Channels	Two or more paths of differing priority	Plain and ordinary meaning
The media stream receiving the alert	Plain and ordinary meaning	Plain and ordinary meaning
An adjustment is made to how the media stream is provisioned to an endpoint	An adjustment is made to how the media stream is propagated to an endpoint relative to the other media streams	Plain and ordinary meaning
Endpoint	End-user device capable of exchanging audio or other data in the architecture	Plain and ordinary meaning
Order of steps	The steps must be performed in the recited order	Plain and ordinary meaning
Communication environment	Plain and ordinary meaning	Plain and ordinary meaning

59. I understand that the remaining claim terms in this IPR have been construed by Petitioner according to their ordinary and customary meaning. The prior art discussed herein discloses the Challenged Claims under any reasonable construction.

VII. TECHNOLOGY BACKGROUND AND STATE OF THE ART

60. Before providing my analysis of the '664 Patent and the prior art references, as included below, a background discussion of the state of the art pertinent to the '664 Patent is helpful. In the subsections below, I describe some

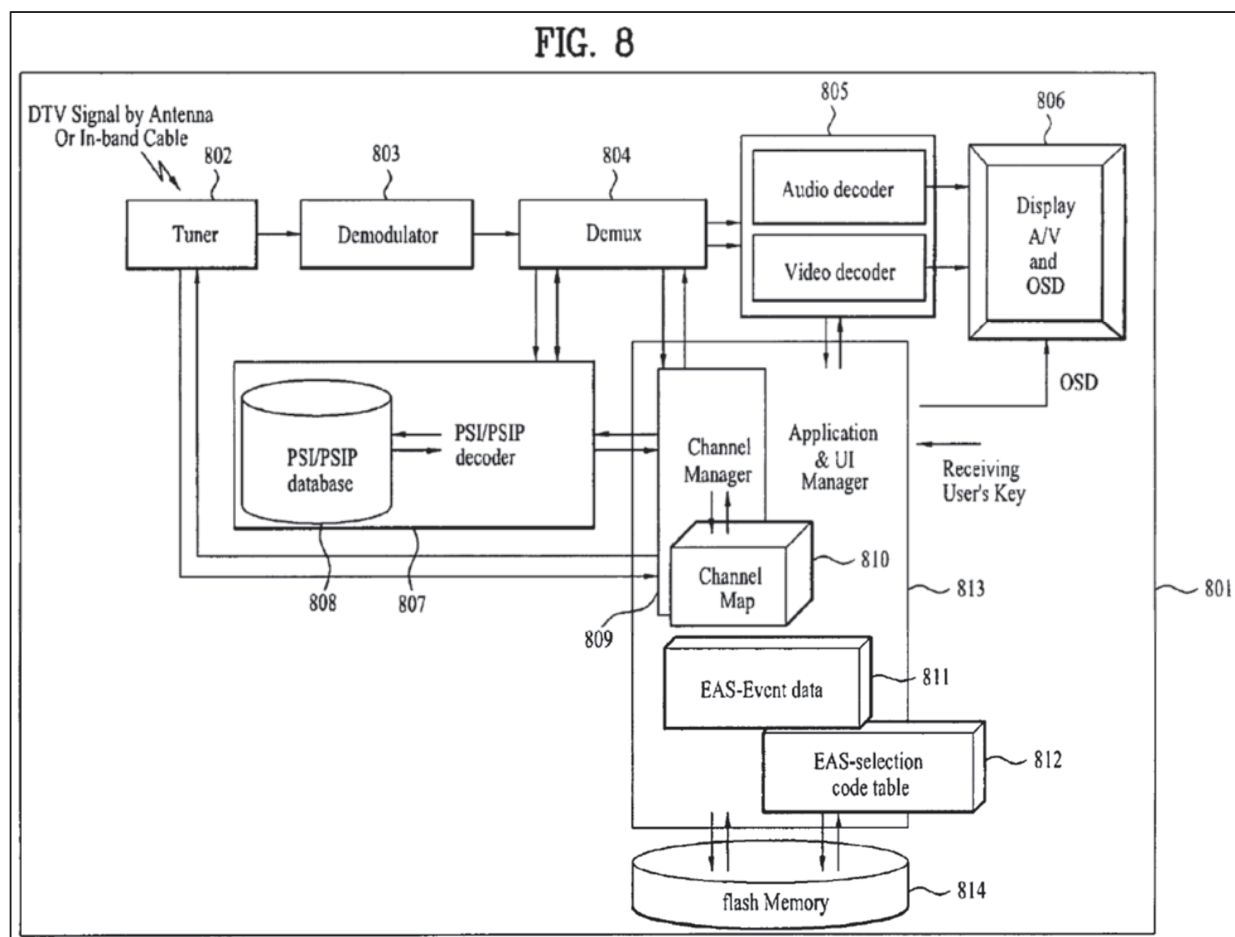
of the features of networking and monitoring systems that would have been well known to a POSITA as of the December 19, 2008, assumed priority date of the '664 Patent.

A. Communication Management Centers

61. By 2008, the field of communication management, including communication management centers, was crowded. Particularly in the field of emergency communications, various types of systems and devices had long been on the market. These systems typically focused on either centralizing communication with responders in the field, such as dispatch consoles, or distributing and alerting people of emergency conditions.

62. Indeed, as early as 1975, Motorola had introduced its CENTRACOM family of control centers, which continued to be developed into the 2000s until Motorola's release of the MCC7500 control center. Ex[1026], p.7. Competing products such as Ericsson's and Telex-Vega's dispatch consoles have been on the market since at least 1995, and 2003 respectively. Ex[1015], p.2; Ex[1025], p.1. Typically, communication management centers allow operators to manage communications. For example, Motorola's CENTRACOM Gold Series allows operators to manage "60 conventional channels, trunked talk groups, Simplex Phone Patchers, and Direct Phone Interconnects." Ex[1018], p.2.

63. As previously discussed, communication management is not restricted to dispatch consoles. Similar techniques are used in numerous other devices such as emergency broadcast receivers. These systems “provide[] an emergency alert function” via “a television signal receiver, radio or other device[.]” Ex[1019], Abstract. An example of one such system is shown in Figure 8 from Patent Pub. No. US 2007/0107009 A1 to Kim (Ex[1020]):



64. These systems “receive terrestrial or cable broadcast signals” and control which channel the system is tuned to, and displayed to the user via “a channel manager 809.” Ex[1020], [0152], [0160]-[0161]. Thus, these television

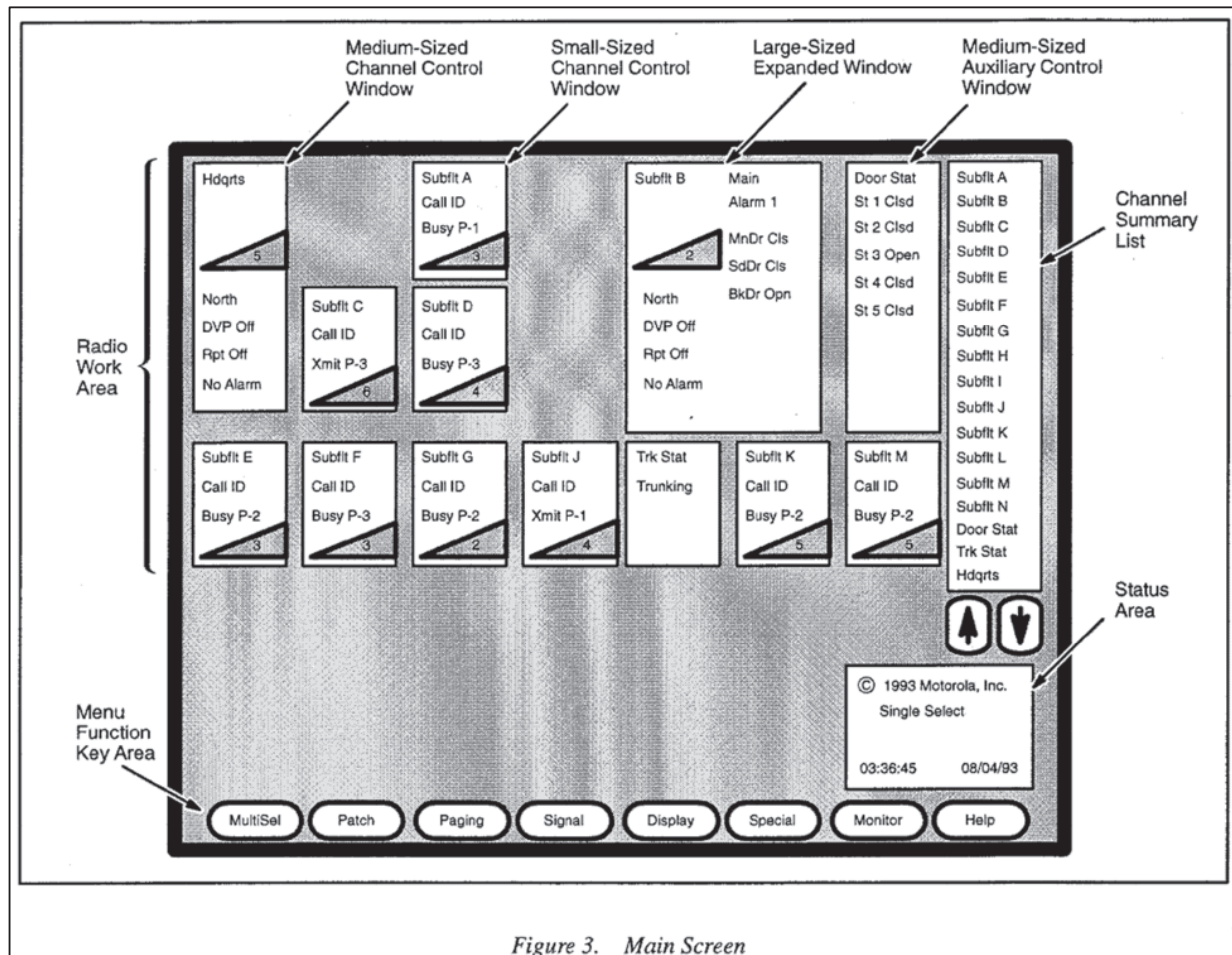
broadcast management devices are able to manage multiple broadcast channels and provide both regular, and emergency broadcast content to users.

65. In short, by 2008, numerous emergency communication management center devices were on the market. By that time, a POSITA would have known that such systems had certain standard features. These included (1) the ability to receive multiple input signals on channels from sources such as trunked radio talk groups, phone interconnects, and other broadcasts; and (2) the ability to provide the received information to a user such as a central dispatcher, or a remote user who needs to be alerted to the emergency. I discuss each of these features below – all were well-known as of 2008.

B. Monitoring Media Streams

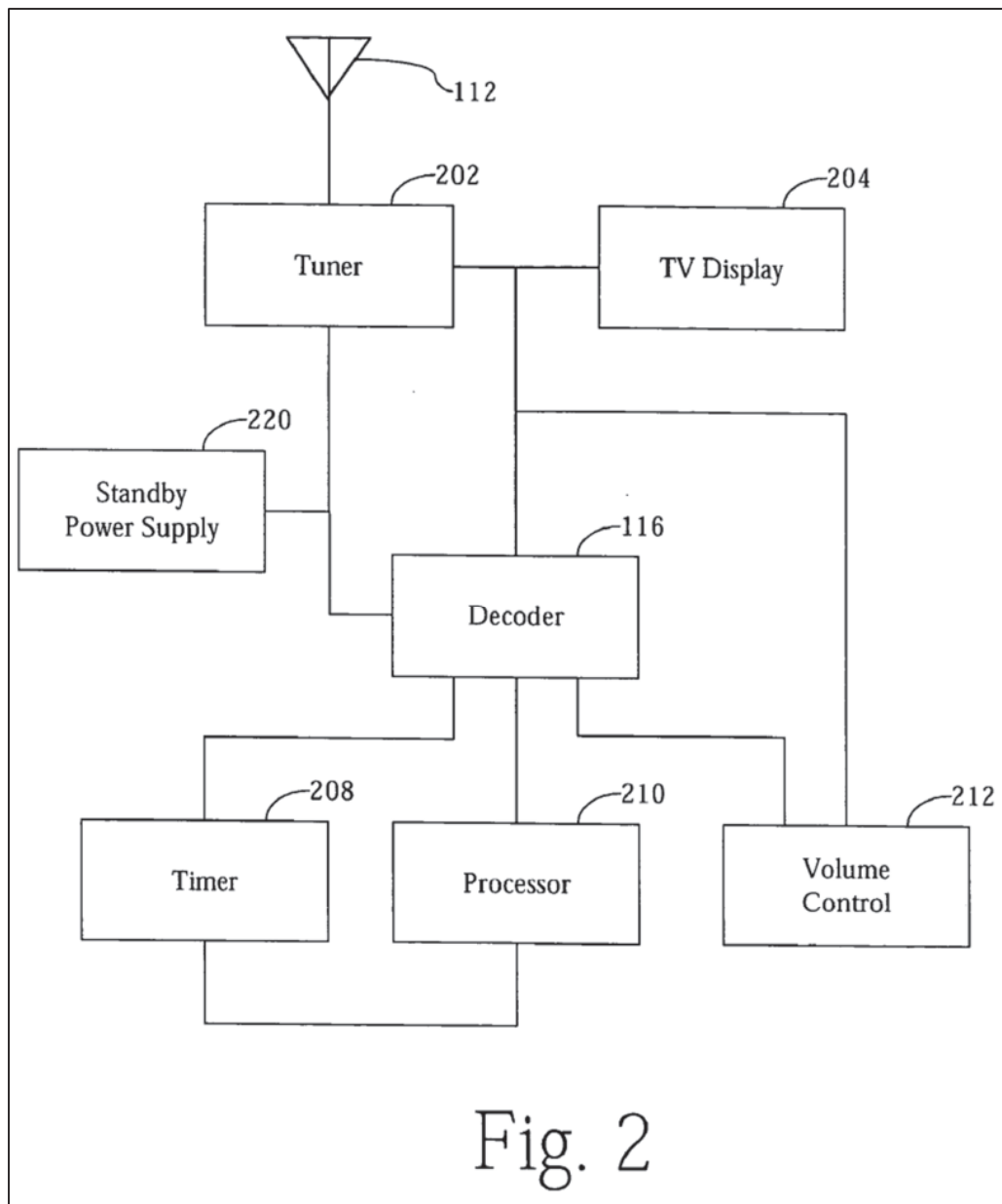
66. Both the dispatch and broadcast communication management systems operate by monitoring multiple media streams. For example, the CENTRACOM Gold Series consoles from Motorola, available well before 2008, have “the capability of controlling...[a] total of 60 conventional channels, trunked talk groups, Simplex Phone Patchers, and Direct Phone Interconnects.” Ex[1018], p.2. Each conventional channel, trunked talk group, simplex phone patch, and direct phone interconnect is an example of a media stream monitored by the CENTRACOM console, as would have been understood by a POSITA.

67. The CENTRACOM console routed the audio from each stream to a “SELECT audio speaker” and at least one “UNSELECT” audio speaker while displaying channels in “Channel Control Windows” on a monitor as shown in Figure 3 below. *Id.*, p.3-5. This enables the user to monitor and “communicate with radio channels and to access auxiliary controls.” *Id.*, p.4.



68. Similarly, the broadcast communication systems monitor “terrestrial or cable broadcast signals” which a POSITA would have understood are types of media streams. Ex[1020], [0152]. Figure 2 below shows an example of such a

communication system as described in §VII.A. In this system, the signals are “continually monitor[ed]” by a tuner and “routed to [a] decoder” which “continually monitors the signal...for a code that indicates an emergency warning message 106 is being broadcast.” Ex[1021], [0022]. When there are no emergency warning messages detected by the decoder, “[t]he tuner 202 provides signals to the television display 204,” which presents the regular broadcast to the user. *Id.*, [0019].



Ex[1021], Fig. 2.

69. These examples illustrate that, by 2008, it was already well-known that communication management systems could monitor multiple media streams.

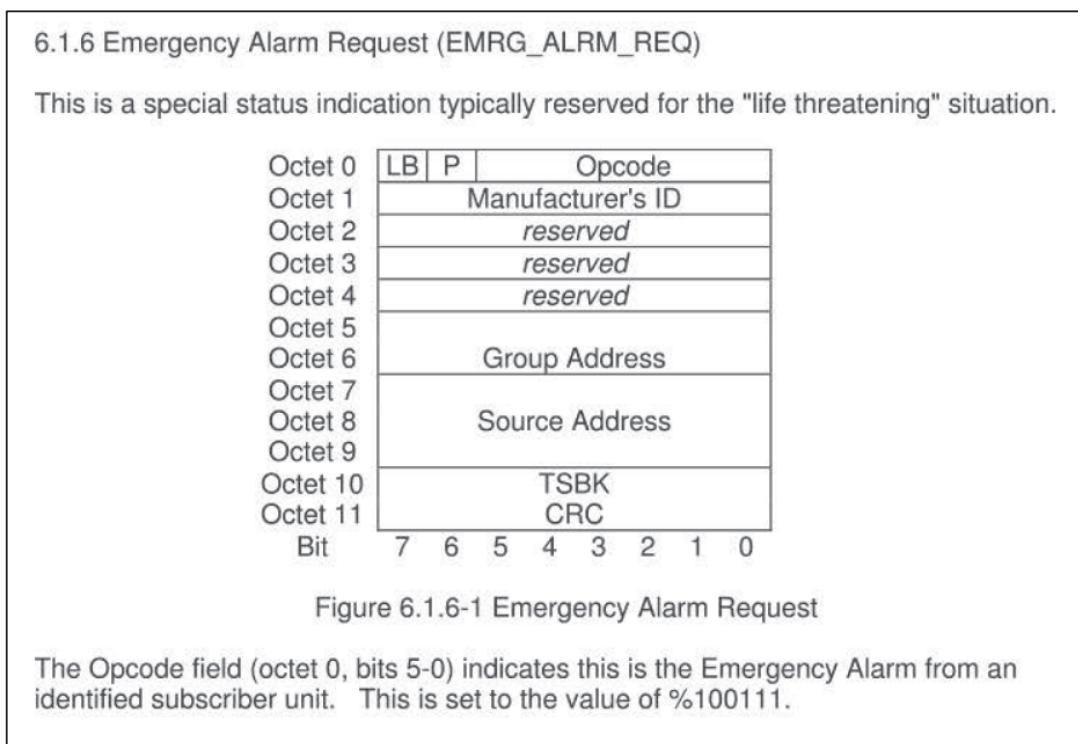
C. Receiving an Alert

70. In the context of emergency communications management, a POSITA would have been well aware of “alerts” and how they are used. For example, a POSITA would have that “alerts” can be used to “notify individuals of the beginning of an emergency event” (Ex[1017], [0025]), or provide all types of information to “commanders about the first responder and/or the environment” during emergency response. Ex[1027], [0047]. For example, “biometric information on the health/vital signs of the first responders as well as [] alerts regarding a fire...and/or gunshots” can all be relayed back to the commander. *Id.* Both the dispatch and broadcast communication management systems have long been able to receive these alerts in various forms such as in packet headers or control packets.

1. Header Packet

71. Multiple dispatch systems, such as Telex-Vega’s dispatch program discussed above, are designed to operate using IP-based radio control based on radio standards such as Project 25 (“P25”). Ex[1022], p.11. The P25 Standard “describes the control channel messages for trunked systems meeting the Project 25 requirements” in order to “ensure interoperability of trunked radio units.” Ex[1023], Foreword. A POSITA would have looked to such standards documents in order to understand how alerts were sent and received by the relevant radio system and dispatch consoles.

72. P25 sends messages in packets with similar formats. For example, Emergency Alarm Requests, which a POSITA would understand to be a type of alert, packets are sent and received in the format shown in the excerpt below. Ex[1023], p.78. Octet 0 forms the header of this alert packet and contains the Emergency Alarm in the form of Opcode %100111. *Id.*



Ex[1023], p.78.

73. Similarly, emergency alerts are received by the broadcast communication systems in standardized formats such as the Emergency Alert System ("EAS"). Ex[1021], [0018]. The "EAS uses a four part message for an emergency activation of the EAS. The four parts are: the preamble and EAS header codes, the audio attention signal, the message, and the preamble and EAS end of

message codes.” *Id.*, [0025]. The EAS header codes “information includ[ing] one or more of the location information, the event code, the valid time period of the event, and the source of the message 106.” *Id.*, [0039]. These “event codes” are the primary portion of the alert, containing information about the type of alert being received, as shown in Figure 4C from Kim (Ex[1020]).

FIG. 4C		
<EAS Event Code(Example)>		
Value	EAS_event_code	Nature of Activation
National Codes:		
0x70	EAN	Emergency Action Notification (National only)
0x71	EAT	Emergency Action Termination (National only)
0x72	NIC	National Information Center
0x73	RMT	Required Monthly Test
0x74	RWT	Required Weekly Test
0x75	NPT	National Periodic Test
Local Codes:		
0x90	ADR	Administrative Message
0x91	BZW	Blizzard Warning
0x92	CEM	Civil Emergency Message
0x93	EVI	Evacuation Immediate
0x94	FFS	Flash Flood Statement
0x95	FFW	Flash flood Warning
0x96	FFA	Flash flood Watch
0x97	FLS	Flood Statement
0x98	FLW	Flood Warning
0x99	FLA	Flood Watch
0x9A	HWW	High Wind Warning
0x9B	HWA	High Wind Watch
0x9C	HLS	Hurricane Statement
0x9D	HUW	Hurricane Warning
0x9E	HUA	Hurricane Watch
0x9F	DMO	Practive/Demo Warning
0xA0	SVR	Severe Thunderstorm Warning
0xA1	SVA	Severe Thunderstorm Watch
0xA2	SVS	Severe Weather Statement
0xA3	SPS	Special Weather Statement
0xA4	TOR	Tornado Warning
0xA5	TOA	Tornado Watch
0xA6	TSW	Tsunami Warning
0xA7	TSA	Tsunami Watch
0xA8	WSW	Winter Storm Waring
0xA9	WSA	Winter Storm Watch
0xAA-FE	[Reserved]	
0xFF	Not Available	

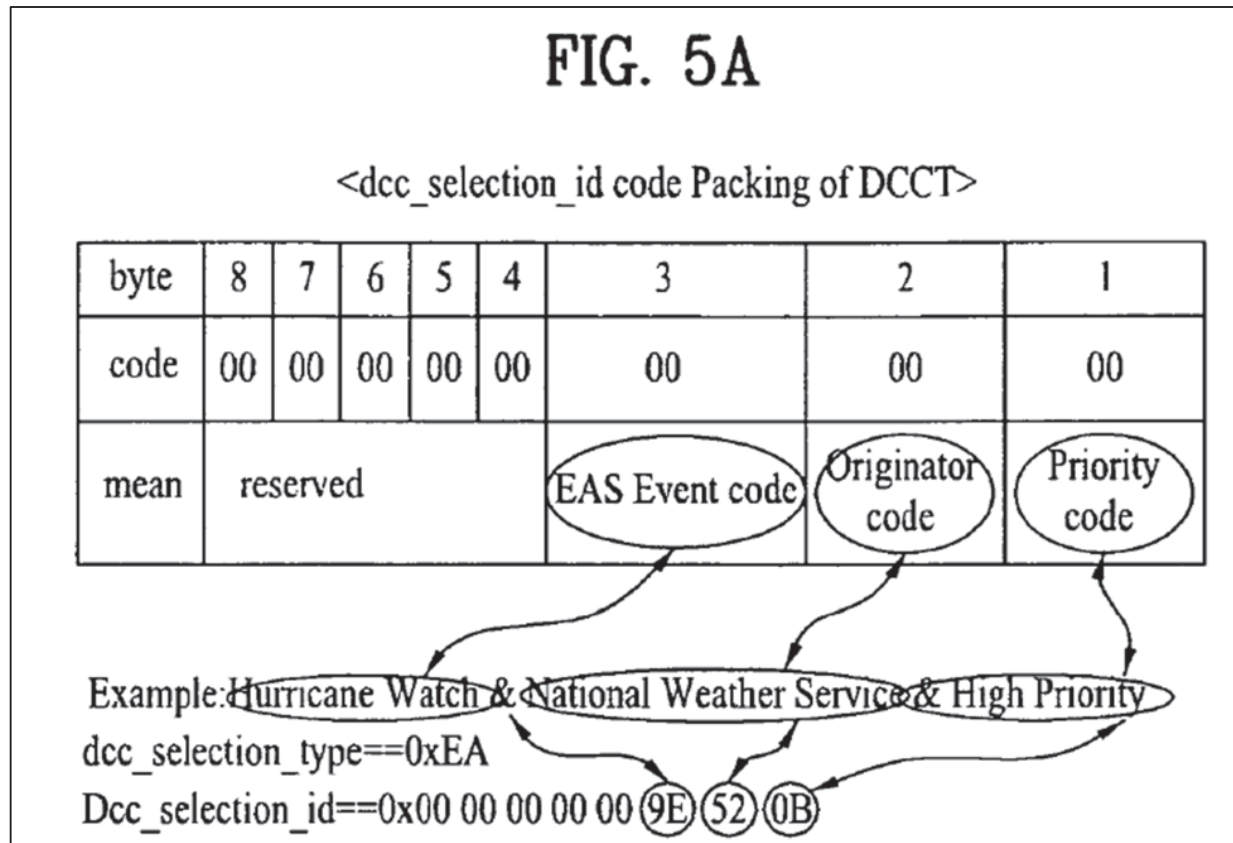
Ex[1020], Fig. 4C.

2. Control Packet

74. Additionally, both the P25 and EAS standards can include messages sent in control packets.

75. The P25 standard “describes that “messages for trunked systems meeting the Project 25 requirements” are sent via “the control channel.” Ex[1023], Foreword. A POSITA would have understood that receiving alerts via packets on a control channel is one example of receiving alerts in control packets.

76. Regarding systems that use EAS, alert codes may be included in other signal packets. For example, tuners may “receive[] a digital television signal including a direct channel change table (DCCT)” that includes “channel ID information,” which “specifies an emergency alert channel associated with an emergency alert event,” and is used by the system control to “and the automatically tune to the emergency alert channel based upon the alert priority.” Ex[1020], [0016]. An example of a DCCT packet containing an EAS event code, which a POSITA would have understood to be an alert received in a control packet, is shown in Figure 5A below:



Ex[1020], Fig. 5A.

D. Elevating the Priority of a Media Stream Receiving an Alert

77. In response to a received alert, it would have been common practice to “elevat[e] a priority” of the media stream receiving the alert such that an adjustment is made to how the media stream is provided, for example, by “simply turn[ing] up the volume” or sending the call to a particular ear. Ex[1001], 3:56-64. By December 2008, a POSITA would have been well aware that this can be performed automatically (e.g., by the communication management system, such as a dispatch control system) or by the dispatcher themselves. For example, the *Department of Defense Design Criteria Standard: Human Engineering* (“DoD”) publication

explained that: “The volume (loudness) of an audio warning signal shall be designed to be controlled by the operator, the sensing mechanism, or both, depending on the operational situation and personnel safety factors.” Ex[1016], p.48. Further, “[w]hen detection of an audio signal is essential (*e.g.*, hand-held mine detectors), the signal level shall be adjustable by the operator.” *Id.*

78. “Push-to-talk is a well known facility for exchanging spoken messages between a group of users via a common communications channel.” Ex[1028], [0002]. The “equipment is arranged in a default state to receiver radio signals from the channel” but pushing a ‘talk’ button “changes the mode of operation of the transceiver to transmit on the common radio channel.” *Id.* Additionally, “Push-to-talk (PTT) devices “can support a single channel or a plurality of channels;” thus, they “are commonly used in safety and security environments.” Ex[1001], 1:29-32. For example, “a management center” connected to other PTT devices may “support[] a plurality of channels.” *Id.*, 1:33-34. In this situation, “less important channels are rendered to one ear, and channels that are more important are rendered to the other ear. Universally, channels are statically configured, where the volume of each channel can be manually adjusted by an end user.” Ex[1001], 1:34-38.

79. That is, a POSITA would have understood that conventional call centers already allowed important call channels to be directed to one or the other of the call dispatcher’s ears, such that “less important channels are rendered to one ear,

and channels that are more important are rendered to the other ear.” *Id.*, 1:33-38.

A POSITA would have been aware that these conventional management centers allowed “the volume of each channel” to “be manually adjusted by the end user.”

Id., 1:36-38. Additionally, a POSITA would have understood that conventional systems already known in the art by the priority date “allow[] speaker assignment to be changed without interrupting the reception of audio signals or without interrupting normal console operation.” Ex[1017], Abstract.

80. Both dispatch and broadcast communication management systems have long been able to elevate the priority of media streams receiving an alert, such as by changing volumes, channels, and/or spatial directions, as discussed below.

1. Changing Volume

81. By the priority date, changing volume in response to an emergency alert would have been a familiar technique well known to a POSITA. For example, CENTRACOM systems have long included individual volume controls for each incoming channel and a mute function for unselect audio. Ex[1018], pp.6, 38. A POSITA would have understood that these features enable a dispatcher to increase the volume of a channel receiving an alert and to mute or decrease the volume of the other channels. Additionally, the P25 Standard’s Statement of Requirements (“P25 SoR”) mandates that, when an emergency alert is received, “[t]he signal volume

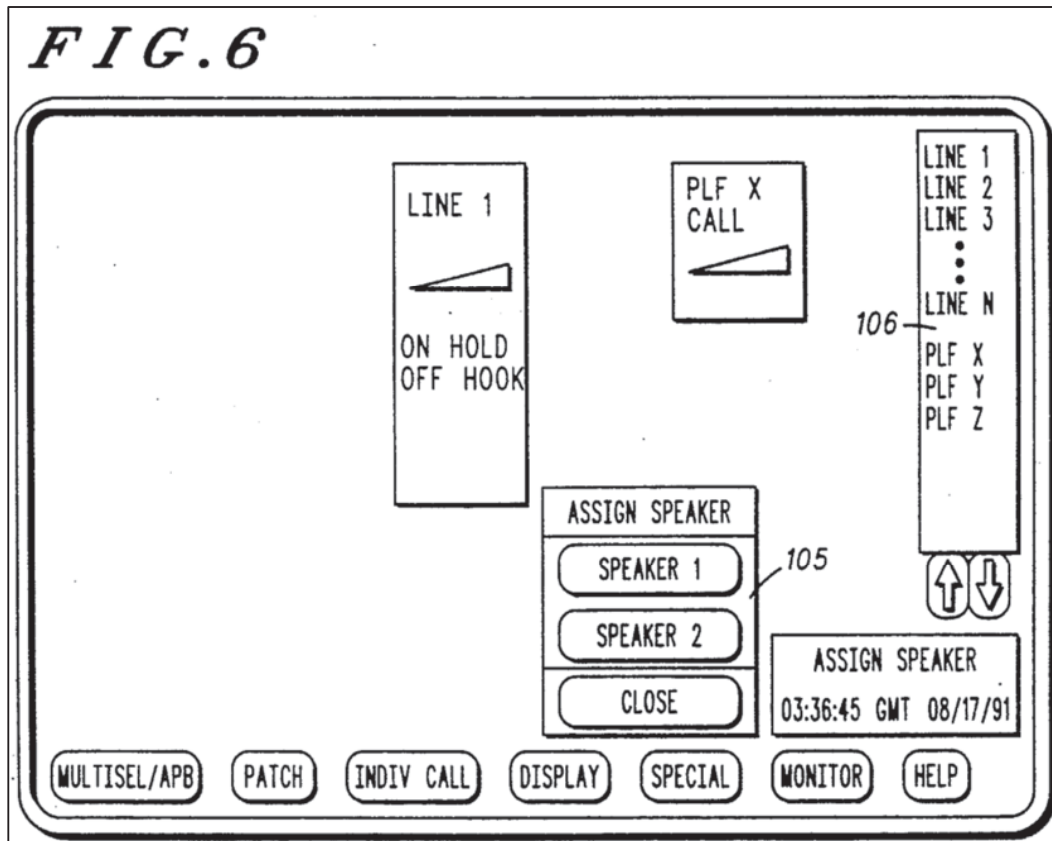
shall ramp from barely audible to maximum set equipment volume over a nominal two-second period.” Ex[1024], p.26.

82. Regarding broadcast communication systems, Owens describes a system that allows the controlling component to “communicate[] with the volume control 212 to ensure that the volume is set at an appropriate level to reproduce the emergency warning message 106. The ability to set the volume control 212 provides for the situation where the user has turned the volume off or down to an inaudible level.” Ex[1021], [0021].

2. Changing Channel and/or Spatial Direction

83. By December 2008, existing communication systems had long allowed for the channel and/or spatial direction of the received alert to be changed in order to ensure that the alert is prioritized.

84. As a POSITA would be aware, dispatch consoles have incorporated these features by allowing the dispatcher to assign channels to specific speakers. Ex[1017], Fig. 6:



85. For example, CENTRACOM incorporates this functionality through one SELECT audio speaker and at least one UNSELECT audio speaker. Ex[1018], p.3. This allows “[a]udio from the ‘selected’ channel” to be routed “to the SELECT audio speaker” by the dispatcher, while “audio from all ‘unselected’ channels” is routed “to the UNSELECT audio speaker.” *Id.* Additionally, this feature is integrated into the P25 SoR, which requires that “[t]he Emergency Alarm tone sounds through the console select speaker.” Ex[1024], p.9.

86. The ability to change speaker assignments to incorporate changing both the channel and spatial direction of an alert would have been a well-known technique to a POSITA before the priority date. It was common to place each speaker in a

specific spatial direction such that, for example, a dispatcher would be able to associate certain spatial directions where the SELECT audio speaker is located with higher priority alerts. Ex[1016], p.49. As one specific example, as stated in the Department of Defense Design Criteria Standard for Human Engineering, “[i]f several channels are to be monitored simultaneously by means of loudspeakers, the speakers shall be mounted at least 10° apart in the horizontal plane frontal quadrant, from 45° left to 45° right of the operator's normal forward facing position.” *Id.*

87. By the priority date, it was conventional for broadcast communication systems to incorporate similar channel-changing functionality. For example, as previously discussed, the system described by Kim “receives a digital television signal including a direct channel change table (DCCT)” that includes “channel ID information,” which “specifies an emergency alert channel associated with an emergency alert event,” and is used by the system control to “automatically tune to the emergency alert channel based upon the alert priority.” Ex[1020], [0016]. Broadcast systems such as Kim that are based upon televisions typically only have one visual output available via the television display. Therefore, a POSITA would understand that changing the channel displayed on the TV elevates the media stream receiving the alert to a priority channel. Kim further discloses multiple alerting methods based on the priority of the alert that range from no interruption of regular

programming, to text-only displays, to fully changing the channel the TV is tuned to. *Id.*, Fig. 4A.

FIG. 4A			
<Alert Priority Codes(Example)>			
Value	Alert_priority	Meaning	Audio Required
0x00	0	Test Message: the alert shall be discarded by all receiving equipment except those designed to acknowledge and process test meaaages.	No
0x01-02	1-2	[Reserved]	
0x03	3	Low priority:the alert may be disregarded if processing the alert would interrupt viewing of an access-controlled servece.	No
0x04-06	4-6	[Reserved]	
0x07	7	Medium priority:the alert may be disregarded if processing the alert would interrupt viewing of a pay-per-view event.	No
0x08-0A	8-10	[Reserved]	
0x0B	11	High priority:the alert shall be processed unconditionally, but can involve text-only display if no audio is available.	No
0x0C-0E	12-14	[Reserved]	
0x0F	15	Maximum priority:the alert shall be processed unconditinally. If audio is avilable without tuning to the details channel, that audio shall be substituted for program audio for the duration of the alert message. If audio is not available by means other than by tuning to the details channel, the details channel shall be acquired for the duration of the alert message.	Yes
0x10-4F	[Reserved]		

88. In addition, as I describe in detail in §VIII and §IX, there are additional broadcast alert systems and others which disclose the functionality of rerouting audio to a different channel and spatial direction.

89. In light of the state of the art by December 2008, in my opinion, no individual elements of the Challenged Claims of the '664 Patent were novel at the time of the alleged invention, and there was nothing novel or inventive about the manner in which those elements were combined in the Challenged Claims. Further, there were no technological barriers to combining these known elements to form the claimed inventions. Indeed, combining these elements would have yielded predictable results. As discussed above, systems for monitoring media streams and receiving alerts were well-known before the priority date. And, as also discussed above, there were a variety of well-known techniques for elevating the priority of a media stream receiving an alert in order to ensure that a dispatcher or television viewer received important emergency communications, including changing the volume, changing the spatial direction, *etc.* In my opinion, there is nothing inventive about the way these elements are combined in the Challenged Claims.

VIII. SUMMARY OF PRIOR ART

90. As previously stated, I have assumed, for the purposes of this analysis, that the Challenged Claims are entitled to a December 19, 2008, priority date.

A. Downs (Ex[1004])

1. Status of Downs

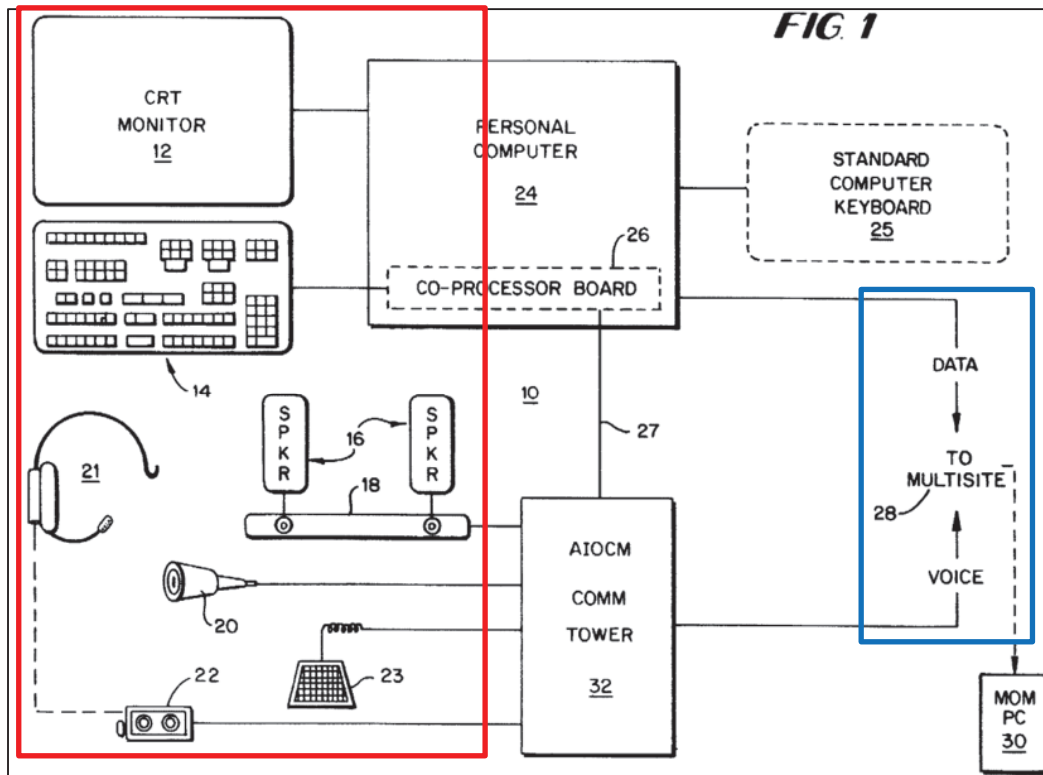
91. U.S. Patent No. 5,754,960 (“Downs”) is entitled “Display Console and User Interface for Multisite RF Trunked System.” Downs was filed February 14, 1992 and issued May 19, 1998. Ex[1004], Cover. I understand from counsel for

Petitioner that Downs is prior art to the '664 Patent at least under 35 U.S.C. §§ 102(a), 102(b) and 102(e).

2. Overview of the Disclosure of Downs

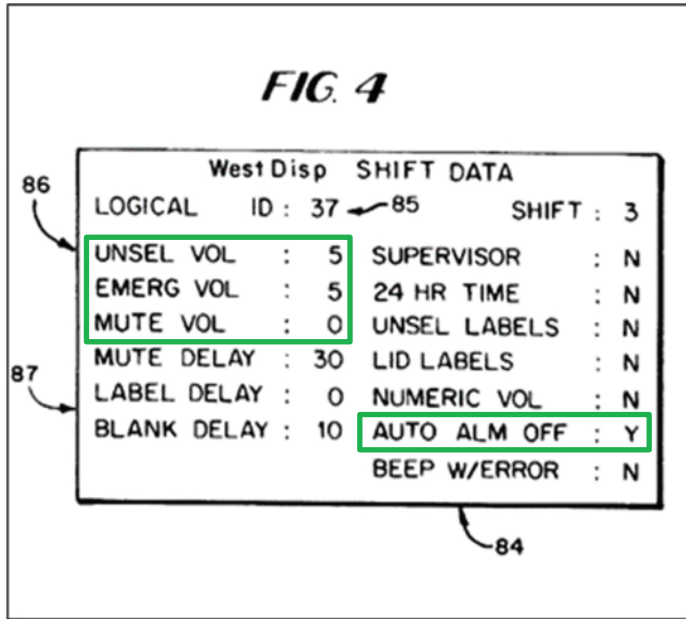
92. Downs describes a dispatch console that “routes audio (voice) and data signals throughout [an] RF system” comprised of “trunked and conventional radio systems...telephone lines...[and] other dispatch consoles” connected to a multisite switch 28. Ex[1004], 4:18-25. These audio and data signals are then organized by the dispatcher into communication modules that “represent a particular group, unit, console, channel, line, etc., that is available to the console.” *Id.*, 6:22-25. For example, “[t]here can be several thousands of radio entities in a multisite system” where “[e]ach entity is an individual trunked radio unit (*e.g.*, mobile, portable, or console), a radio talk group, or a conventional radio” sending audio and data signals to the dispatcher. *Id.*, 2:52-55.

93. These communication modules provide the dispatcher with “information on a specific call or group such as the caller, volume, and emergency.” *Id.*, 3:24-25. Figure 1, below, depicts such a dispatch console with user input/output components in red, as well as audio and data signal connections to the RF system in blue.



94. Downs incorporated these features because “[t]he dispatchers must be free to concentrate on the substance of the calls, any one of which may be an emergency call” and “added features of a complex RF could become a hindrance to the dispatcher, unless the dispatcher is able to quickly and easily operate the dispatch console.” *Id.*, 2:40-50.

95. Figure 4, below, depicts some of Downs’s emergency call alerting features. For example, “Emergency calls are broadcast louder from the dispatcher speakers than other calls” based on the predetermined emergency volume level set by the dispatcher. *Id.*, 6:47-52.



96. Downs further provides the dispatcher the option to ensure that communications are easily comprehensible by “choos[ing] a particular communications module,” such as one that has received an emergency call and sending the audio from that module to “the select speaker” which “may be [a] headset.” *Id.*, 8:41-48.

97. As discussed in Downs, and as further explained below, a POSITA would have recognized that these features could be used to improve multiple dispatch consoles such as Motorola's Centracom II Plus and "the C3™ Series Consoles sold by assignee Ericsson GE Mobile Communications Inc," Ex[1004], 2:60-64, and would have been motivated to do so. Additionally, the C3™ Series Consoles are designed to operate with the EDACS standard (Ex[1005]), which is described in more detail below. Ex[1015], Title.

B. EDACS Standard (Ex[1005])

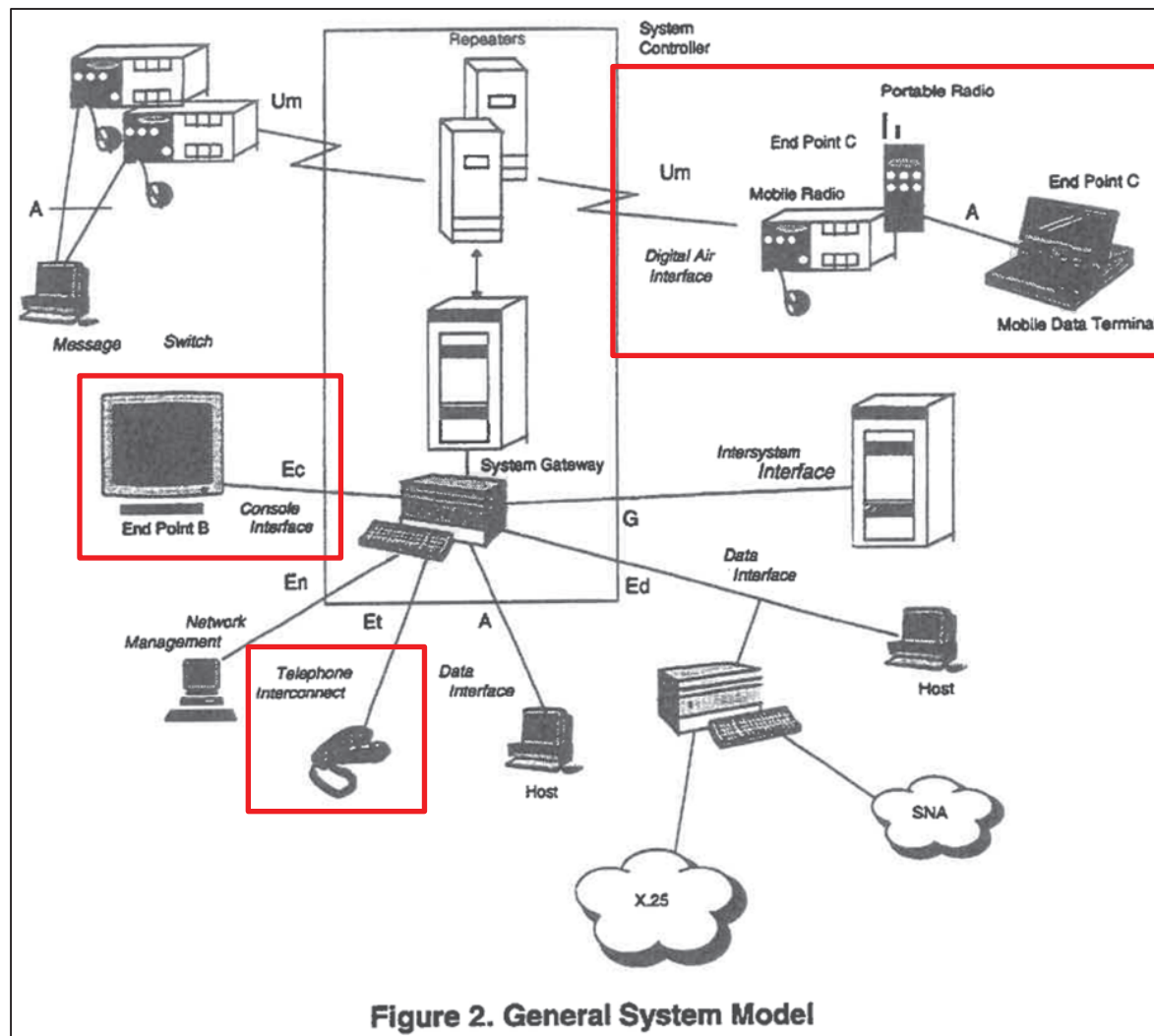
1. Status of EDACS Standard

98. *A System and Standards Definition for a Digital Land Mobile Radio System, TSB69* (“EDACS”) was published by the Telecommunications Industry Association in November 1998 and would have been available for purchase through TIA at least by November 30, 1998. Ex[1014], ¶26. The TIA published this document in order to provide “the basic expectations of Enhanced Digital Access Communication Systems...because it is felt that there is a need for technical information on digital techniques for Land Mobile Radio Service.” Ex[1005], Foreword. A POSITA would have known to look to the TIA for such technical information on EDACS, and multiple other telecommunications standards, and thus would have found this document because TIA is a well-known hub for such communication technology information. A POSITA would have reasonably considered TIA as a convener of industry thought leaders for Information and Communications Technology (ICT) innovation. EDACS was, at least, accessible by going to the TIA main webpage, and accessed via a search engine on the TIA website under the search link, followed by entering the document number and clicking the link. I understand from counsel for Petitioner that because it was publicly accessible before December 19, 2008 EDACS Standard is prior art to the ’664 Patent at least under 35 U.S.C. §§ 102(a), and 102(b).

2. Overview of the Disclosure of EDACS Standard

99. EDACS Standard explains that “[t]his Enhanced Digital Access Communications System (EDACS®) and Standards Definition describes the functional elements of the EDACS System, as well as defining the basic system architecture.”

100. The EDACS standard is intended to be used with a number of different devices such as dispatch console interfaces, radios, telephones, and others as shown in Figure 2 below. A dispatch console interface is intended to be an “interface between a system controller and a console unit” and to “provide for control of certain system functions and features.” *Id.*, p.5. Given Down’s reference to the “C3™ Series Consoles” which operate on the EDACS standard, a POSITA would understand that Downs describes a console interface that would be compliant with the EDACS standard. Ex[1004], 2:62-3:3; Ex[1015], Title.

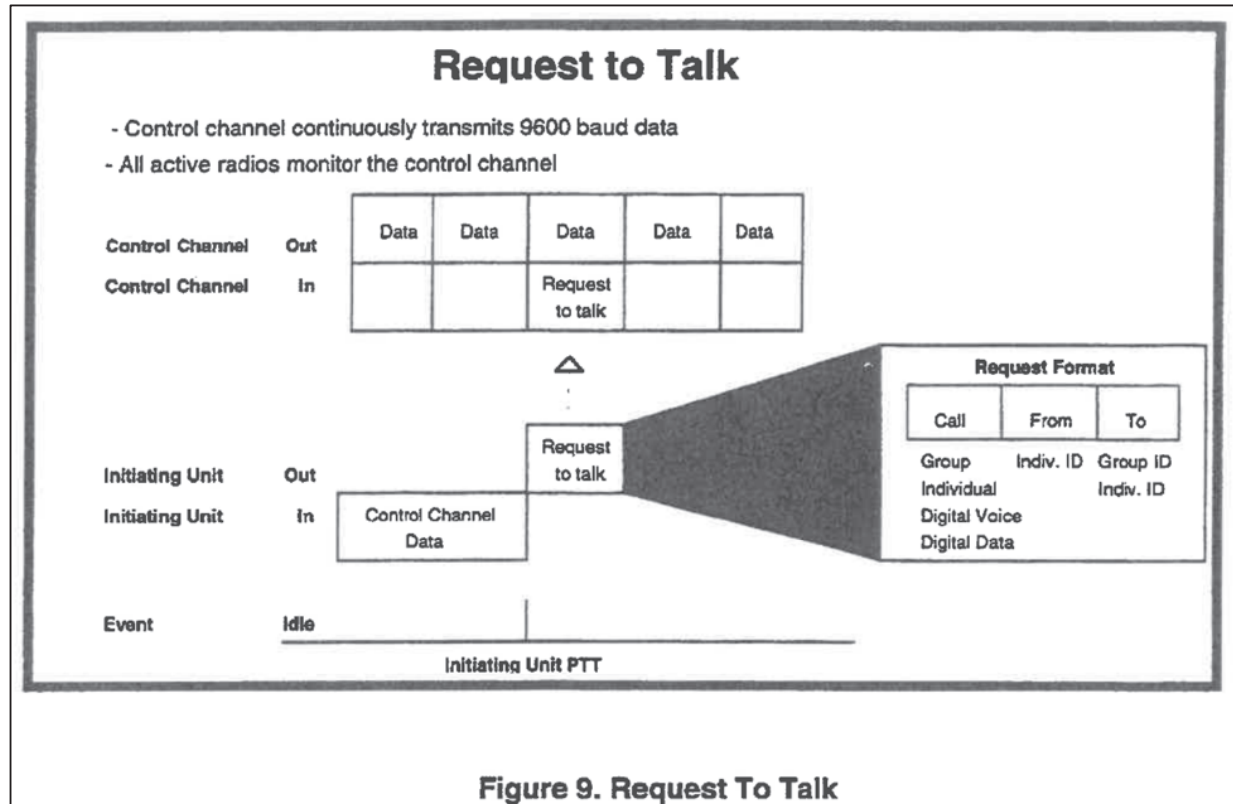


Id., p.6.

101. EDACS “supports three communication modes and four call types.” *Id.*, p.15. These call types are “Group”, “Group Emergency”, “Individual”, and “System All Call.” *Id.*, p.16. “An emergency group call is initiated by pressing the emergency button on the radio. Once initiated, the radio immediately transmits the emergency call request on the inbound control channel” and the system “assigns the emergency call to a free channel” or places it “at the ‘top of the queue’.” *Id.*, p.17.

When such a call is placed “[t]he system automatically assigns the highest priority to the talk group” signals receiving the emergency message. *Id.*, p.43. Thus, “[e]ven on heavily loaded systems, emergency calls are handled quickly and efficiently.” *Id.*, p.17.

102. Figure 9 below shows a call request sent in the EDACS format which contains call type and communication mode information, followed by the IDs of the sender and indented destination. *Id.*, p.54.



103. Further, “emergency group calls are message trunked” rather than “transmission trunked” like typical group calls. *Id.*, p.17. “Transmission trunking means that a working channel is assigned for the duration of a caller’s

transmission,” whereas messages trunking “means a channel is assigned for the duration of the conversation, or emergency.” *Id.* Message trunking is “very useful to the supervisor who requires a dedicated channel while transmitting critical instructions or for emergency calls” because it “assures a dedicated channel” for these priority communications. *Id.*, p.29.

C. Childress (Ex[1031])

1. Status of Childress

104. U.S. Patent No. 4,905,302 (“Childress”) is entitled “Trunked Radio Repeater System.” Childress was filed June 3, 1987 and issued February 27, 1990. Ex[1031], Cover. Childress is prior art to the ’664 Patent at least under 35 U.S.C. §§ 102(a), (b), and (e).

2. Overview of the Disclosure of Childress

105. Childress discloses a “trunked radio repeater system[]” that uses “digital control signals transmitted over a dedicated control channel” and “plural working channels.” Ex[1031], 1:6-11. This system is designed so that “it meets and, in many areas, surpasses all of the existing APCO-16 requirements” laid out by the Association of Public-Safety Communications Offices, Inc. Ex[1031], 2:29-38, 4:59-61.

106. To accomplish this, Childress discloses a messaging sequence and structure used to request and use a trunked channel that includes “all mobiles of the called group” receiving an “emergency group call confirmation message,” which

FIG. 10

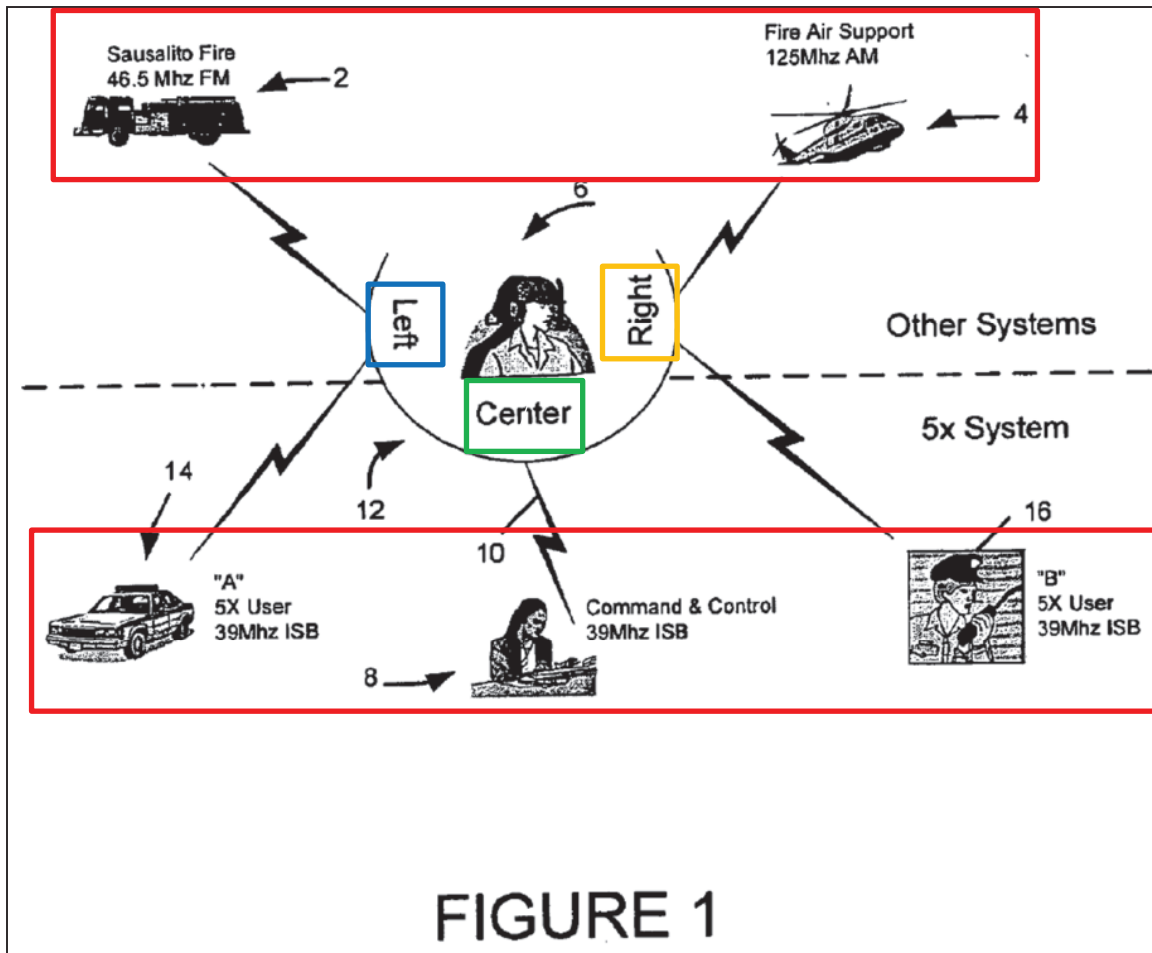
107. U.S. Patent Publication No. 2006/0147028 A1 (“Hancock”) is entitled “Multi-Mode, Multi-Channel Psychoacoustic Processing for Emergency Communications.” Hancock was filed January 5, 2005, and published July 6, 2006.

Ex[1006], Cover. Hancock is prior art to the '664 Patent at least under 35 U.S.C. §§ 102(a), 102(b) and 102(e).

2. Overview of the Disclosure of Hancock

108. Hancock describes “[a]n emergency radio communication system” in which “[e]ach radio receives multiple channel/frequency communications and spatially locates the received communications at predetermined ‘ear’ locations comprising left earphone, right earphone, and both earphones (right and left) according to the source of the received communications.” Ex[1006], Abstract. This enables “differentiating received signals whether on one or multiple channels” from multiple entities such as two separate fire departments and “control and command communications or air support communications” at the same time. *Id.*, [0008].

109. Hancock spatially locates each received signal by “phas[ing] and/or vary[ing] the dB amplitude of the received signals to move a signal from direct left (or right) across a two-dimensional soundfield to position a received channel/frequency at locations in addition to the direct left, right or center.” *Id.*, [0009]. As shown in Figure 1 below, Hancock describes certain channels being “routed to the center acoustic spatial position 12,” (shown in green) while others “routed to the left position,” (shown in blue) or “routed to the right” (shown in orange) by default. *Id.*, [0045].



110. Additionally, “[t]he data channel can be used to send/receive messages, emergency beacons, sensor data and profile update commands.” *Id.*, [0022]. This includes “send[ing]/receiv[ing] low speed test messages including emergency alerts.” *Id.*, [0032]. Thus, when an emergency alert is received the spatial location is changed from the predetermined location such that “emergency transmissions would be routed to both ears,” thereby helping to ensure the dispatcher is able to clearly comprehend these priority emergency transmissions. *Id.*, [0045].

111. Further, “the transmitting user can select the audio channel output of the receiver (left, right, center, etc) by any of the following means: 1) by default as profiled in the radio[;] 2) by profiled location using the last channel received (receive channel 'A' last, transmit next on channel 'A'[;] 3) by a pressing combination of buttons on the radio case (i.e. Left for left output, right for right output, both for center output)[; or] 4) by data received on the last or prior receptions.” *Id.*, [0076]-[0080].

E. Reich (Ex[1007])

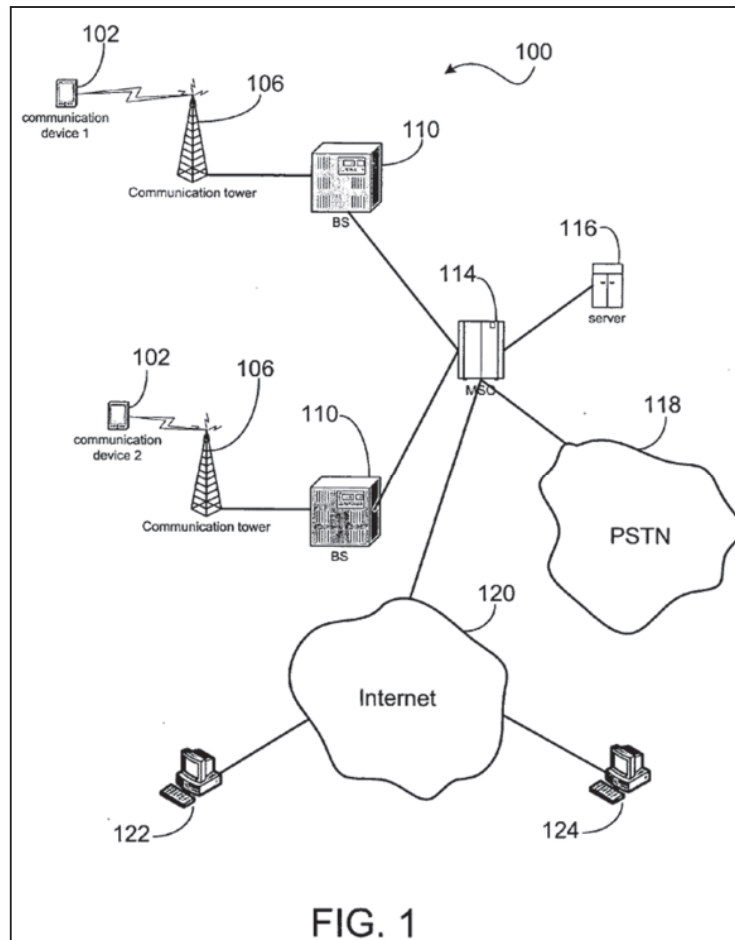
1. Status of Reich

112. U.S. Patent Publication No. 2007/0197248 A1 (“Reich”) is entitled “System and Method for Multiple Simultaneous Communication Groups in a Wireless System.” Reich was filed February 17, 2006, and published August 23, 2007. Ex[1007], Cover. I understand from counsel for Petitioner that Reich is prior art to the '664 Patent at least under 35 U.S.C. §§ 102(a), 102(b) and 102(e).

2. Overview of the Disclosure of Reich

113. Reich’s disclosure “enables a wireless device to simultaneously monitor multiple PTT communication groups and to interrupt an incoming PTT communication with a higher priority PTT communication.” Ex[1007], [0008]. “In one embodiment, a method enables a wireless device having an audio device and a display device to monitor multiple PTT communications on a wireless network.”

114. As shown in Figure 1 below, this wireless PTT communications network “includes one or more communication towers 106, each connected to a base station (BS) 110 and serving users with communication device 102. The communication device 102 can be cellular telephones, pagers, personal digital assistants (PDAs), laptop computers, or other hand held, stationary, or portable communication devices that support push-to-talk (PTT) communications.” *Id.*, [0025]. Further, the PTT transmissions “can be based on different technologies, such code division multiple access (CDMA), time division multiple access (TDMA), frequency division multiple access (FDMA), the global system for mobile communications (GSM), or other protocols that may be used in a wireless communications network or a data communications network.” *Id.*, [0025].



115. Reich teaches that “[w]hen a PTT communication is received from one non-primary PTT group” and the system beings to “receive a PTT communication from the primary PTT group,” the system “interrupts the current non-primary PTT audio communication and sends the primary PTT audio communication from the primary PTT group.” *Id.*, [0029]. In response to receiving overlapping communications of different priorities, Reich provides that “wireless handset 102...may also request communications from a particular PTT communications group be muted, or volume significantly lessened such that the non-primary

communication can still be heard faintly in the background of the primary communication.” *Id.*, [0027].

116. “Alternatively, if the server is transmitting a non-primary PTT communication to a user and a primary PTT communication directed to the same user is received, the server may lower the volume of the non-primary PTT communication that is being broadcasted to the targeted user and then transmitting the incoming primary PTT communication on the top of the non-primary PTT communication. The user will then hear the primary PTT communication over a faded non-primary PTT communication.” *Id.*, [0041].

F. Kim (Ex[1008])

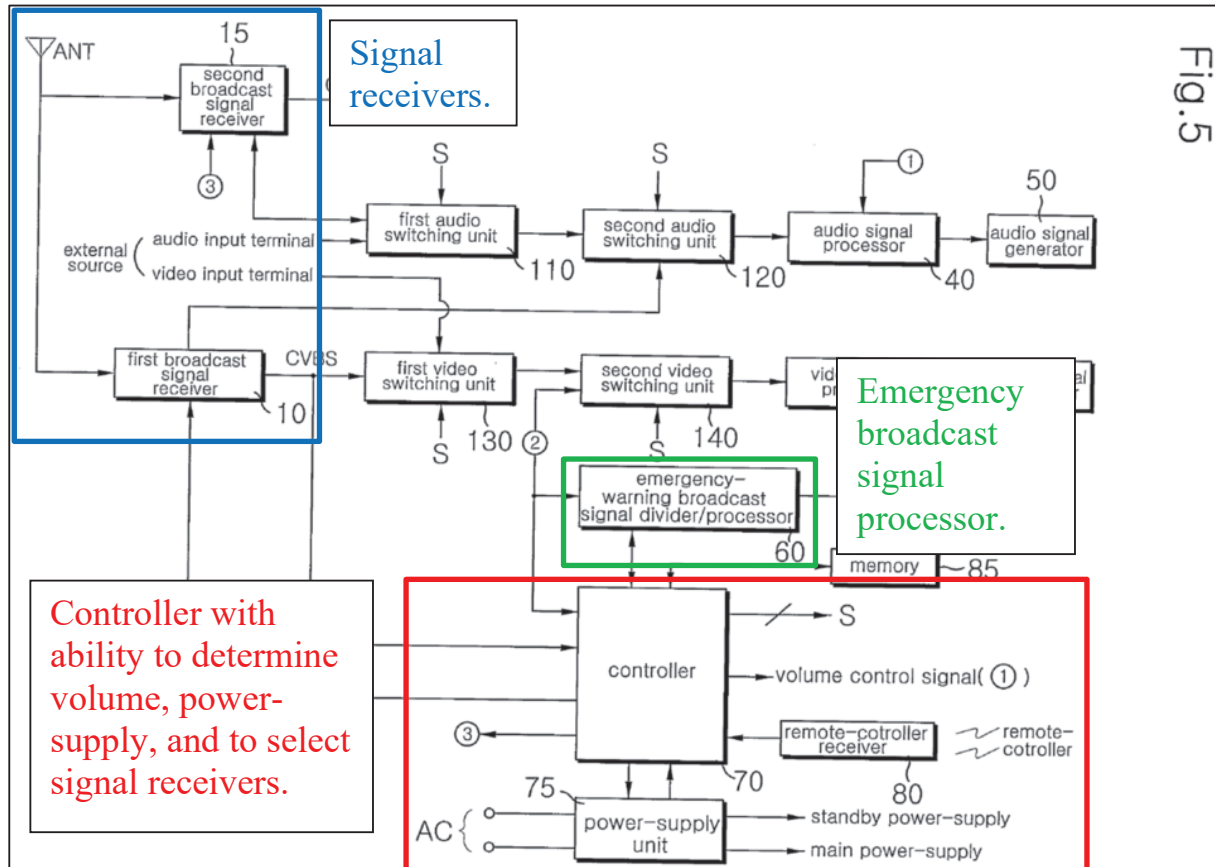
1. Status of Kim

117. International Patent Publication No. WO 2004/034350 A1 (“Kim”), is entitled “Television Set and Method for Notifying a Disaster Situation.” Kim was filed Oct. 9, 2003, with priority to Oct. 9, 2002, and published Apr. 22, 2004. Ex[1008], Cover. I understand from counsel for Petitioner that Kim is prior art to the ’664 Patent at least under 35 U.S.C. §§ 102(a), 102(b) and 102(e).

2. Overview of the Disclosure of Kim

118. Kim teaches a television-based method and apparatus for notifying a viewer of a disaster situation, intended to improve upon existing telephone-based warning systems. Ex[1008], Title, 1:11-21, 3:19-4:11. This system, shown in Figure 5 below, includes a “first broadcast signal receiver 10,” “second broadcast

signal receiver 15,” “emergency-warning broadcast signal divider/processor 60”,
“controller 70,” and power-supply unit 75, among other components, as well as a
TV which is not depicted in the figure. *Id.*, 23:2-8.



119. The first and second “broadcast signal receiver[s]” would be tuned to separate broadcast stations, one of which may be a dedicated emergency-warning broadcast station. Then, when an emergency-warning broadcast is initiated by one of these stations, the data is “overlapped with or inserted in the [] broadcast signal,” received by one of the signal receivers and processed by the “emergency-warning broadcast signal divider/processor.” *Id.*, 3:19-4:1.

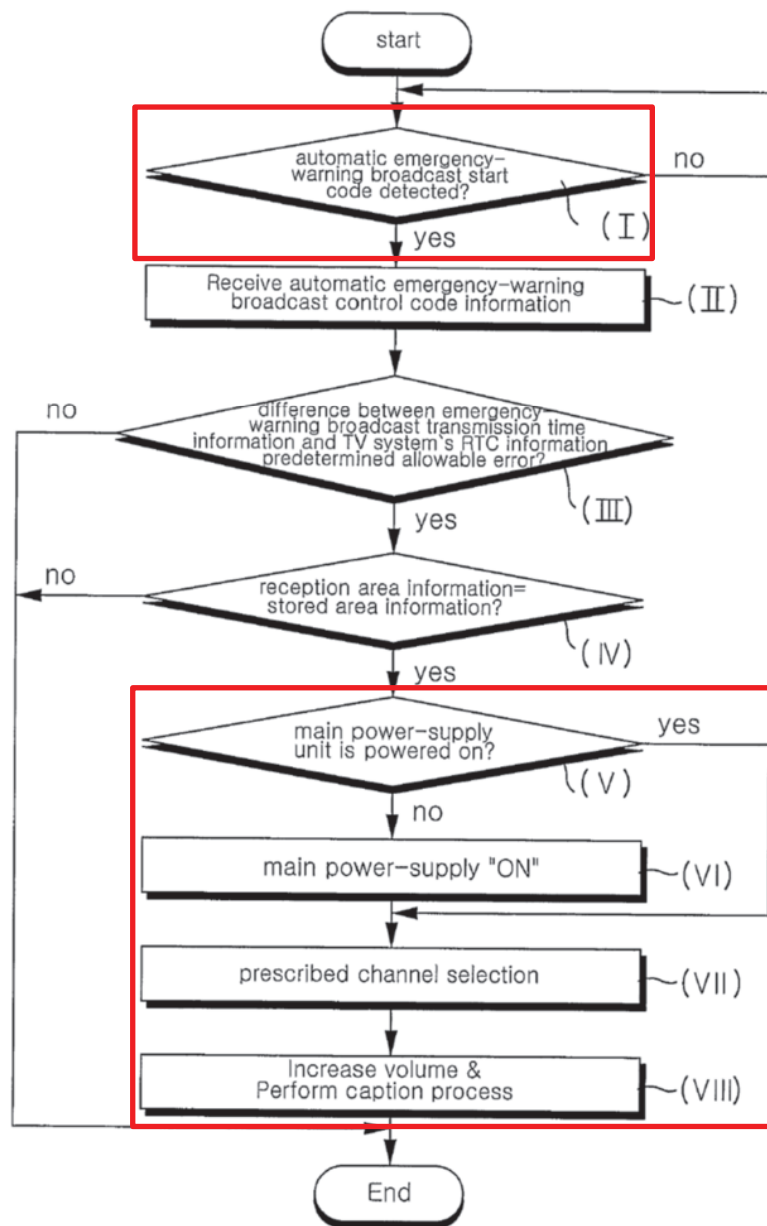
120. An exemplary emergency-warning broadcast signal is shown below in Figure 1. It contains “data with emergency-warning broadcast control information” (*id.*, 3:21-4:3) which is “added in predetermined units (i.e., packet)” to the broadcast digital data streams. *Id.*, 29:20-21.

Fig. 1

control code	TV automatic emergency-warning broadcast start		test code		TV automatic emergency-warning broadcast transmission time		TV automatic emergency-warning broadcast duration		The number of TV automatic emergency-warning broadcast reception areas		TV automatic emergency-warning broadcast reception area 1	
Hex	ID37	ID37			year/month/day/hour/minute	year/month/day/hour/minute	xx	xx	xx	xx	xx/xx/xx/xx	xx/xx/xx/xx
The number of bytes	2	2	1	1	5	5	1	1	1	1	4	4

TV automatic emergency-warning broadcast reception area 2		TV automatic emergency-warning broadcast reception area Nt	TV automatic emergency-warning broadcast reception group	TV automatic emergency-warning broadcast caption start	TV automatic emergency-warning broadcast caption data	TV automatic emergency-warning broadcast caption termination	TV automatic emergency-warning broadcast termination
xx/xx/xx/xx		xx/xx/xx/xx	xx xx	ID39 ID39	text	ID3A ID3A	ID38 ID38
4	4	4	1 1	2 2		2 2	2 2

121. When a signal like the above is received, “controller 70,” “selects a channel transferring the emergency-warning broadcast signal,” from one of the broadcast receivers, controls the power state of the TV via power-supply unity 75, and controls the volume of the TV via a volume control signal among other functions as shown in Figure 3 below. *Id.*, 14:7-12.



G. Ishibashi (Ex[1009])

1. Status of Ishibashi

122. Exhibit 1009 (“Ishibashi”) is an English translation of Japanese Patent Publication No. 2006-340164 A (“Ishibashi”), is entitled “Emergency-Alert Broadcast Receiver and Method for Receiving Emergency-Alert Broadcasts.”

Ishibashi was filed June 3, 2005, and published December 14, 2006. Ex[1009], Cover. I understand from counsel for Petitioner that Ishibashi is prior art to the '664 Patent at least under 35 U.S.C. §§ 102(a) and 102(b).

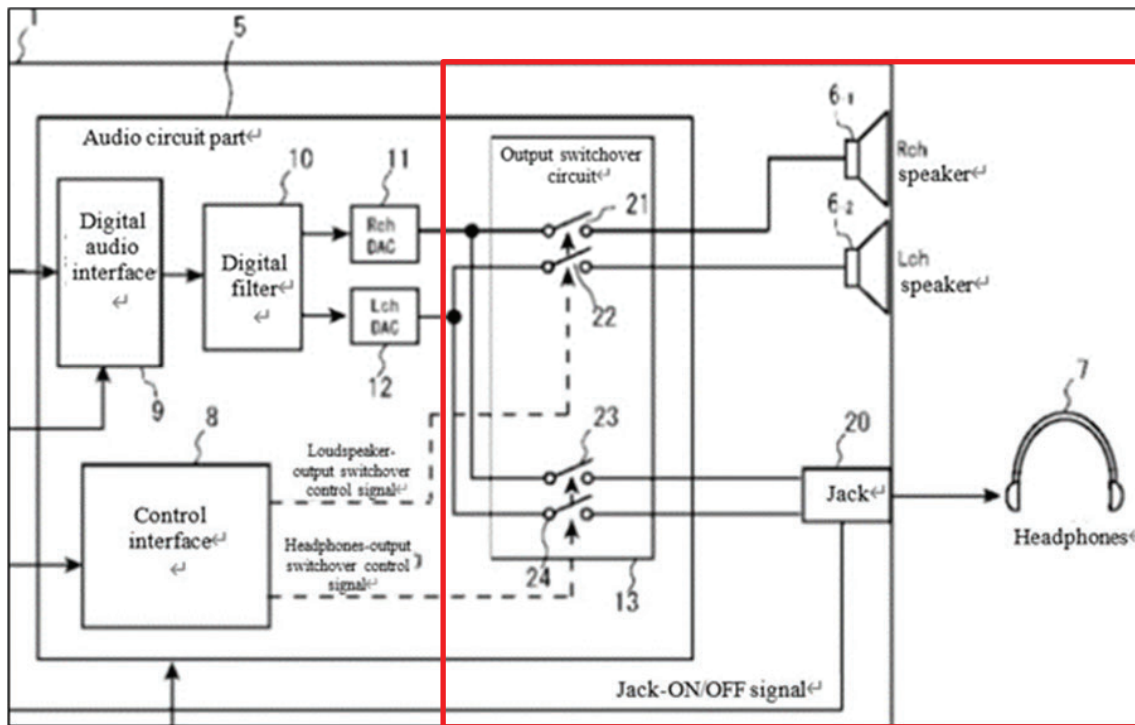
2. Overview of the Disclosure of Ishibashi

123. Ishibashi discloses a system to ensure that a viewer is informed of an emergency warning broadcast, “even if headphones or earphones are left plugged into a jack.” Ex[1009], [0007]. When “an emergency-alert broadcast receiver” receives an alert, the system “automatically switches the audio output to the loudspeaker upon receipt of an emergency-alert broadcast.” *Id.*, [0001].

124. These emergency warning broadcasts are sent from “broadcasting station[s]” and interrupt “the broadcasting of regular TV and radio programs” by transmitting a “radio wave (*e.g.*, an emergency-alert-broadcast activation pilot signal), into which an emergency-alert-broadcast activation flag has been inserted.” *Id.*, [0002]. A “tuner part...tunes into the desired broadcast channel, and outputs the data associated with the broadcast channel thus tuned in.” *Id.*, [0006]. Finally, the “audio circuit part adjusts the audio output to the maximum volume,” and “a switchover means” routes the audio data “to be output through both the [] loudspeaker and the [] jack.” *Id.*

125. Ishibashi’s “audio circuit part”, shown in the excerpted Figure 1 below, comprises an “output-switchover circuit” which “switches the audio signal to

loudspeaker 6 or headphones 7.” *Id.*, [0015]. This ensures that “that the audio sound is output from...at least the loudspeaker 6 during the broadcasting of an emergency-alert.” *Id.*, [0017]. Alternatively, Ishibashi discloses that “audio will be output through both loudspeaker 6 and headphones 7” during an emergency warning broadcast. *Id.*, [0043].



126. Thereby, “an emergency-alert broadcast” is heard by the viewer “even when the audience has forgotten to unplug their headphones or earphones from the jack after viewing and/or listening to a broadcast.” *Id.*, [0005].

H. Goss (Ex[1010])

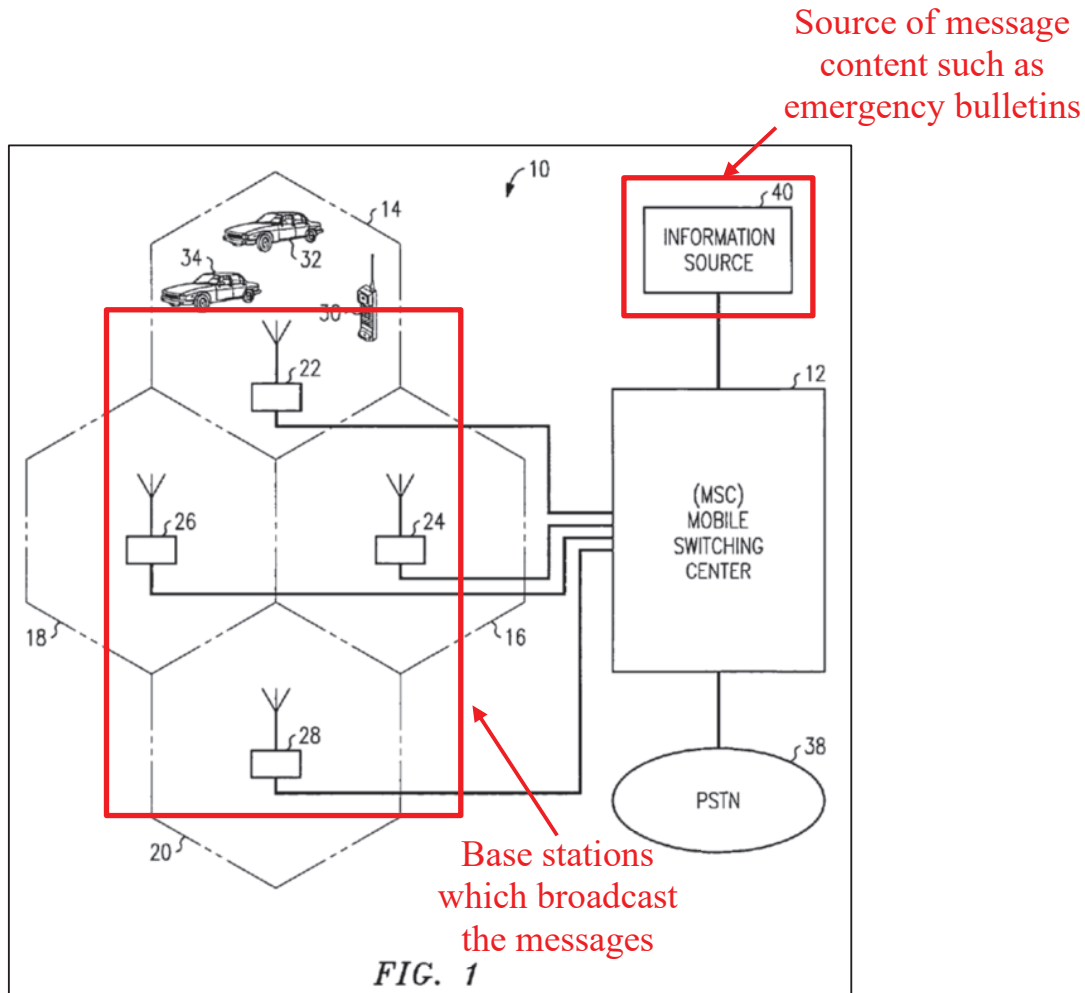
1. Status of Goss

127. U.S. Patent No. 7,330,693 (“Goss”), is entitled “Broadcast Channels for Wireless Telephony.” Goss was filed Sep. 17, 1999 and issued Feb. 12, 2008. Ex[1010], Cover. I understand from counsel for Petitioner that Goss is prior art to the ’664 Patent at least under 35 U.S.C. §§ 102(a), and 102(e).

2. Overview of the Disclosure of Goss

128. Goss teaches “broadcast capabilities and messaging services that enable a live or recorded message to be broadcast to a plurality of users.” Ex[1010], 1:7-9. Goss provides that “[t]he content of such broadcast services may include weather broadcasts, emergency bulletins, news, sports, or any other information or human-understandable message that may be suitable for distribution via a broadcast medium.” *Id.*, 1:34-37.

129. Figure 1 (below) shows “a system for providing broadcast channels in wireless telephony applications.” *Id.*, 2:56-57. However, Goss notes that “[o]ne skilled in the art will appreciate that the invention disclosed herein is not limited to CDMA systems and could be applied to wireless systems employing other transmission technologies, or air interfaces, whether deployed now or in the future.” *Id.*, 3:1-5.



130. Further, these “[b]roadcast announcement messages may be retransmitted from time to time to alert users who did not receive the message when first transmitted.” *Id.*, 6:4-7. Goss teaches that this ability to “transmit one or more broadcast messages on an occasional basis...may be useful for alerting users to an urgent situation.” *Id.*, 7:55-57.

IX. APPLICATION OF THE PRIOR ART TO THE CHALLENGED CLAIMS

131. I have been asked to provide my opinion as to whether the Challenged Claims of the '664 Patent would have been obvious in view of the prior art. The discussion below provides a detailed analysis of how the prior art references I reviewed disclose, teach, or suggest the limitations of the Challenged Claims of the '664 Patent.

132. As part of my analysis, I have considered the scope and content of the prior art and any potential differences between the claimed subject matter and the prior art. I have conducted my analysis as of the filing/priority date of the '664 Patent: December 19, 2008. I have also considered the level of ordinary skill in the pertinent art as of that date.

133. Below, I describe in detail the scope and content of the prior art, as well as any differences between the subject matter claimed and the prior art, on an element-by-element basis for each challenged claim of the '664 Patent. The analysis supports my finding that the differences between the claims of the '664 Patent and the prior art discussed herein are such that the subject matter as a whole would have been obvious at the time of the priority date of the '664 Patent to a POSITA.

134. In the grounds below, I describe on an element-by-element basis how the prior art discloses or teaches all elements of Claims 1-20 of the '664 Patent.

A. Grounds of Unpatentability

135. I have reviewed and analyzed the prior art references and materials listed in Section III above. In my opinion, the Challenged Claims of the '664 Patent are rendered obvious based on the following prior art set forth in Grounds 1-5 below:

Ground	'664 Patent Claims	Basis for Challenge
1	1-6, 8-9, and 11-20	Obvious over Downs in view of EDACS
2	1-6, 8-9, and 11-20	Obvious over Ground 1 in further view of Childress
3-4	3-5, 13-14, 18, and 19	Obvious over Ground 1 or 2 in further view of Hancock
5-6	7, 10	Obvious over Ground 1 or 2 in further view of Reich
7	1-2, 6-9, 11-12, 15-17 and 20	Obvious over Kim
8	3-5, 13-14, and 18-19	Obvious over Ground 5 in view of Ishibashi
9	10	Obvious over Ground 5 in view of Goss

B. Ground 1: Claims 1-6, 8-9, and 11-20 are obvious over Downs in view of the EDACS Standard.

1. A POSITA Would Have Combined Downs with the EDACS Standard with a reasonable expectation of success.

136. There would have been significant motivation to combine Downs with the EDACS standard so that Downs would be connected to “digitally trunked multisite [radio] systems.” Ex[1004], 2:30. Downs discloses a dispatch console

that “routes audio (voice) and data signals throughout [an] RF system” comprised of “trunked and conventional radio systems...telephone lines...[and] other dispatch consoles.” Ex[1004], 4:18-25. Although Downs does not explicitly describe what these signals contain and how such signals are routed, Downs references multiple dispatch console systems that it could be used with such as Motorola’s Centracom II Plus and “the C3™ Series Consoles” which were sold by Ericsson. Ex[1004], 2:60-64.

137. “EDACS® is a registered trademark of Ericsson” and Ericsson’s C3™ Series Consoles that were designed to operate with the EDACS standard. Ex[1015], Title; Ex[1005], p.2. EDACS is an “FDMA, digital, trunked, Land Mobile Radio communication system” containing multiple interfaces such as a console interface, mobile and portable radios, telephones, and more, as shown below in the combined Figure. *Id.*, p.2, 6. It would be well understood that making a dispatch console compatible with EDACS Standard would make the system more marketable as it would better interface with existing and expected future systems. Ex[1005], Forward.

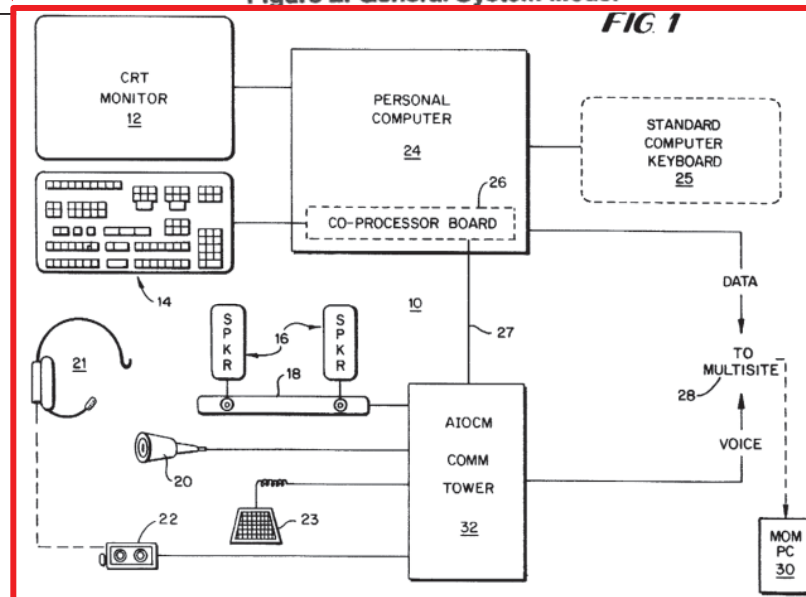
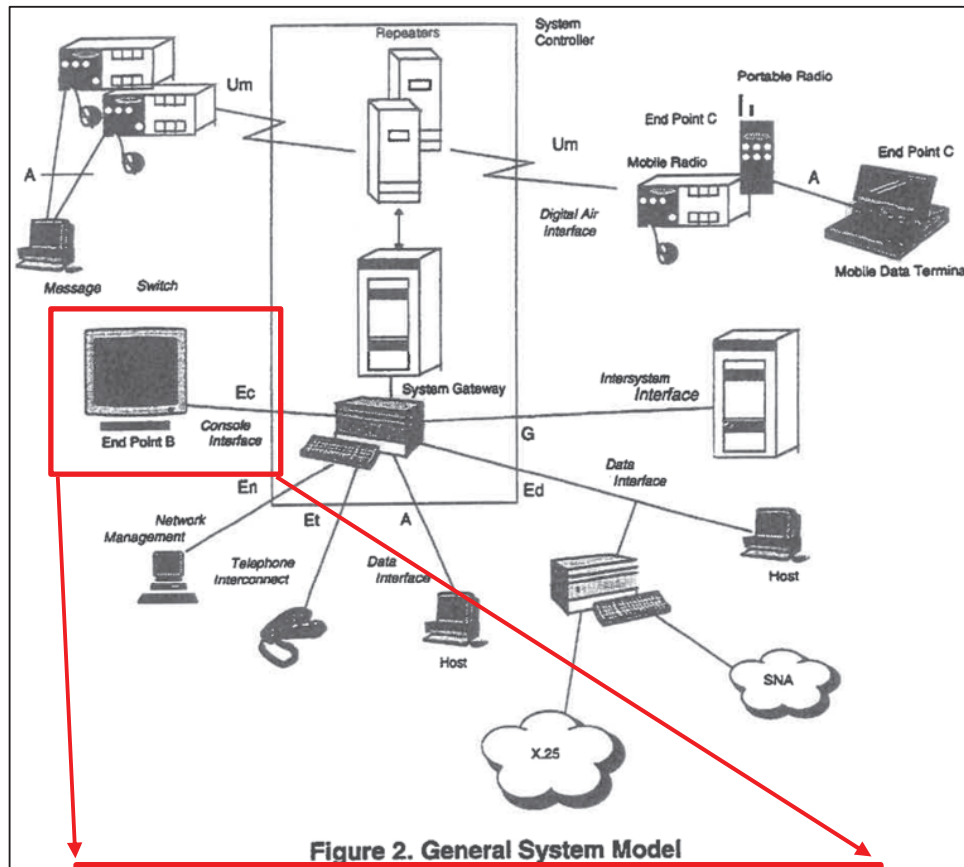
138. The EDACS Standard discloses that call requests are sent in a specific format that contains call type and communication mode information, followed by the IDs of the sender, and intended destination. Ex[1005], p.54. The EDACS System “supports three communication modes and four call types” including

“Group”, “Group Emergency”, “Individual”, and “System All Call.” Ex[1005], p.15-16. “Group Emergency” calls are given particular importance as evidenced by when an emergency call is “initiated, the radio immediately transmits the emergency call request on the inbound control channel” (Ex[1005], p.17) and the system “assigns the highest priority to the talk group[’s]” signals (*id.*, p.43) and “assigns the emergency call to a free channel.” *Id.*, p.17.

139. Additionally, EDACS discloses using different trunking methods for emergency group calls compared to other types of calls. “[E]mergency group calls are message trunked” rather than “transmission trunked” like typical group calls. *Id.*, p.17. message trunking “means a channel is assigned for the duration of the conversation, or emergency.” *Id.* This type of trunking is “very useful to the supervisor who requires a dedicated channel while transmitting critical instructions or for emergency calls” because it “assures a dedicated channel” for these priority communications. *Id.*, p.29. In contrast, “[t]ransmission trunking means that a working channel is assigned for the duration of a caller’s transmission,” *Id.*

140. It should be noted that providing these additional types of trunking methods would provide additional flexibility to emergency call handling systems as well as potentially improving their reliability and integrity.

141. The combined figure below shows a hypothetical communication system that is possible using the EDACS standard, which includes a “Console



142. It would have been known that applying the Downs system to a C3TM Series Console would result in a compatible endpoint in an EDACS-based communication system. Further, by working at Ericsson, a POSITA would likely have had direct access to the Downs Patent, C3TM Series Consoles, and EDACS Standards documents, all of which were owned by Ericsson. Ex[1004], Cover; Ex[1005], p.2; Ex[1015], p.2. Thus, the EDACS Standard would have been an ideal starting place for a POSITA seeking further information regarding “route[ing] audio (voice) and data signals throughout the RF system” as described in Downs. Ex[1004], 4:18-25.

143. Implementing requirements of the EDACS Standard in the Downs dispatch console would have been a simple, predictable combination that a POSITA would have understood and reasonably expected to succeed. For example, the EDACS Standard was already implemented in the C3TM Series Consoles. Ex[1015], Title. Additionally, the EDACS standard is intended to “allow both compatibility and interoperability between various systems and elements,” including being “backward compatible and interoperable with existing” EDACS equipment. Ex[1005], Foreword. Therefore, a POSITA would be both motivated and able, to combine Hancock and Downs and would have had an expectation of success.

2. Claim 1

144. Downs in view of the EDACS Standard renders *a method, comprising: monitoring media streams associated with channels in a communication environment; receiving an alert in one of the media streams; and elevating a priority associated with the media stream receiving the alert, such that an adjustment is made to how the media stream is provisioned to an endpoint in the communication environment* obvious.

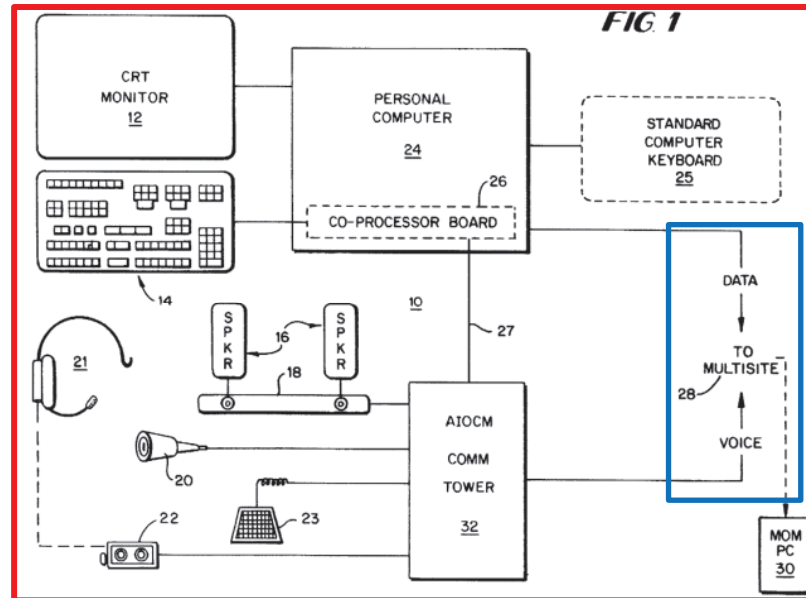
a. 1[Pre]: A method, comprising:

145. If the preamble is limiting, Downs discloses a “*method*” that enables “radio dispatchers” to “communicate with hundreds, if not thousands, of system users” without becoming “overwhelmed by the operational aspects of the RF system” so that they can “concentrate on the substance of the calls, any one of which may be an emergency call.” Ex[1004], 9:51-53, 1:59-60, 2:43-46.

146. Therefore, Downs in view of the EDACS Standard renders *a method*, obvious.

b. 1[a]: monitoring media streams associated with channels in a communication environment;

147. Downs in view of EDACS discloses “*monitoring [e.g., by dispatch console 10] media streams [e.g., continuous voice and associated data signals from talk group sent to multisite switch 28] associated with channels [e.g., control channel*



149. It would have been understood from Downs that the RF system is a communication environment comprised of “trunked and conventional radio systems...telephone lines...[and] other dispatch consoles” connected to the multisite

switch. *Id.*, 4:23-25. The “dispatcher console 10” is thus informed of the status of transmitters and channels that are being used in the system by “communicat[ing] with the RF system through a console interface module (CIM) (not shown) in a multisite switch 28,” which “routes audio (voice) and data signals throughout the RF system.” *Id.*, 4:18-21.

150. EDACS discloses a trunked radio system in which call requests are received “inbound control channel” and the system “assigns the [] call to a free [working] channel” to handle the communication. Ex[1005], p.17. The working channels can have different priorities. Ex[1005], p.29 (describing assigning a “dedicated channel” for an emergency call).

151. Downs takes this information about “the individual transmitters and channels that are being used, and of the status of other transmitters and receivers in the system,” and “presents information on ongoing communications throughout the RF system and historical information on recently terminated calls...in an array of communication module windows.” Ex[1004], 2:20-23; 3:17-23. These communication modules thus “provide call access to...entities” such as “an individual trunked radio unit...a radio talk group, or a conventional radio” via voice and associated data signals (*media streams*) and are “programmed by the dispatcher to represent a particular group, unit, console, channel, line, etc., that is available to the console.” *Id.*, 4:52-54, 6:21-26.

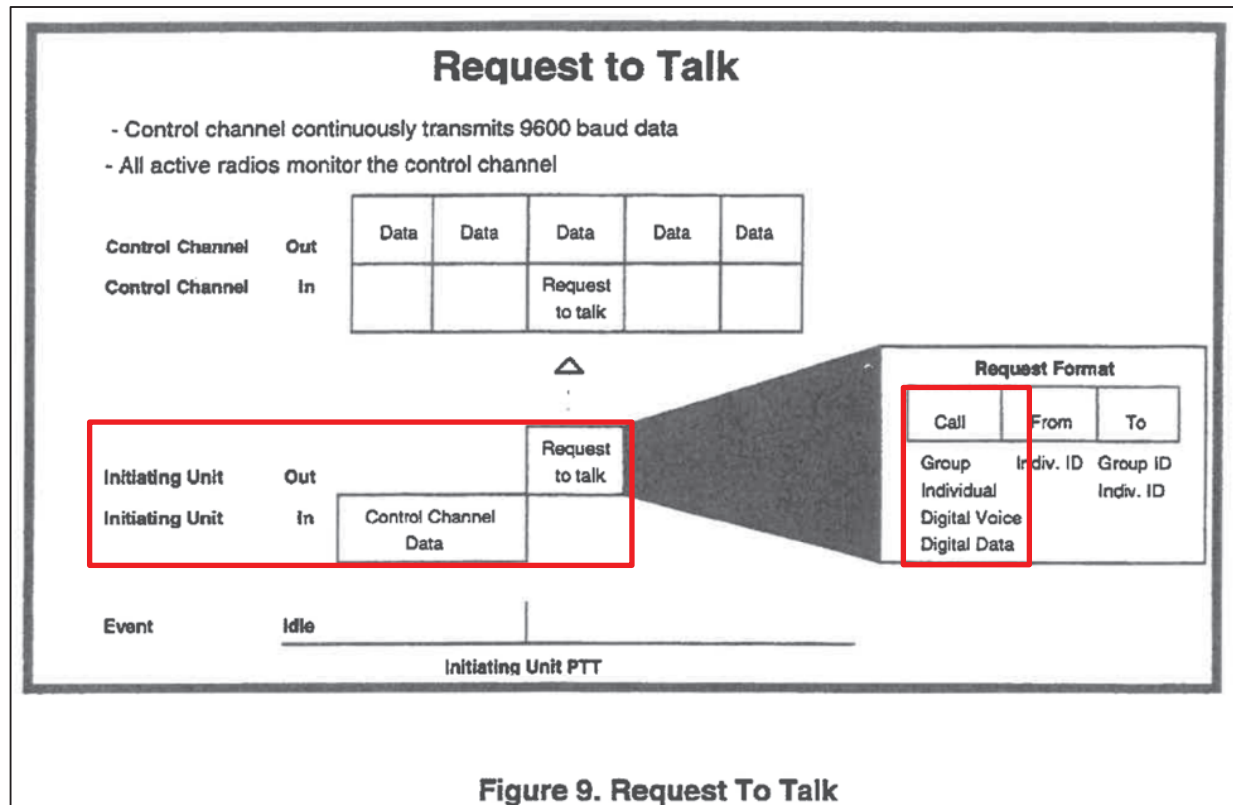
152. Therefore, it would have understood that Downs in view of EDACS discloses that the dispatch console *monitors media streams* (audio talk group signals) *associated with channels* (control channel and working channels) *in the communication environment*. *Id.*, 3:4-26, 6:24-26; *see also id.*, 4:18-29, 6:19-29, 11:55-12-7, 12:15-39, 12:46-64, and 13:4-14:8.

153. Therefore, Downs in view of EDACS renders *monitoring media streams associated with channels in a communication environment* obvious.

c. 1[b]: receiving an alert in one of the media streams; and

154. To the extent “*receiving an alert in one of the media streams*” is construed to require the alert and media stream be received on the same channel, it is rendered obvious by Ground 2. *See infra* §IX.C.

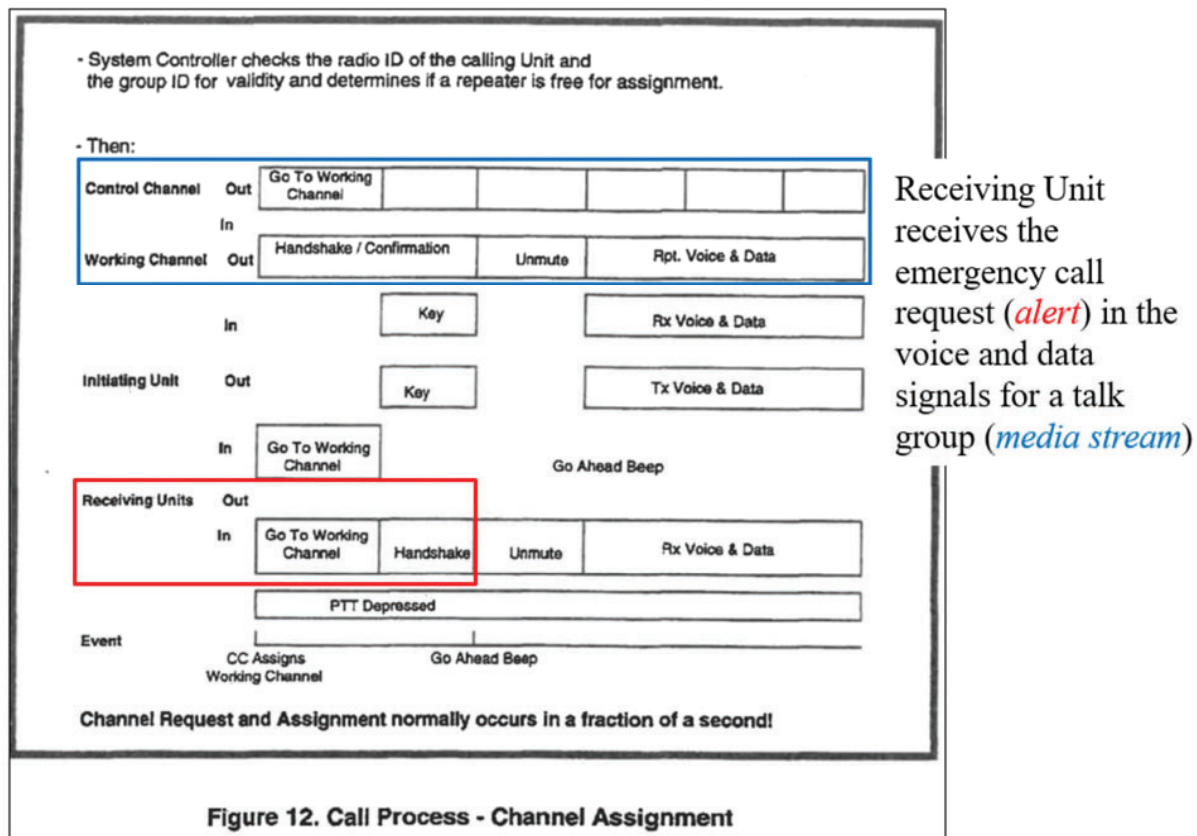
155. Downs in view of the EDACS Standard discloses *receiving an alert* [e.g., Group Emergency Call Type] *in one of the media streams* [e.g., talk group voice and associated data signals sent via the control channel and working channels].



156. Downs was designed, in part, to ensure that dispatchers are “free to concentrate on the substance of the [received] calls, any one of which may be an emergency call.” Ex[1004], 2:44-46. Although Downs does not discuss how its system determines that a call is an emergency call, it does contemplate use with the C3™ Series Consoles which operate on the EDACS Standard. *Id.*, 2:62-3:32; Ex[1015], Title.

157. EDACS Standard discloses that complaint systems should “support[] three communication modes and four call types,” including a “Group Emergency” call type. Ex[1005], pp.15-16. These emergency calls are “initiated by pressing the emergency button on the radio. Once initiated, the radio immediately transmits

the emergency call request on the inbound control channel” (*id.*, p.17), and the system “assigns the highest priority to the talk group[’s]” signals receiving the emergency call, (*id.*, p.43) and “assigns the emergency call to a free channel” or places it “at the ‘top of the queue’.” *Id.*, p.17. Thus, emergency call requests, each of which would correspond to a claimed *alert*, are *received* on the inbound control channel *monitored* by the dispatch console and assigned the highest priority. *Id.*, pp. 43, 59, Fig. 9. “All members of the talk group are notified of the emergency condition” and begin communicating on the working channel as shown in Figure 12. *Id.*, p.43.

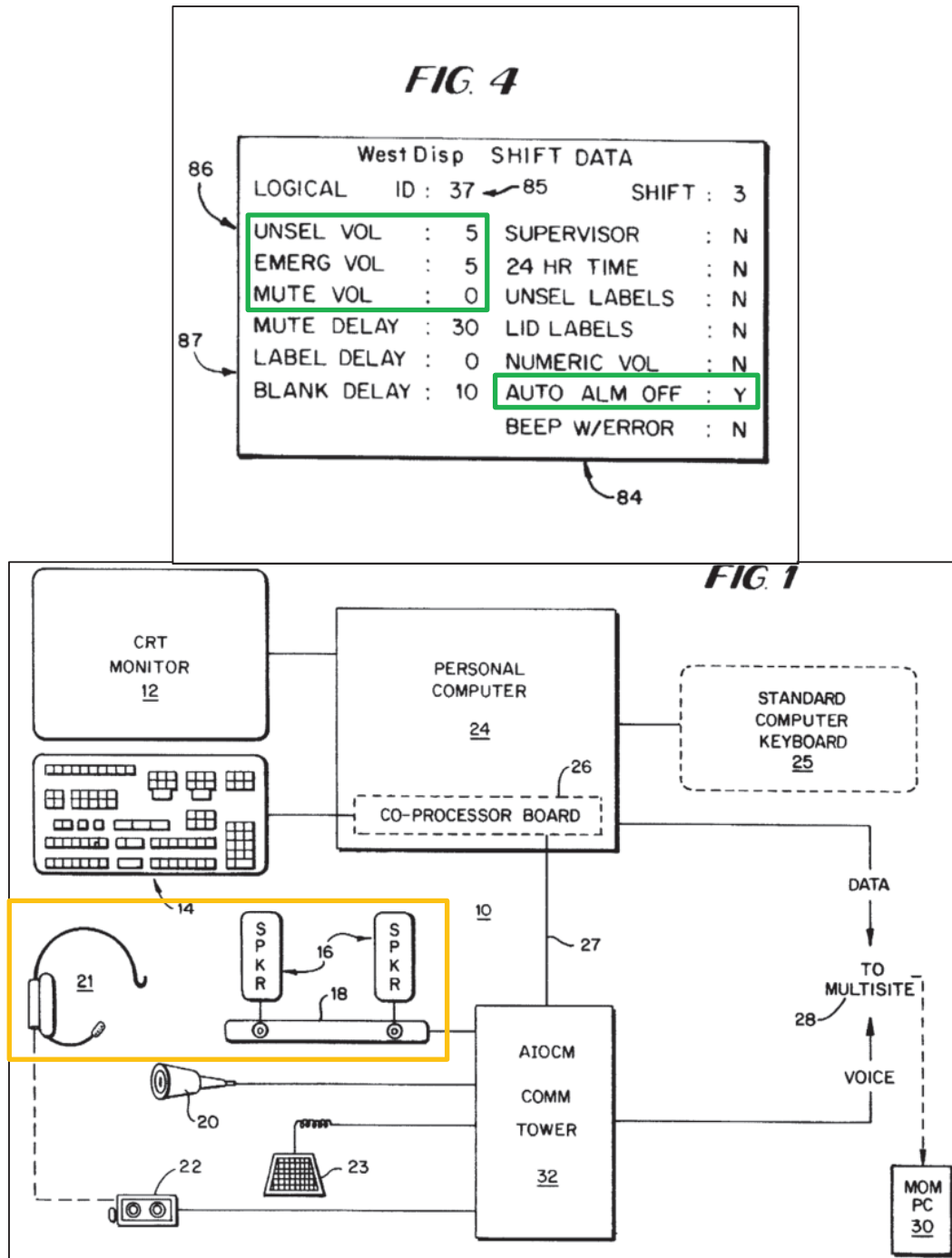


158. Thus, it would be understood by a POSITA that the Downs-EDACS Standard combination discloses receiving an *alert in one of the media streams*. Information that an emergency call is being received is then provided to the dispatcher via a “receiving/emergency call indicator 68,” in communication module 60 (*media stream monitored* by the dispatcher), as well as other means discussed further below. Ex[1004], 3:24-26, 6:30-41; *see also id.*, 2:40-50, 3:17-26, 6:30-46, and Fig. 3. As discussed above, there would have been motivation for a POSITA to combine Down with the EDACS standard to facilitate routing audio (voice) and data signals throughout the RF system as described in Downs. Ex[1004], 4:18-25; *supra* §IX.B.1.

159. Therefore, Downs in view of the EDACS Standard renders *receiving an alert in one of the media streams* obvious.

- d. 1[c]: elevating a priority associated with the media stream receiving the alert, such that an adjustment is made to how the media stream is provisioned to an endpoint in the communication environment.**

160. Downs in view of the EDACS Standard discloses “*elevating a priority associated with the media stream receiving the alert, such that an adjustment is made to how the media stream is provisioned* [e.g., in response to the emergency call request in the combined Downs-EDACS system, broadcasting at a louder volume, or changing speaker location] *to an endpoint in the communication environment* [e.g., the dispatcher’s console with speakers 16, headset 21, and microphone 20].”

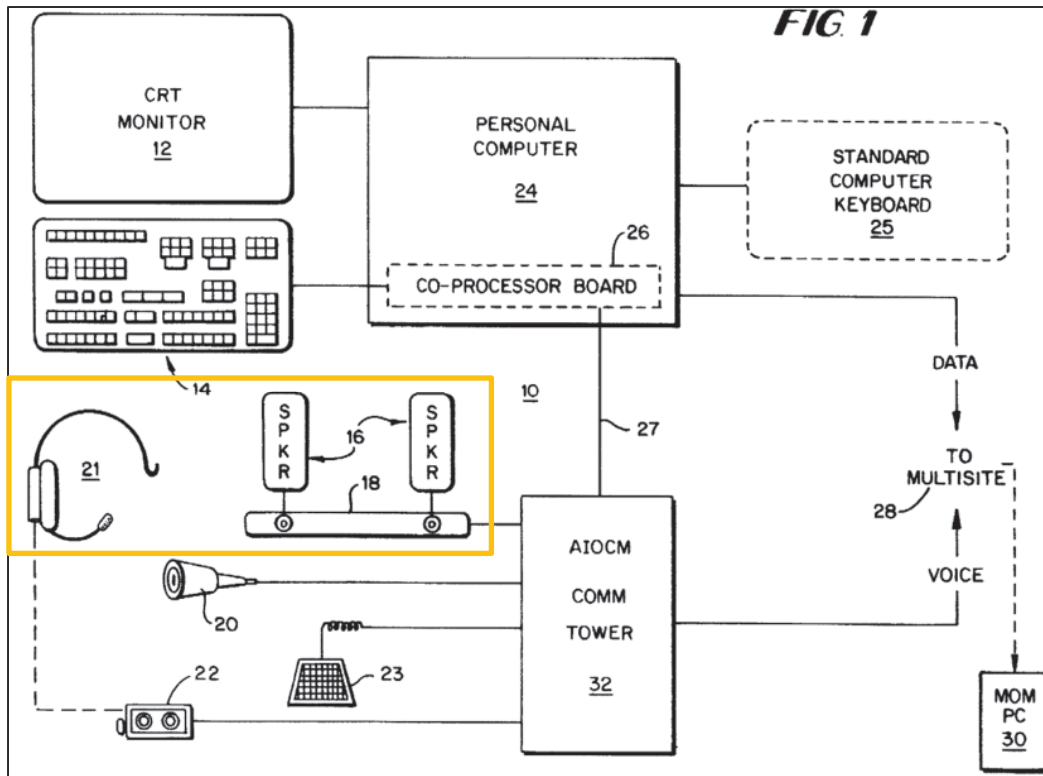


161. Upon receiving an emergency call request (*alert*), the EDACS Standard specifies that “[t]he system automatically assigns the highest priority to the talk group[’s]” signals (*media stream receiving the alert*). *Id.*, p.43. Thus, it would

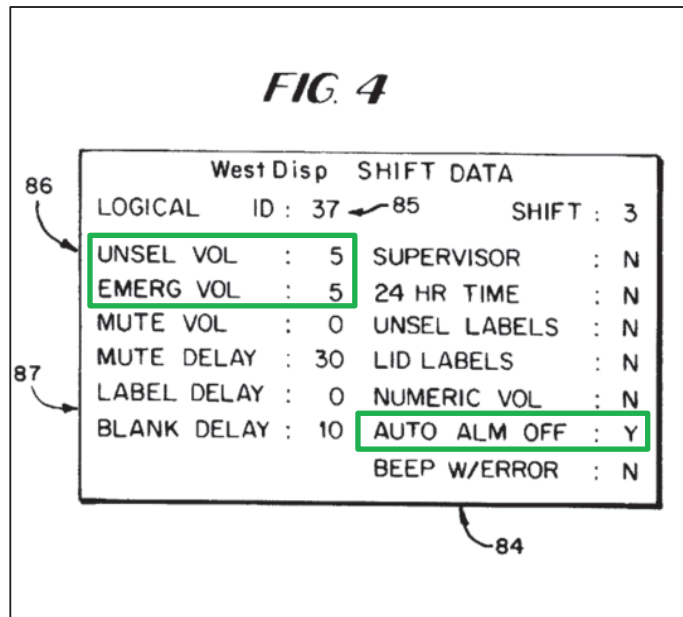
be understood that the EDACS Standard discloses “elevating a priority associated with the media stream receiving the alert” as stated by the claim.

162. In the combined system, the Downs dispatcher console would then use this priority indication to initiate a variety of both automatic and manual ways to *adjust how the media stream is provisioned to an endpoint in the communication environment* to ensure that the dispatcher is aware of the alert.

163. Downs discloses that *adjustments* be made to the volume at which the audio from communication modules assigned to the talk group’s signals (*media streams*) receiving emergency call requests (*alerts*) is *provisioned*, such that “emergency calls are broadcast louder from the dispatcher speakers than other calls” based on a pre-set emergency volume level. *Id.*, 6:39-52. Such an auditory adjustment further *elevates the priority of the* talk group’s signals (*media stream*) *receiving the alert, such that* it can be clearly heard over other, lower-priority media streams through speakers 16 or headset 21 used at the dispatcher console (*endpoint in the communication environment*) as shown in Figure 1 below. *See also id.*, 3:17-25, 6:30-53, and Figs. 1, and 3-4.



164. These “volume settings 86,” are “set such that emergency calls are broadcast louder from the dispatcher speakers than other calls,” and are one example of options set by the dispatcher and saved in a “dispatcher profile,” shown in Figure 4 below. *Id.*, 6:47-52; *see also id.*, 3:17-25, 6:30-53, and Figures 3-4.

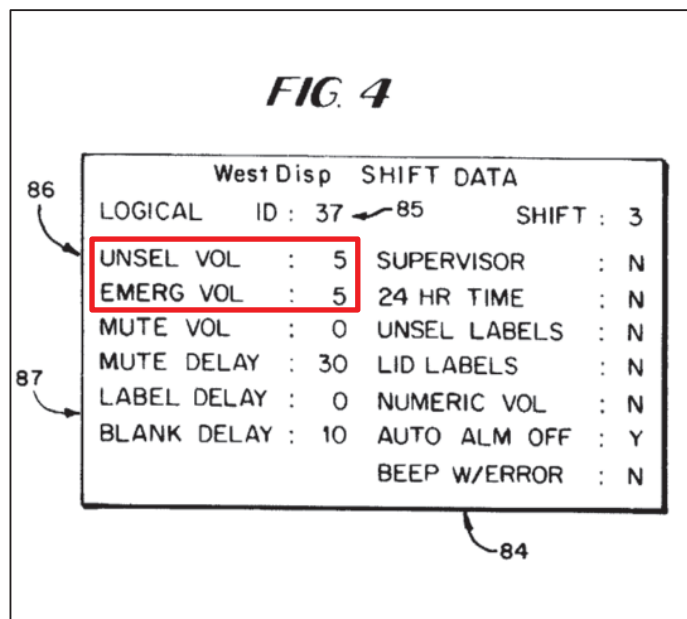


165. In addition to pre-setting emergency volume levels, Downs also enables dispatchers to manually *adjust* how a communication module assigned to the talk group's signals (*media stream*) is *provisioned* by "choos[ing] a particular communications module," such as one that has received an emergency call request (*alert*) and sending the audio from a communication module to "the select speaker" which "may be [a] headset." *Id.*, 8:40-48. Thus, providing dispatchers with another auditory adjustment that *elevates the priority of the* talk group's signals (*media stream*) *receiving the alert*, by *adjusting* where the audio from the communication module assigned to the talk group's signals receiving the emergency call request (*alert*) is heard by the dispatcher's console (*endpoint in the communication environment*). *See also id.*, 8:40-48.

166. Therefore, Downs in view of the EDACS Standard renders *elevating a priority associated with the media stream receiving the alert, such that an adjustment is made to how the media stream is provisioned to an endpoint in the communication environment* obvious.

3. Claim 2: The method of claim 1, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert.

167. Downs discloses “[t]he method of claim 1, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert.”



168. The '664 Patent discloses a functionality identically method for handling emergency calls to Downs. That is, “where a channel of an end-user device is set at a low priority and at a low volume” when an alert is received, “the

volume of the channel is increased and/or, the system moves the channel to the high priority spatial position.” Ex[1001], 7:62-8:5.

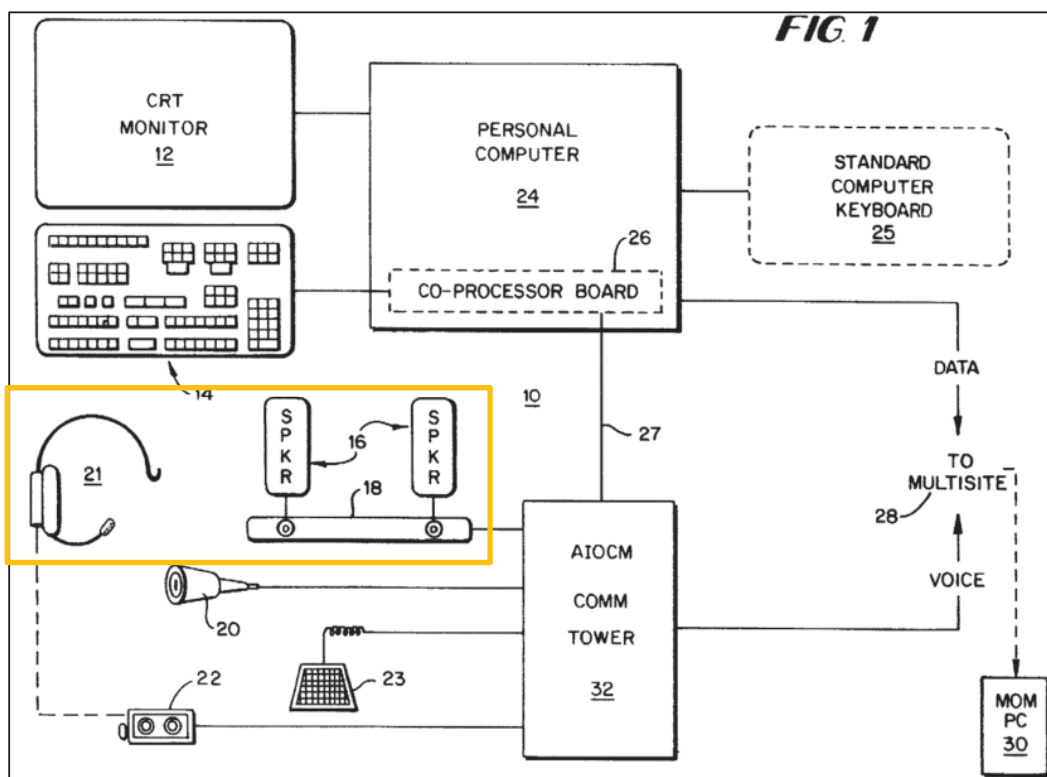
169. As previously discussed, Downs discloses “dispatcher profile[s]” which includes “volume settings 86,” among “other features of the profile.” Ex[1004], 6:47-50. “The volume levels can be set such that emergency calls are broadcast louder from the dispatcher speakers than other calls.” *Id.*, 6:50-52. Thus, just as in the ’664 Patent, Downs discloses that when an emergency call request (*alert*) is received, if the *volume* of the communication module assigned to the talk group’s signals (*media stream*) *receiving the alert* is set at a low volume, the *volume* of the channel is automatically *increased* to the pre-set emergency volume level of the dispatcher’s profile. Figure 4 above illustrates a potential dispatcher profile, including the independent emergency volume setting option.

170. Therefore, Downs discloses that, upon receiving an emergency call request (*alert*), the system in Downs performs the step of automatically *elevating the priority* of that emergency call by *increasing the volume* of the communication module assigned to the talk group’s signals receiving the call in the same manner as the ’664 Patent. *See also id.*, 3:17-25, 6:47-53, and Figures 4.

171. Thus, Downs renders *elevating the priority by increasing the volume of the media stream receiving the alert* obvious.

4. **Claim 3: The method of claim 1, wherein elevating the priority comprises changing a spatial direction for rendering the media stream receiving the alert.**

172. Downs discloses manually “*changing a spatial direction [e.g., speakers 16, 18, and headset 21] for rendering the media stream receiving the alert.*” Should the claims be construed to require “automatically” changing the spatial direction, it is rendered obvious by Ground 3. *See infra* §IX.D.2.



173. As previously discussed, Downs provides the dispatcher the ability to manually “choose a particular communications module,” such as one that has received an emergency call, and change the speaker to which the audio output from that module is sent. Ex[1004], 8:40-48. For example, the audio may be selected and routed to “the select speaker” which “may be [a] headset.” *Id.*, 8:40-48. One

potential embodiment of outputs for communications module audio is shown above in Figure 1.

174. Rerouting the audio from an unselect speaker to “the select speaker” or a “headset” in response to an emergency call request (*alert*) results in a *change in spatial direction for rendering the* communication module assigned to the talk group’s signals (*media stream*) *receiving the alert* because the select speaker and/or the headset would have different spatial locations than the original speaker to which the communication module audio was routed. *Id.*, 8:40-48. This would not only be possible but preferable to place the speakers and headset at separate spatial locations. For example, DoD instructs that “[i]f several channels are to be monitored simultaneously by means of loudspeakers, the speakers shall be mounted at least 10° apart in the horizontal plane frontal quadrant, from 45° left to 45° right of the operator's normal forward facing position.” Ex[1016], p.49.

175. Thereby, upon receiving an emergency call request, the dispatcher can select that communication module assigned to the talk group’s signals receiving the alert and *change the spatial direction* of the audio output from the unselect speaker to “the select speaker” which “may be [a] headset.” *Id.*, 8:40-48.

176. Therefore, Downs renders *elevating the priority by changing a spatial direction for rendering the media stream receiving the alert* obvious.

- 5. Claim 4: The method of claim 1, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert and changing a spatial direction for rendering the media stream receiving the alert.**

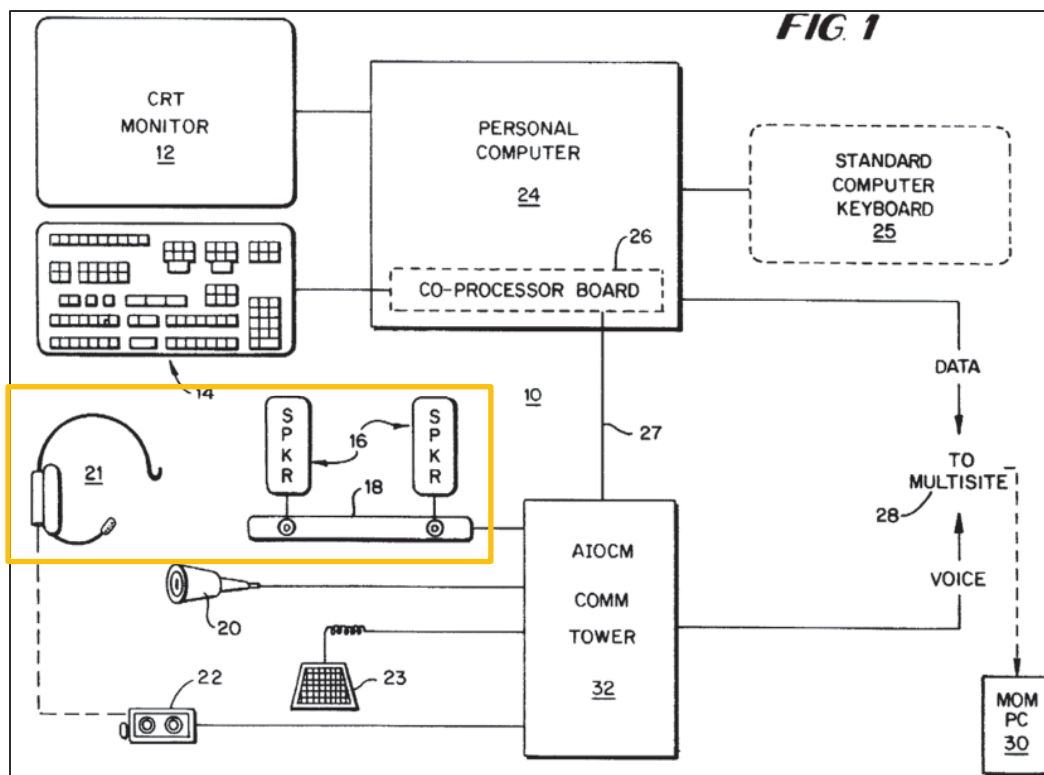
177. Claim 4 is a combination of, and identical to, claims 2 and 3.

Ex[1001], cls. 2, 3, 4.

178. Thus, for all of the same reasons described for claims 2 and 3, incorporated here, Downs renders *elevating the priority by increasing the volume of the media stream receiving the alert and changing a spatial direction for rendering the media stream receiving the alert* obvious. Ex[1004], 6:47-53, 8:41-48.

- 6. Claim 5: The method of claim 1, wherein elevating the priority comprises rendering the media stream receiving the alert to a priority spatial direction.**

179. As previously discussed for claim 3, Downs discloses “*elevating the priority comprises rendering the media stream receiving the alert to a priority spatial direction [e.g., speakers 16, 18, and headset 21]*”. To the extent the claims are construed to require “automatically” changing the spatial direction, it is rendered obvious by Ground 3. *See infra* §IX.D.4.



180. Downs provides the dispatcher the option to “choose a particular communications module,” such as one that has received an emergency call, and send the audio from a module to a priority spatial direction—namely, “the select speaker” which “may be [a] headset” rather than to the non-priority unselect speaker. Ex[1004], 8:40-48. Figure 1 above shows one potential embodiment of outputs for communications module audio.

181. Rerouting the audio from an unselect speaker to “the select speaker” or a “headset” in response to an emergency call request (*alert*) is a direct action by the dispatcher intended to *elevate the priority* of the communication module assigned to the talk group’s signals (*media stream*) receiving the alert to a priority spatial

direction. Id., 8:40-48. It would have been understood that such a change would be made by the dispatcher in order to prioritize the communication module assigned to the talk group's signals (*media stream*) receiving the emergency call request (*alert*) by routing the audio to the dispatcher's preferred *priority spatial direction*.

182. Thereby, upon receiving an emergency call request (*alert*), the dispatcher can select the communication module assigned to the relevant radio unit or radio talk group's signals (*media stream receiving the alert*) and *elevate* the module *to a priority spatial direction* such as "the select speaker" which "may be [a] headset." *Id.*, 8:40-48.

183. Therefore, Downs renders *elevating the priority by rendering the media stream receiving the alert to a priority spatial direction* obvious.

7. Claim 6: The method of claim 1, wherein elevating the priority includes identifying a primary channel and rendering the alert message to the primary channel.

184. Downs in view of the EDACS Standard discloses "*identifying a primary channel and rendering the alert message to the primary channel.*"

185. Downs, in part, is designed to "display[] call information in an easy-to-comprehend manner, that can be simply configured to suit individual dispatchers." Ex[1004], 3:4-6. However, Downs does not explicitly disclose how its system receives that call information. Instead, Downs contemplates use with the C3™

Series Consoles which operate on the EDACS Standard. Ex[1004], 2:62-3:32; Ex[1015], Title.

186. EDACS Standard discloses that when emergency call requests are “initiated, the radio immediately transmits the emergency call request on the inbound control channel” (Ex[1005], p.17) and the system “assigns the highest priority to the talk group[’s]” signals (*id.*, p.43) and “assigns the emergency call to a free channel.” *Id.*, p.17. This “free channel” is analogous to the *primary channel* of the claim limitation, because the “free channel” is identified “[d]ue to the urgency of this event alert” and “the system responds by moving the alert message to the primary channel.” Ex[1001], 4:1-3; Ex[1005], p.17, 43.

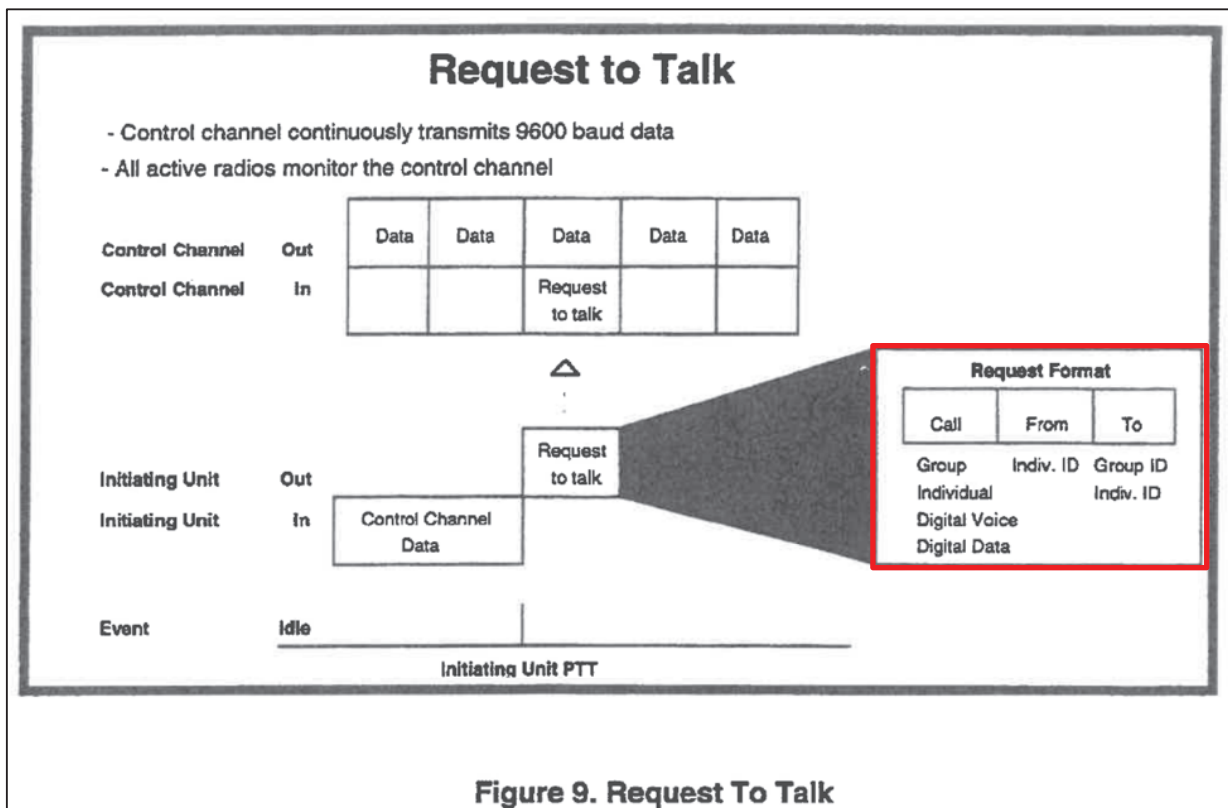
187. Additionally, “emergency group calls are message trunked” rather than “transmission trunked” like typical group calls. Ex[1005], p.17. Message trunking “means a channel is assigned for the duration of the conversation, or emergency.” *Id.* This can be “very useful to the supervisor who requires a dedicated channel while transmitting critical instructions or for emergency calls” because it “assures a dedicated channel” for these priority communications. *Id.*, p.29. In contrast, “[t]ransmission trunking means that a working channel is assigned for the duration of a caller’s transmission.” Therefore, because the message trunking “assures a dedicated channel” for these priority communications, the

identified “free channel” discloses the claimed *primary channel rendering the alert*.
Id., p.29.

188. Thus, Downs in view of the EDACS Standard renders *elevating the priority by identifying a primary channel and rendering the alert message to the primary channel* obvious.

8. Claim 8: The method of claim 1, wherein the alert is received in a header of a packet of the media stream.

189. Downs in view of the EDACS Standard discloses “*the alert is received in a header of a packet of the media stream.*”



190. Downs describes routing signals but does not disclose the content of the signaling messages. Instead, Downs contemplates use with the C3™ Series

Consoles which operate on the EDACS Standard. Ex[1004], 2:62-3:32; Ex[1015], Title.

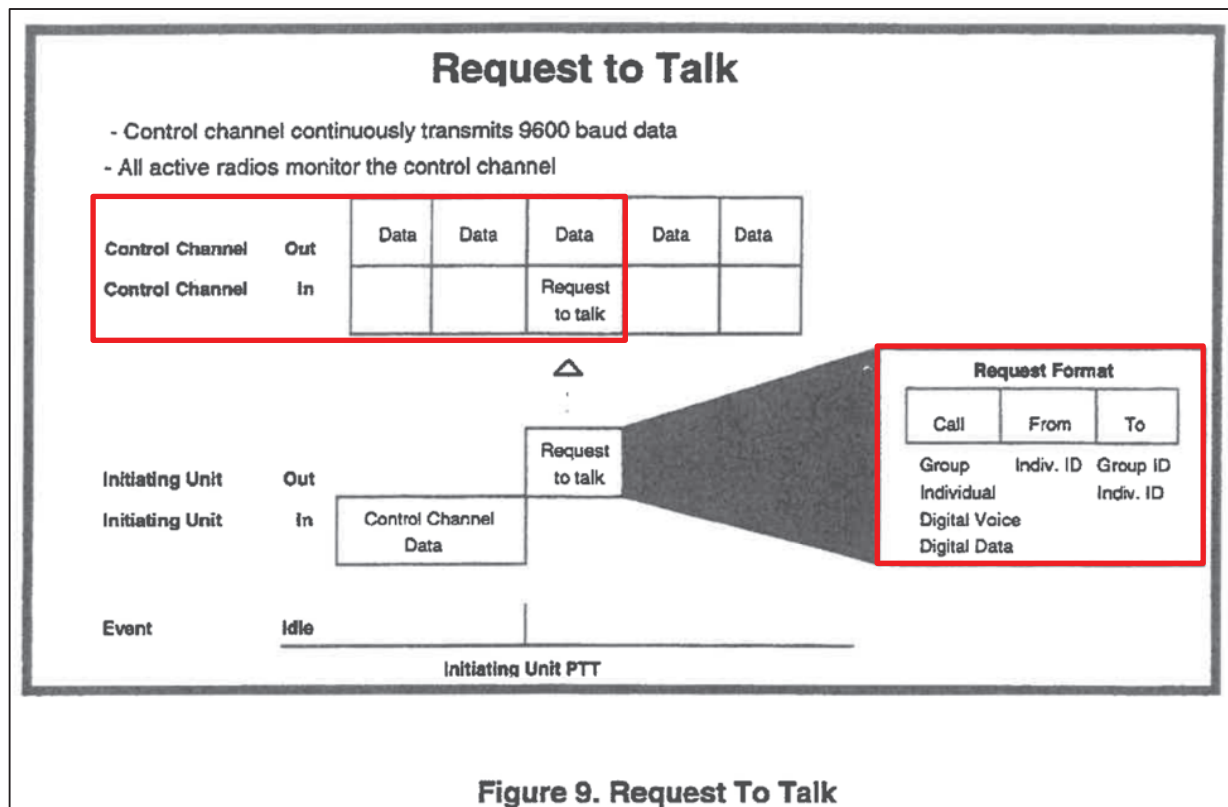
191. EDACS Standard discloses that these call requests are sent in the format shown above in Figure 9 containing call type and communication mode information, followed by the IDs of the sender, and intended destination. *Id.*, p.54. The EDACS System “supports three communication modes and four call types” including “Group”, “Group Emergency”, “Individual”, and “System All Call.” Ex[1005], p.15-16. These call types would have been understood to be included in a *header packet of the media stream* as claimed, because they are the first piece of information sent in the “request to talk”. *Id.*, p.54.

192. Thus, in the combined system, Downs dispatch counsel receives a “Group Emergency” call type (*alert*) included in the *header packet* of the call request sent on the control channel associated with the talk group’s signals (*media stream*).

193. Therefore, Downs in view of the EDACS Standard renders receiving the alert *in a header packet of the media stream* obvious.

9. Claim 9: The method of claim 1, wherein the alert is received in a control packet of the media stream.

194. Downs in view of the EDACS Standard discloses “the alert is received in a control packet of the media stream.”



195. As previously discussed, Downs describes routing signals but does not disclose the content of the signaling messages. However, Downs does contemplate use with the C3™ Series Consoles which operate on the EDACS Standard. Ex[1004], 2:62-3:32; Ex[1015], Title.

196. The EDACS Standard discloses that call requests are sent in the format shown above in Figure 9 in which call type and communication mode information, are followed by the IDs of the sender, and intended destination. *Id.*, p.54. The EDACS System “supports three communication modes and four call types” including “Group”, “Group Emergency”, “Individual”, and “System All Call.” Ex[1005], p.15-16. “Once initiated, the radio immediately transmits the

emergency call request on the inbound control channel.”³ *Id.*, p.17. The system then “assigns the emergency call to a free channel” or places it “at the ‘top of the queue’” (*id.*) and “automatically assigns the highest priority to the talk group[’s]” signals receiving the emergency message. *Id.*, p.43

197. Thus, a “Group Emergency” call type (*alert*) would be included in a *packet* of the call request sent on the control channel associated with the talk group’s signals (*media stream*), which would have been understood to be a *control packet* based on the use of the inbound control channel to send the information and the impact it has on the functioning of the system.

198. Therefore, Downs in view of the EDACS Standard renders receiving the alert *in a control packet of the media stream* obvious.

10. Claim 11: Non-transitory readable media that includes code for execution and when executed by a processor operable to perform operations comprising: monitoring media streams associated with channels in a communication environment; receiving an alert in one of the media streams; and elevating a priority associated with the media stream receiving the alert.

199. Claim 11 is nearly identical to claim 1. The only difference is that claim 11 recites “*non-transitory readable media that includes code for execution and when executed by a processor operable to perform operations comprising*” the same steps as the “*method*” in claim 1. Ex[1001], cls. 1, 11; *Bancorp Servs., LLC*,

³ All emphasis added in bold italics unless otherwise noted.

v. Sun Life Assurance Co. of Can. (U.S.), 687 F.3d 1266, 1277 (Fed. Cir. 2012)

(asserted system and medium claims treated as no different from the asserted method claims). The dispatch console program, disclosed by Downs, is intended to “allow[] a standard personal computer to be converted into a dispatcher console.” Ex[1004], 4:12-13. It would have been understood that a standard personal computer includes non-transitory computer readable media that includes code for execution by a processor to perform operations. For example, in Downs’s “preferred embodiment, the personal computer is an AT-class PC computer equipped with VGA graphics, 2 megabytes of RAM, a hard disk and a floppy disk for loading software” (*non-transitory computer readable media that includes code for execution and when executed by a processor operable to perform operations*). Ex[1004], 3:66-4:2. As described for limitation 1[c], Downs discloses that the volume of a communication module receiving an emergency call request is increased to ensure that the dispatcher is alerted to the priority information in the call.

§IX.B.2.d.

200. Thus, for all of the same reasons described for claim 1, incorporated here, Downs and the EDACS Standard render *non-transitory readable media that includes code for execution and when executed by a processor operable to perform operations comprising: monitoring media streams associated with channels in a*

communication environment; receiving an alert in one of the media streams; and elevating a priority associated with the media stream receiving the alert obvious.

11. Claims 12-15

12	The non-transitory readable media of claim 11, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert.
13	The non-transitory readable media of claim 11, wherein elevating the priority comprises changing a spatial direction for rendering the media stream receiving the alert.
14	The non-transitory readable media of claim 11, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert and changing a spatial direction for rendering the media stream receiving the alert.
15	The non-transitory readable media of claim 11, wherein elevating the priority includes identifying a primary channel and rendering the alert message to the primary channel.

201. Claims 12-15 are nearly identical to claims 2-4 and 6 respectively. The only difference is that claims 12-15 depend on claim 11. Ex[1001], cls. 2-4, 6, and 12-15. As previously discussed, Downs discloses that “[i]n the preferred embodiment, the personal computer is an AT-class PC computer equipped with VGA graphics, 2 megabytes of RAM, a hard disk and a floppy disk for loading software” (*non-transitory computer readable media that includes code for execution and when executed by a processor operable to perform operations*). Ex[1004], 3:66-4:2. It would have been understood that this computer and non-transitory computer readable media includes code for performing these claims even if some human action is also involved.

202. Thus, for all of the same reasons described for claims 2-4, 6, and 11, incorporated here, Downs in view the EDACS Standard renders *elevating the priority by increasing the volume and/or changing a spatial direction for rendering the media stream receiving the alert, and identifying a primary channel and rendering the alert message to the primary channel* obvious.

- 12. Claim 16: An apparatus, comprising: a memory element; a processor; and a management element stored in the memory element and configured to interface with the processor such that the apparatus is configured for: monitoring media streams associated with channels in a communication environment; receiving an alert in one of the media streams; and elevating a priority associated with the media stream receiving the alert.**

203. Claim 16 is nearly identical to claim 1. The only difference is that claim 16 recites “*an apparatus, comprising: a memory element; a processor; and a management element stored in the memory element and configured to interface with the processor such that the apparatus is configured for*” performing the same steps as the “method” in claim 1. Ex[1001], cls. 1, 16; *Bancorp*, 687 F.3d at 1277 (asserted system and medium claims treated as no different from the asserted method claims). The dispatch console program, disclosed by Downs, is intended to “allow[] a standard personal computer to be converted into a dispatcher console.” Ex[1004], 4:12-13. It would have been understood that a standard personal computer includes a memory element, a processor, and a management element (*e.g.*, software) stored in the memory element and configured to interface with the

processor. For example, Downs discloses that “[i]n the preferred embodiment, the personal computer is an AT-class PC computer equipped with VGA graphics, 2 megabytes of RAM, a hard disk and a floppy disk for loading software.” *Id.*, 3:66-4:2. As described for limitation 1[c], Downs discloses that the volume of a communication module receiving an emergency call is increased to ensure that the dispatcher is alerted to the priority information in the call. §IX.B.2.d.

204. Thus, for all of the same reasons described for claim 1, incorporated here, Downs and the EDACS Standard render *an apparatus, comprising: a memory element; a processor; and a management element stored in the memory element and configured to interface with the processor such that the apparatus is configured for: monitoring media streams associated with channels in a communication environment; receiving an alert in one of the media streams; and elevating a priority associated with the media stream receiving the alert* obvious.

13. Claims 17-20

17	The apparatus of claim 16, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert.
18	The apparatus of claim 16, wherein elevating the priority comprises changing a spatial direction for rendering the media stream receiving the alert.
19	The apparatus of claim 16, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert and changing a spatial direction for rendering the media stream receiving the alert.
20	The apparatus of claim 16, wherein elevating the priority includes identifying a primary channel and rendering the alert message to the primary channel.

205. Claims 17-20 are nearly identical to claims 2-4 and 6 respectively. The only difference is that claims 17-20 depend on claim 16. Ex[1001], cls. 2- 4, 6, and 17-20. As previously discussed, Downs discloses that “[i]n the preferred embodiment, the personal computer is an AT-class PC computer equipped with VGA graphics, 2 megabytes of RAM, a hard disk and a floppy disk for loading software. Ex[1004], 3:66-4:2. This would have been understood to mean that this computer and memory include management elements for performing these claims even if some human action is also involved.

206. Thus, for all of the same reasons described for claims 2-4, 6, and 11, incorporated here, Downs in view of the EDACS Standard renders *elevating the priority by increasing the volume and/or changing a spatial direction for rendering the media stream receiving the alert, and identifying a primary channel and rendering the alert message to the primary channel* obvious.

C. Ground 2: Claim 1 is obvious over Downs and the EDACS Standard in further view of Childress.

207. To the extent it is found that Ground 1 does not render obvious “*receiving an alert in one of the media streams*” as recited in claims 1, 11, and 16—*e.g.*, if construed to require the alert and media stream be transmitted on the same channel—this limitation is rendered obvious in further view of Childress.

1. A POSITA Would Have Combined Downs (as modified by the EDACS Standard) with Childress with a reasonable expectation of success.

208. As discussed previously, Downs discloses a dispatch console connected to a multisite switch that “routes audio (voice) and data signals throughout [an] RF system.” Ex[1004], 4:18-25. The EDACS Standard discloses an “FDMA, digital, trunked, Land Mobile Radio communication system.” Ex[1005], Forward.

209. Childress discloses “digital control signals transmitted over a dedicated control channel” and “plural working channels” in a “trunked radio repeater system[]”, like EDACS. Ex[1031], 1:6-11.

210. A POSITA would have been motivated to implement Childress’s digital control signals in the Down-EDACS Standard combination in order to define the control signals used in EDACS, but not explicitly described, and to ensure that the system “meets and, in many areas, surpasses all of the existing APCO-16 requirements” laid out by the Association of Public-Safety Communications Officers, Inc. Ex[1031], 2:29-38, 4:59-61. Meeting and exceeding the APCO-16 requirements would have provided benefits such as: enhancing interoperability between systems; improving communications speed and efficiency (through the use of more efficient protocols), enhancing data and voice capabilities (enabling more effective and efficient transfer of multimedia data, videos, images, *etc.*), and generally increased public safety (by optimizing communications infrastructure and

protocols, Public Safety Officers will have better coordinated responses). Additionally, the system would be better positioned for future upgrades and standards (for example, there is now an APCO-25 standard).

211. Accordingly, it would have been within the abilities of a POSITA to use Childress's digital control signals with the Downs-EDACS combination. Therefore, a POSITA would have been motivated to combine, and could have combined, Hancock and Downs with an expectation of success.

2. "receiving an alert in one of the media streams"

212. To the extent "*receiving an alert in one of the media streams*" requires the alert and media stream be transmitted on the same channel, Downs and the EDACS Standard in further view of Childress renders limitation 1[b] obvious.

213. Downs and the EDACS Standard in further view of Childress discloses *receiving an alert* [e.g., Group Emergency Call Type] *in one of the media streams* [e.g., working channel data signals].

214. The EDACS Standard discloses the 'Group Emergency' call type, which corresponds to the claimed *alert* and are 'message trunked' rather than 'transmission trunked.' *Supra* §§IX.B.2.c, IX.B.7. Childress further discloses that "all mobiles of the called group" receive an "emergency group call confirmation message" that contains a "Message/Transmission Trunking" bit and a 12-bit "Group ID" on a working channel. Ex[1031], 28:42-58. Therefore, it would have been

obvious to a POSTIA that a working channel (*single channel media stream*) with a ‘Message Trunking’ bit, or a ‘Group Emergency’ ID would indicate an *alert* to the receiving unit.

215. Thus, the Downs-EDACS Standard combination in further view of Childress discloses or at least renders obvious *receiving an alert in one of the media streams*.

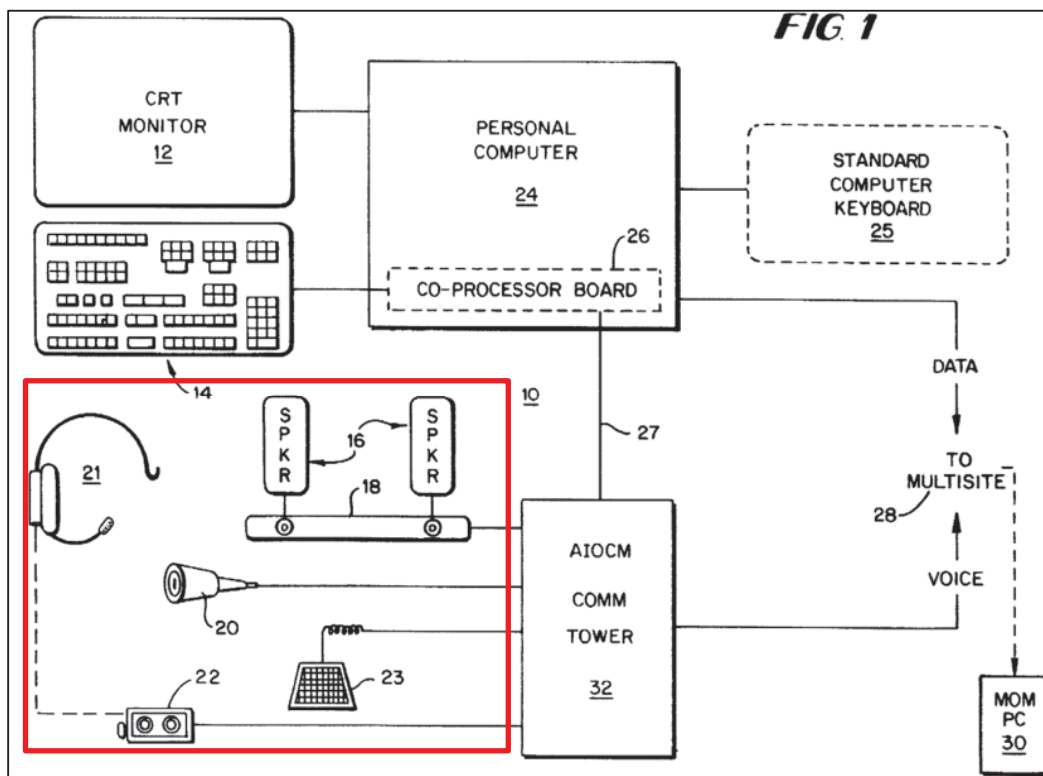
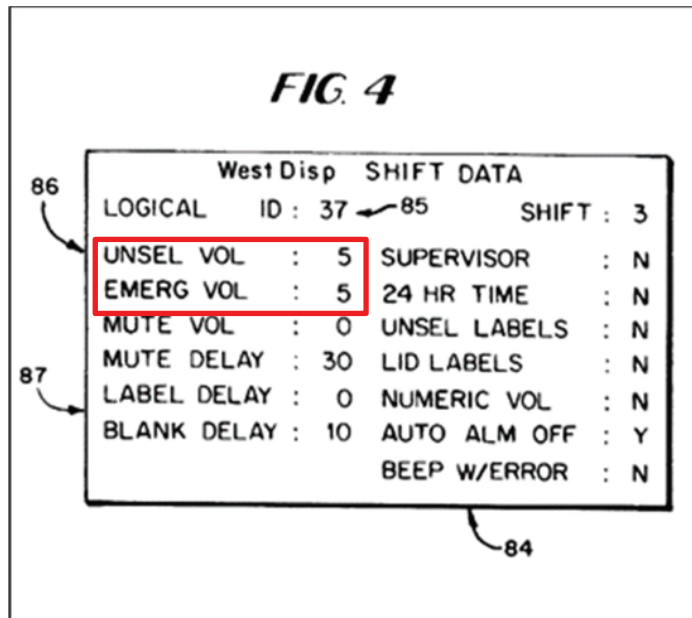
D. Grounds 3 and 4: Claims 3-5, 13, 14, 18 and 19 are obvious over Downs and the EDACS Standard in further view of Hancock.

1. A POSITA Would Have Combined Downs (as modified by the EDACS Standard) with Hancock with a reasonable expectation of success.

216. As previously discussed, Downs discloses that, to ensure dispatchers are able to concentrate on the substance of specific calls, a dispatch console connected to a multisite switch that “routes audio (voice) and data signals throughout [an] RF system.” Ex[1004], 4:18-25. These audio and data signals are then organized by the dispatcher into communication modules that “represent a particular group, unit, console, channel, line, etc., that is available to the console” (Ex[1004], 6:22-25), which provide “information on a specific call or group such as the caller, volume, and emergency” to the dispatcher. *Id.*, 3:24-25.

217. Downs discloses that “emergency calls are broadcast louder from the dispatcher speakers than other calls” based on the predetermined emergency volume level set by the dispatcher, shown in Figure 4 below. *Id.*, 6:30-52. Downs further

provides the dispatcher the ability to “choose a particular communications module,”
such as one that has received an emergency call, and send the audio from that module
to “the select speaker” which “may be [a] headset.” *Id.*, 8:41-48.



218. These automatic and manual adjustments to communications modules disclosed by Downs are intended to ensure that dispatchers are “free to concentrate on the substance of the calls, any one of which may be an emergency call” (*id.*, 2:40-50) even though modern “dispatchers can now communicate with hundreds, if not thousands, of system users” all from one console. *Id.*, 1:59-60.

219. Thus, on its own, Downs discloses a dispatch console that monitors multiple media streams, which are channels organized into communication modules, receives an alert (*e.g.*, emergency call requests) in those communication modules, and elevates the priority of the communication module receiving the alert by automatically turning up the volume and allowing the dispatcher to manually determine if the audio should be sent to the select speaker or headset. These adjustments are intended to ensure that the emergency call is prioritized over other incoming communications and is comprehensible over the noise of those lower priority channels.

220. Hancock similarly discloses “radios and systems utilized by fire, police, air, military and other agencies for coordinated communications in the field.” Ex[1006], [1001]. Hancock also has the same goal as Downs: ensuring “the user is able to identify the source of the received communications by the relative position of the received audio in this two dimension stereo soundfield” rather than “hearing

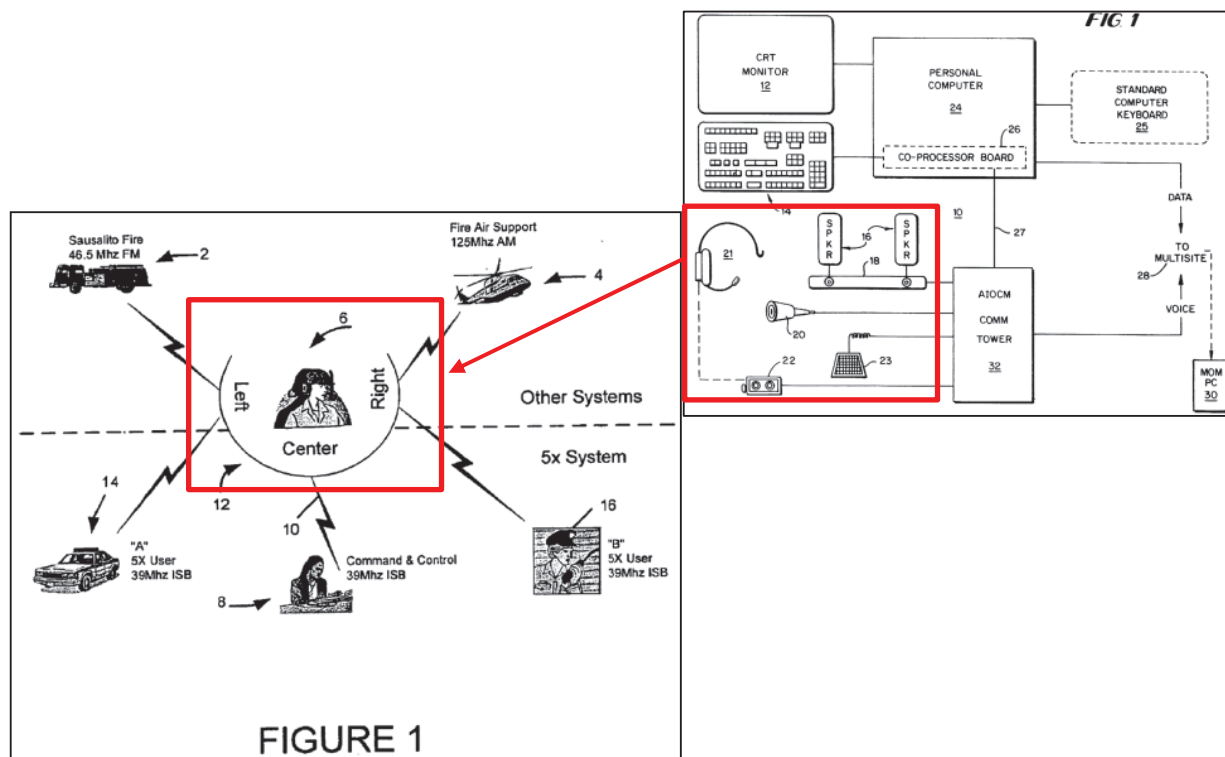
jumbled communication from multiple agencies talking over one another.”
Ex[1006], [0009].

221. Hancock accomplishes this by spatially locating each received signal by “phas[ing] and/or vary[ing] the dB amplitude of the received signals to move a signal from direct left (or right) across a two-dimensional soundfield to position a received channel/frequency at locations in addition to the direct left, right or center.” *Id.*, [0009]. This functionality is described as “Psychoacoustic Spatial Presentation” which determines the spatial “presentation of channel specific information” “dynamically using a data broadcast on the same or additional channel.” *Id.*, [0012]. Hancock further discloses that “[a]ccording to an exemplary embodiment of the present invention, an emergency communication system is provided, which utilizes radios with headsets, headphones, earphones and/or custom audio interfaces for a minimum of two audio channels.” *Id.*, [0008].

222. Thus there would have been motivation for a POSITA to implement Hancock’s psychoacoustic spatial presentation in the Downs dispatch console in order to improve Downs’ ability to ensure the prioritization and comprehensibility of incoming emergency calls, as well as to increase the call handling capacity and flexibility of the system.

223. Downs and Hancock are in the same field of art, *e.g.*, emergency radio communications systems. Ex[1004], 1:39-60; Ex[1006], Abstract, [0001].

Further, both Downs and Hancock disclose receiving and processing communications from multiple channels and distinguishing emergency alerts from other communications to ensure that a dispatcher is able to properly prioritize those emergency transmissions. Ex[1004], 1:59-60, 2:40-50; Ex[1006], Abstract, [0008]. Downs accomplishes this through volume changes and manual speaker reassignments, while Hancock provides implementation details for a robust spatial location system that may be operated manually or automatically in response to an emergency transmission. Ex[1004], 6:30-52, 8:41-48; Ex[1006], [0045], [0076]-[0080].



224. As depicted above, it would have been within a POSITA's abilities to use Hancock's psychoacoustic spatial presentation with the Downs dispatch console and a POSITA would have had multiple reasons to make this combination.

225. One such motivation would have been to combine Downs and Hancock is Hancock's automated spatial location changes in response to emergency transmissions. "Using the flexibility of the psychoacoustic processing," would have further helped to address the problems and confusion caused by monitoring multiple simultaneous communication streams and trying to distinguish and prioritize emergency transmission from the rest of the communications discussed by Downs by providing that "one half of a team could be located in [*sic*] left audio channel and the other half in the right. Command and Control (dispatch) could be located in the center channel (both left and right)." Ex[1006], [0024]; Ex[1004], 1:48-60, 2:40-50. Therefore the combination would provide the same benefit of spatially "differentiating received signals whether on one or multiple channels" as disclosed in Hancock. Ex[1006], [0008]-[0013], [0045], [0076]-[0080].

226. A POSITA would have also understood that implementing Hancock's psychoacoustic spatial presentation in the Downs dispatch console would have been a simple, predictable combination reasonably expected to succeed. For example, Hancock already discloses that "the communication system consists of one or more

dispatch or command and control consoles 8 communicating with many mobile or portable communication systems.” Ex[1006], [0044].

227. Therefore, a POSITA would have been motivated to combine Hancock and Downs with a reasonable expectation of success.

2. Claim 3: The method of claim 1, wherein elevating the priority comprises changing a spatial direction for rendering the media stream receiving the alert.

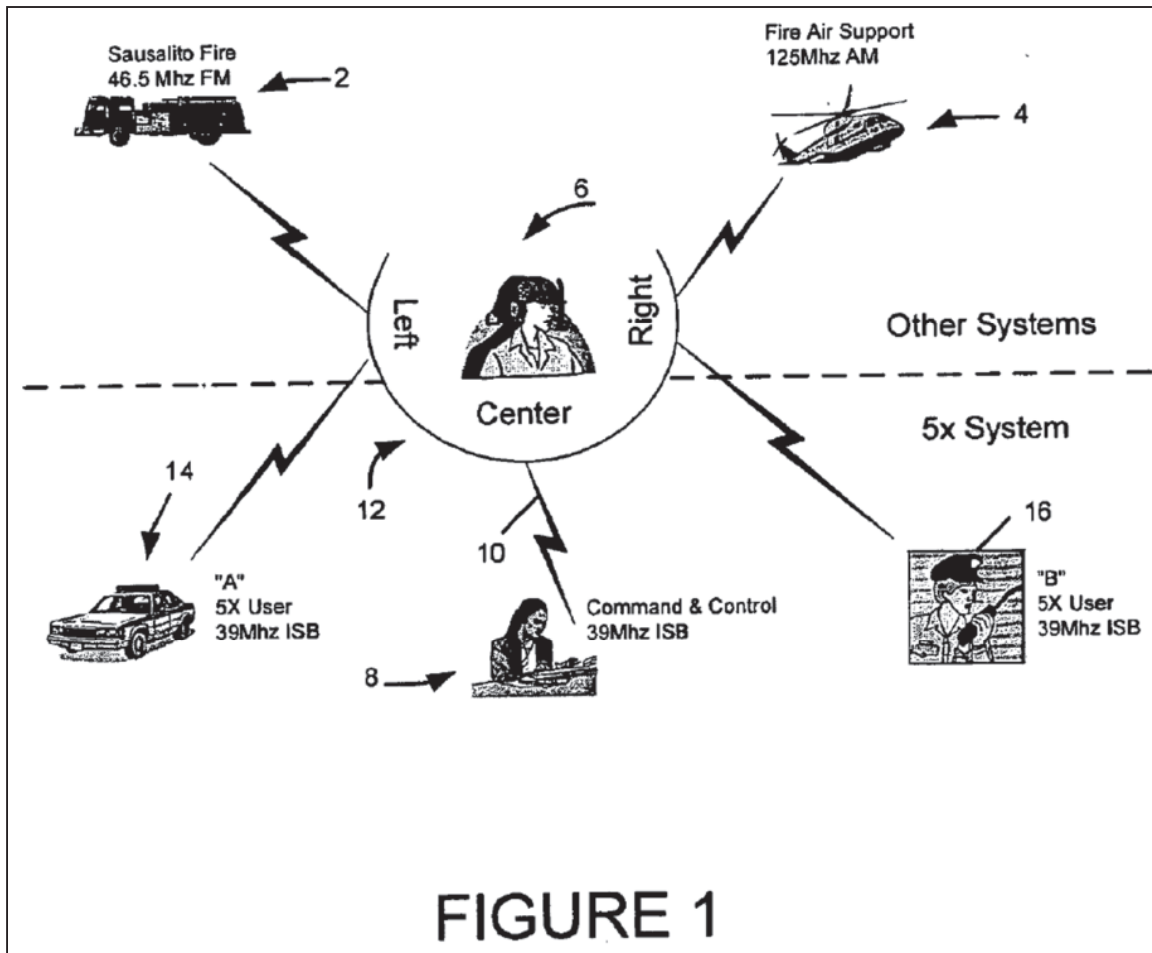
228. To the extent “*changing a spatial direction*” requires “automatically” changing a spatial direction as apparently alleged by Patent Owner, *see supra* §VI.F Downs and the EDACS Standard in further view of Hancock renders claim 3 obvious.

229. Whereas the ’664 Patent discloses that “[b]y properly managing the volume of the mixed channels, any channel can be configured to appear for the user from any designated arrival direction,” Hancock discloses substantially identical functionality. Ex[1001], 5:59-62. Hancock states “[t]he system of the exemplary embodiment of the invention can also phase and/or vary the dB amplitude of the received signals to move a signal from direct left (or right) [*changing a spatial direction*] across a two-dimensional soundfield to position a received channel/frequency [*for rendering the media stream receiving the alert*] at locations in addition to the direct left, right or center.” Ex[1006], [0009] (here and thereafter

emphasized details are supplied). The “audio output channel (left, right or center)” is automatically selected by “control processor 30.” *Id.*, [0072].

230. Additionally, Hancock describes “[a]n emergency radio communication system” in which “[e]ach radio receives multiple channel/frequency communications and spatially locates the received communications at predetermined ‘ear’ locations comprising left earphone, right earphone, and both earphones (right and left) according to the source of the received communications.” Ex[1006], Abstract.

231. In one embodiment, Hancock discloses “[a]s illustrated in FIG. 1 [shown below], command and control signals 10 are routed to the center acoustic spatial position 12, mobile communications among team members are routed to the left position, and a second police unit 16 is routed to the right” while “emergency transmissions would be routed to both ears.” *Id.*, [0045]; *see also id.*, Abstract, [0004], [0009], [0011]-[0013], [0035], [0045], [0051], [0071]-[0072], and [0076]-[0080].



232. A POSITA would have been motivated to include increasing volume, and automatically changing the output ear locations as taught by Hancock into the dispatch controller of Downs in order to improve the system's call prioritization, flexibility, quality, and capacity (*e.g.*, by doubling the amount of information flows a dispatcher could handle simultaneously). For example, when receiving "emergency transmissions" (*alerts*), the talk group's signals receiving those transmissions (*media streams*) would be *changed* from their original spatial direction and "routed to both ears" to ensure the dispatcher is able to clearly comprehend these

priority transmissions. *Id.*, [0045]. Therefore, the combination of Downs and Hancock discloses *changing* the “‘ear’ locations comprising left earphone, right earphone, and both earphones (right and left)” (*spatial directions*) based on the source, or content of an incoming transmission (*media stream*). Ex[1006], Abstract.

233. Thus, Downs in view of Hancock renders *elevating the priority* by *changing a spatial direction for rendering the media stream receiving the alert* obvious.

3. Claim 4: The method of claim 1, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert and changing a spatial direction for rendering the media stream receiving the alert.

234. Claim 4 is a combination of, and identical to, claims 2 and 3. Ex[1001], cls. 2, 3, 4. Inserting Hancock’s “vary[ing] the dB amplitude of the received signals to move a signal from direct left (or right) [*changing a spatial direction*] across a two-dimensional soundfield” (Ex[1006], [0009]) into Downs’s increased volume levels for emergency calls as both involve varying volume levels and are intended to ensure that emergency communications are heard clearly, and both techniques would work together to improve communication awareness, which would have been obvious to a POSITA. Ex[1001], 6:50-52.

235. Thus, for all of the same reasons described for claims 2 and 3, incorporated here, Downs and the EDACS Standard in further view of Hancock,

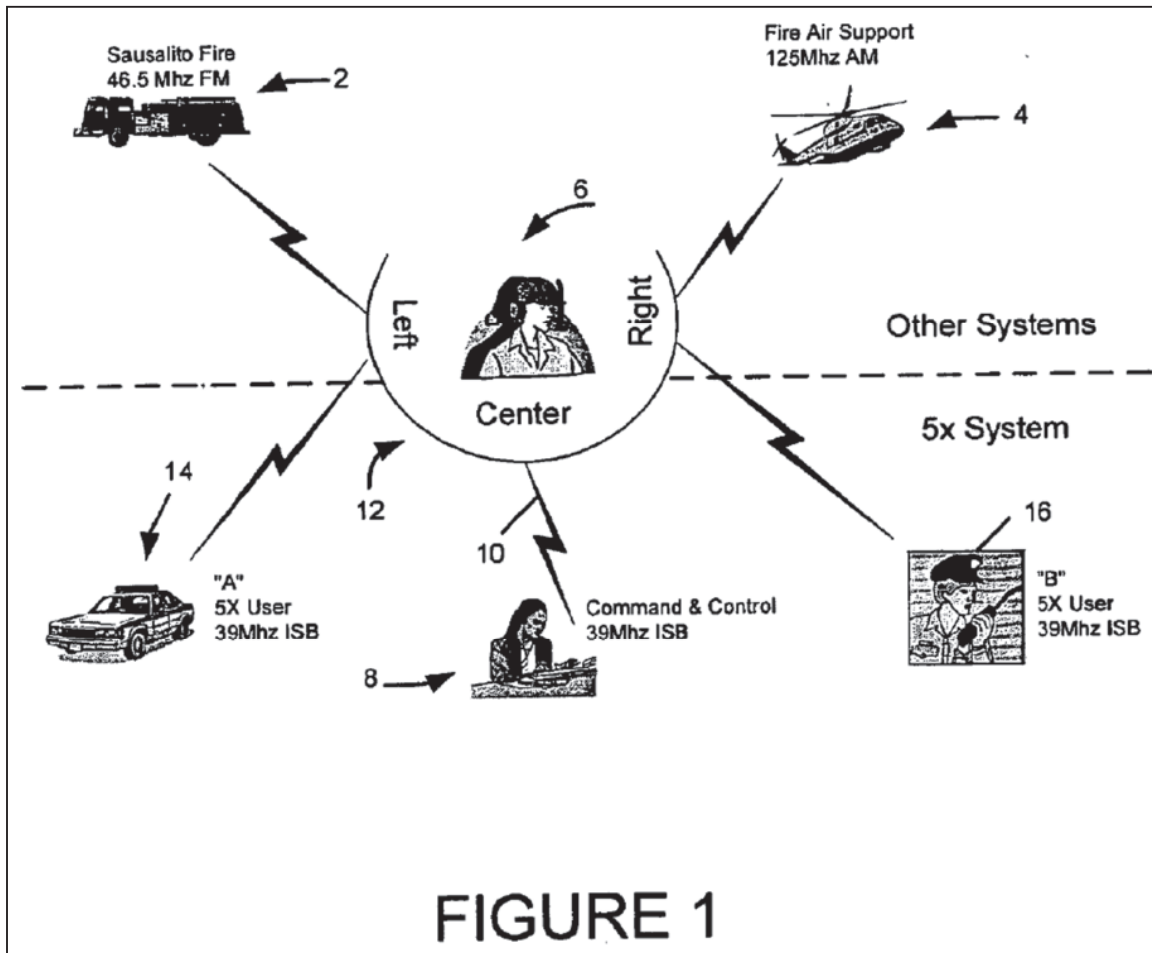
renders *elevating the priority by increasing the volume of the media stream receiving the alert and changing a spatial direction for rendering the media stream receiving the alert* obvious.

4. Claim 5: The method of claim 1, wherein elevating the priority comprises rendering the media stream receiving the alert to a priority spatial direction.

236. To the extent “*rendering the media stream receiving the alert to a priority spatial direction*” requires “automatically” changing to a priority spatial direction as apparently alleged by Patent Owner, *see supra* §VI.F, Downs and the EDACS Standard in further view of Hancock renders this limitation obvious.

237. As previously discussed, Hancock discloses “[a]n emergency radio communication system” in which “[e]ach radio receives multiple channel/frequency communications and spatially locates the received communications at predetermined ‘ear’ locations comprising left earphone, right earphone, and both earphones (right and left) according to the source of the received communications” (Ex[1006], Abstract) while “emergency transmissions [*alerts*] would be routed to both ears [*priority spatial direction*].” [1006], [0045]; *see also id.*, Abstract, [0004], [0009], [0011]-[0013], [0035], [0045], [0051], [0071]-[0072], and [0076]-[0080]. “As illustrated in FIG. 1 [*shown below*], command and control signals 10 are routed to the center acoustic spatial position 12 [*priority spatial direction*],

mobile communications among team members are routed to the left position, and a second police unit 16 is routed to the right.”



238. Combining Hancock’s “vary[ing] the dB amplitude of the received signals to move a signal from direct left (or right) [*changing a spatial direction*] across a two-dimensional soundfield” (Ex[1006], [0009]) with Downs’s increased volume levels for emergency calls as both involve varying volume levels and are intended to ensure that emergency communications are heard clearly, would have been obvious to a POSITA. *Id.*, 6:50-52.

239. Thus, the combination of Downs and Hancock discloses *elevating the priority* of an emergency transmission (*media stream receiving the alert*) by *rendering the media stream receiving the alert “to both ears” (priority spatial direction)* to ensure the dispatcher is able to clearly comprehend these priority transmissions. Ex[1006], [0045].

240. Therefore, Downs in view of Hancock renders *elevating the priority* by *rendering the media stream receiving the alert to a priority spatial direction* obvious.

5. Claims 13-14

13	The non-transitory readable media of claim 11, wherein elevating the priority comprises changing a spatial direction for rendering the media stream receiving the alert.
14	The non-transitory readable media of claim 11, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert and changing a spatial direction for rendering the media stream receiving the alert.

241. Claims 13-14 are nearly identical to claims 3-4. The only difference is that claims 13-14 depend on claim 11. Ex[1001], cls. 3-4, 13-14. Thus, for all of the same reasons described for claims 3-4 and 11, incorporated here, Downs and the EDACS Standard in further view of Hancock renders *elevating the priority* by *increasing the volume and/or changing a spatial direction for rendering the media stream receiving the alert* obvious.

6. Claims 18-19

18	The apparatus of claim 16, wherein elevating the priority comprises
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	changing a spatial direction for rendering the media stream receiving the alert.
19	The apparatus of claim 16, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert and changing a spatial direction for rendering the media stream receiving the alert.

242. Claims 18-19 are nearly identical to claims 3-4. The only difference is that claims 18-19 depend on claim 16. Ex[1001], cls. 3-4, 18-19.

243. Thus, for all of the same reasons described for claims 3-4 and 16, incorporated here, Downs and the EDACS Standard in further view of Hancock renders *elevating the priority by increasing the volume and/or changing a spatial direction for rendering the media stream receiving the alert* obvious.

E. Grounds 5 and 6: Claims 7 and 10 are obvious over Downs and the EDACS Standard in further view of Reich.

1. A POSITA Would Have Combined Downs (as modified by the EDACS Standard) with Reich with a reasonable expectation of success.

244. As previously discussed, Downs discloses a dispatch console that monitors multiple media streams, which are channels organized into communication modules, receives emergency calls in those communication modules, and elevates the priority of the communication module receiving the alert by automatically turning up the volume, and allowing the dispatcher to manually determine if the audio should be sent to the select speaker or headset. *Supra* §IX.B.2. These adjustments are intended to ensure that the emergency call is prioritized over other

incoming communications and is comprehensible over the noise of those lower priority channels, thus improving the quality of the communication system. *Supra* §IX.B.2. To the extent that Downs is found not to expressly disclose or render obvious that elevating the priority includes turning a volume down on media streams not receiving the alert, Reich discloses this aspect of claim 7.

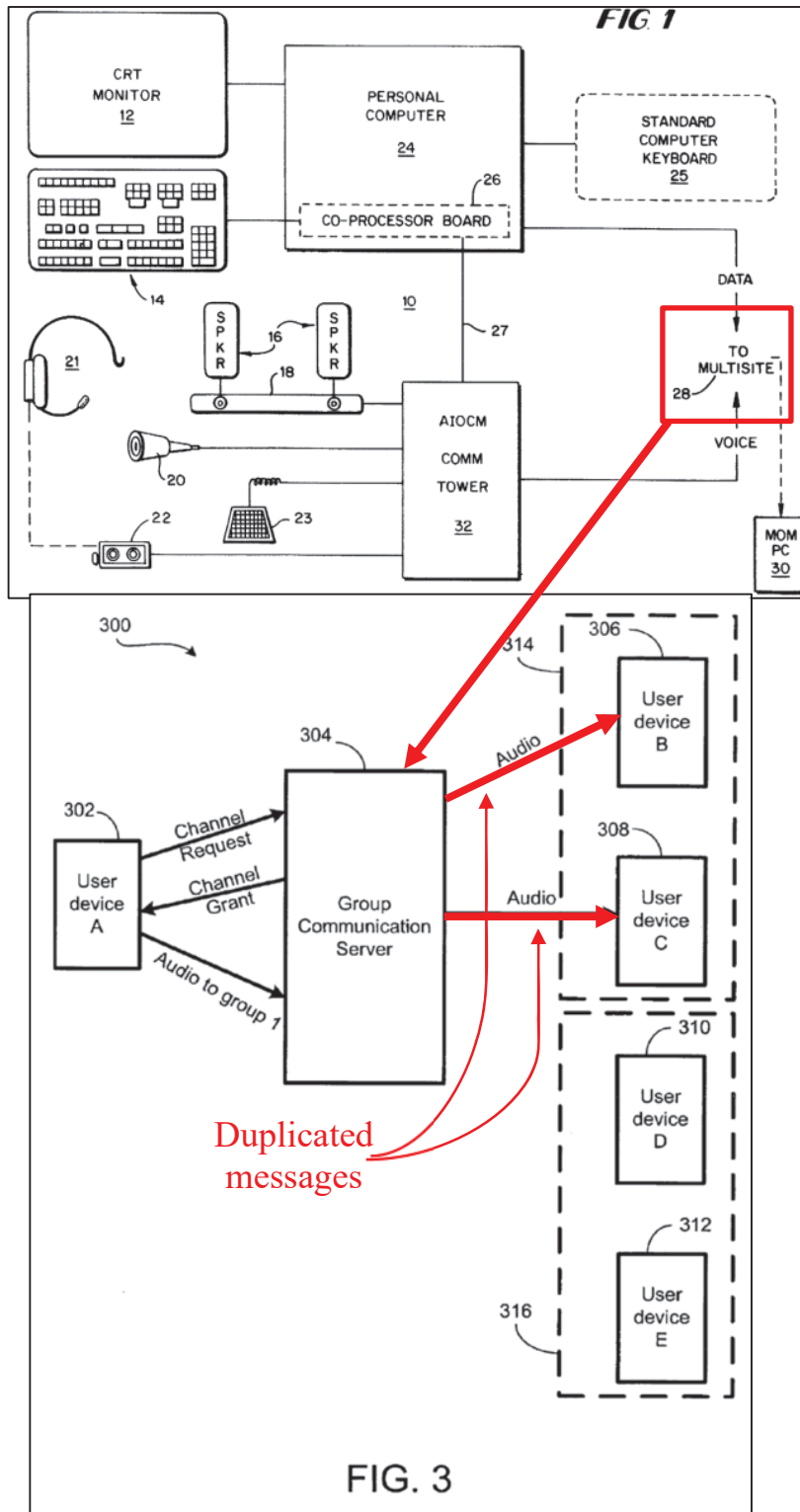
245. Like Downs, Reich discloses a “device to simultaneously monitor multiple PTT communication groups and to interrupt an incoming PTT communication with a higher priority PTT communication.” Ex[1007], [0008]. In a manner similar to Downs’s “emergency calls” that require elevated priority, Reich discloses that “[c]ommunications from a primary PTT communication group may trump communications from non-primary PTT communication groups within the devices of the group.” *Id.*, [0026]. Then both Downs and Reich modify the audio outputs of the monitored media streams in order to ensure that the primary emergency communication is distinguishable from the non-priority communications. Ex[1004], 6:47-52; Ex[1007], [0027].

246. Whereas, Downs discloses volume increases on the priority channel and manual speaker reassignments, (Ex[1004], 6:30-52, 8:41-48), Reich “request[s] communications from a particular PTT communications group be muted, or volume significantly lessened such that the non-primary communication can still be heard

faintly in the background” when a simultaneous priority communication is received Ex[1007], [0027]; *see also id.*, [0036], [0041].

247. A POSITA would have understood that, in situations where speaker volumes may already be set fairly high, Reich’s disclosure of decreasing the volumes of non-priority channels would be particularly useful in the Downs system. Ex[1007], [0027]. Thus, it would have been obvious to a POSITA that Reich provides a unique solution to the problem of monitoring multiple simultaneous communications through volume adjustments not disclosed by Downs. Ex[1007], [0027], [0036], [0041].

248. Additionally, Reich teaches that a “user’s message is received by the server and the server duplicates the message for each and every receiving party.” Ex[1007], [0005]. As shown in the combined figure below, by applying this technique in Downs’s multisite switch 28, it would be ensured that each message handled by the multisite switch is received by each and every receiving party such as additional dispatch consoles connected to the communication system



249. Thus, a POSITA would have been motivated to implement Reich's ability to automatically decrease the volume of non-priority messages (and place them in the background) and to duplicate messages in the Downs dispatch console (as modified by EDACS Standard) in order to further ensure the prioritization and comprehensibility of incoming emergency calls, as well as increase the flexibility, efficiency, and quality of the communication system.

250. Implementing Reich's lowered non-priority communication volumes in the Downs dispatch console would have been a simple, predictable combination, which a POSITA would have reasonably expected to succeed. Downs and Reich are in the same field of art (*e.g.*, multi-channel radio communications systems) and both disclose receiving and processing communications from multiple channels and distinguish priority messages from other communications to ensure that a user is able to properly prioritize those emergency transmissions. Ex[1004], 1:39-60, 2:40-50; Ex[1007], [0013], [0041]. Accordingly, a POSITA would have been able to plug Reich's volume decrease and message duplication into the Downs dispatch console.

251. Thus, a POSITA would be both motivated and able to combine Reich and Downs with an expectation of success.

2. Claim 7: The method of claim 1, wherein elevating the priority includes turning a volume down on media streams not receiving the alert.

252. Downs and the EDACS Standard in further view of Reich disclose “*elevating the priority includes turning a volume down on media streams not receiving the alert.*”

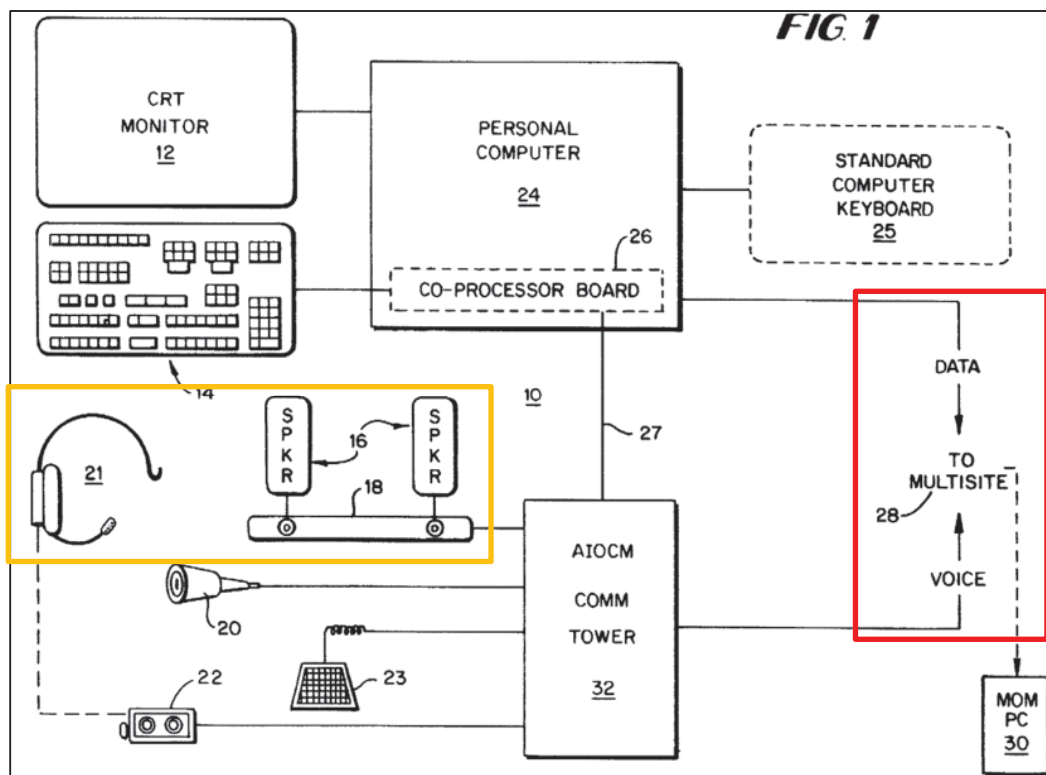
253. Reich teaches that “wireless handset 102 is capable of monitoring multiple PTT communication groups [*media streams*].” Ex[1007], [0027]. When one of the monitored communication groups receives a priority message (*alert*) the handset may “request communications from a particular PTT communications group be muted, or volume significantly lessened such that the non-primary communication can still be heard faintly in the background.” *Id.*, [0027]. “For example, if the user is listening to [*sic*] conversation from a friend in his PTT friend group and a message from his boss is received, the conversation from his friend will be dropped, muted, or placed in the background in favor of the message from his boss.” *Id.*, [0036]. “Alternatively, if the server is transmitting a non-primary PTT communication to a user and a primary PTT communication directed to the same user is received, the server may lower the volume of the non-primary PTT communication that is being broadcasted to the targeted user and then transmitting the incoming primary PTT communication on the top of the non-primary PTT communication. The user will then hear the primary PTT communication over a

fainted non-primary PTT communication.” *Id.*, [0041]. It would have been obvious to incorporate Reich’s technique of turning a volume down on media streams not receiving the alert in the system of Downs (as modified by EDACS Standard) in order to increase the likelihood that communications modules (*media streams*) having an elevated priority are heard.

254. Thus, Downs and the EDACS Standard in further view of Reich renders obvious *elevating the priority* of the communication module (*media stream*) *receiving the alert* by *lowering the volume of, or muting,* the non-primary communication module (*media stream not receiving the alert*).

3. Claim 10: The method of claim 1, wherein the alert is duplicated and rendered at a higher volume.

255. Downs and the EDACS Standard in further view of Reich disclose or at least render obvious “*the alert is duplicated* [e.g., by Group Communication Server 304] *and rendered at a higher volume* [e.g., to speakers 16, 18, or headset 21].”



256. Reich teaches that a “user's message is received by the server and the server duplicates the message for each and every receiving party.” This duplication is shown in Figure 3 above. By applying this technique in Downs’s multisite switch 28, it would be ensured that each message handled by the multisite switch is received by each and every receiving party.

257. As discussed, Downs discloses *increasing the volume of the alert*. §IX.B.3. Therefore, Downs and the EDACS Standard in further view of Reich renders *duplicating the alert and rendering it at a higher volume* obvious.

F. Ground 7: Claims 1-2, 6-9, 11-12, 15-17, and 20 are obvious over Kim.

1. Claim 1

258. Kim renders *a method, comprising: monitoring media streams associated with channels in a communication environment; receiving an alert in one of the media streams; and elevating a priority associated with the media stream receiving the alert, such that an adjustment is made to how the media stream is provisioned to an endpoint in the communication environment* obvious.

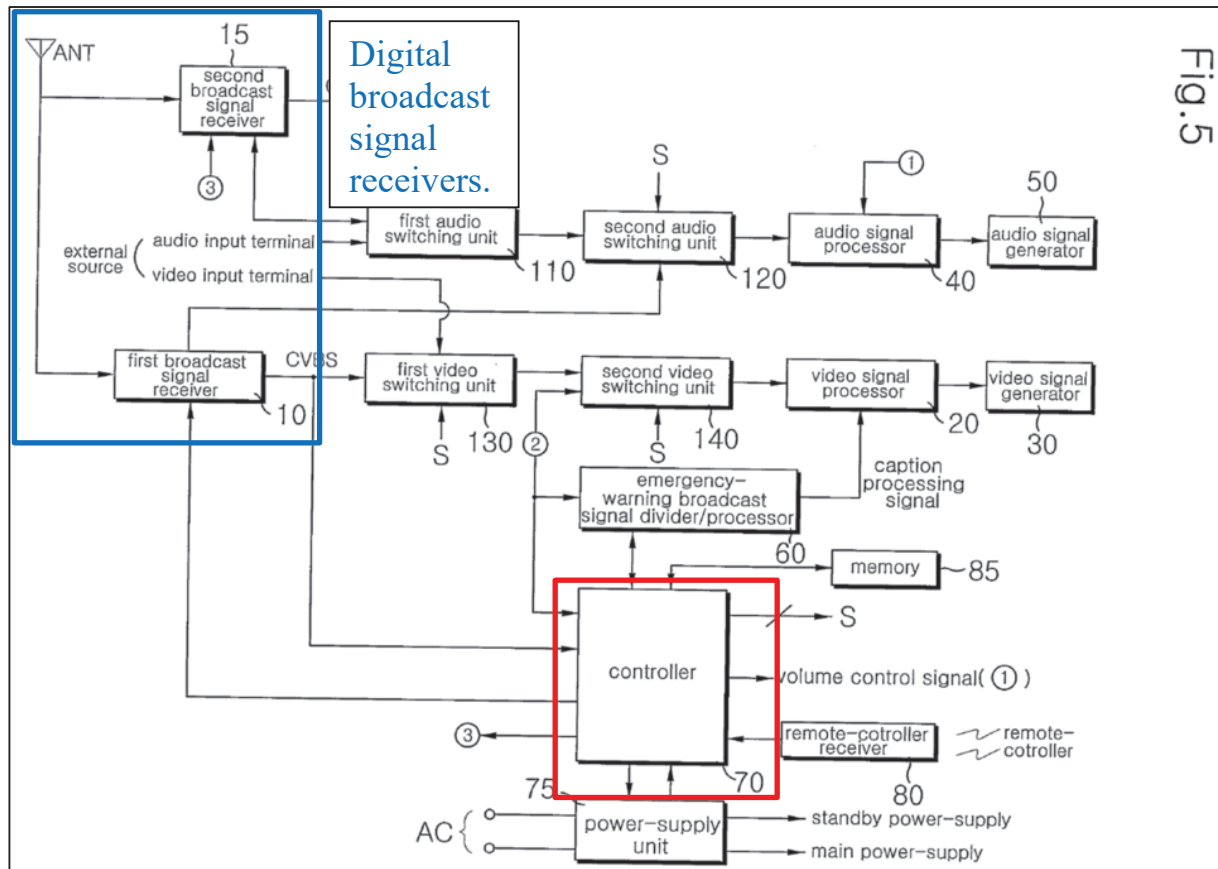
a. 1[Pre]: A method, comprising

259. If the preamble is limiting, Kim discloses a “*METHOD FOR NOTIFYING A DISASTER SITUATION*” via a television set. Ex[1008], Title (emphasis added); *see also id.*, Abstract, 2:23-3:12, 14:7-12, 33:2-38:21.

260. Therefore, Kim renders *a method* obvious.

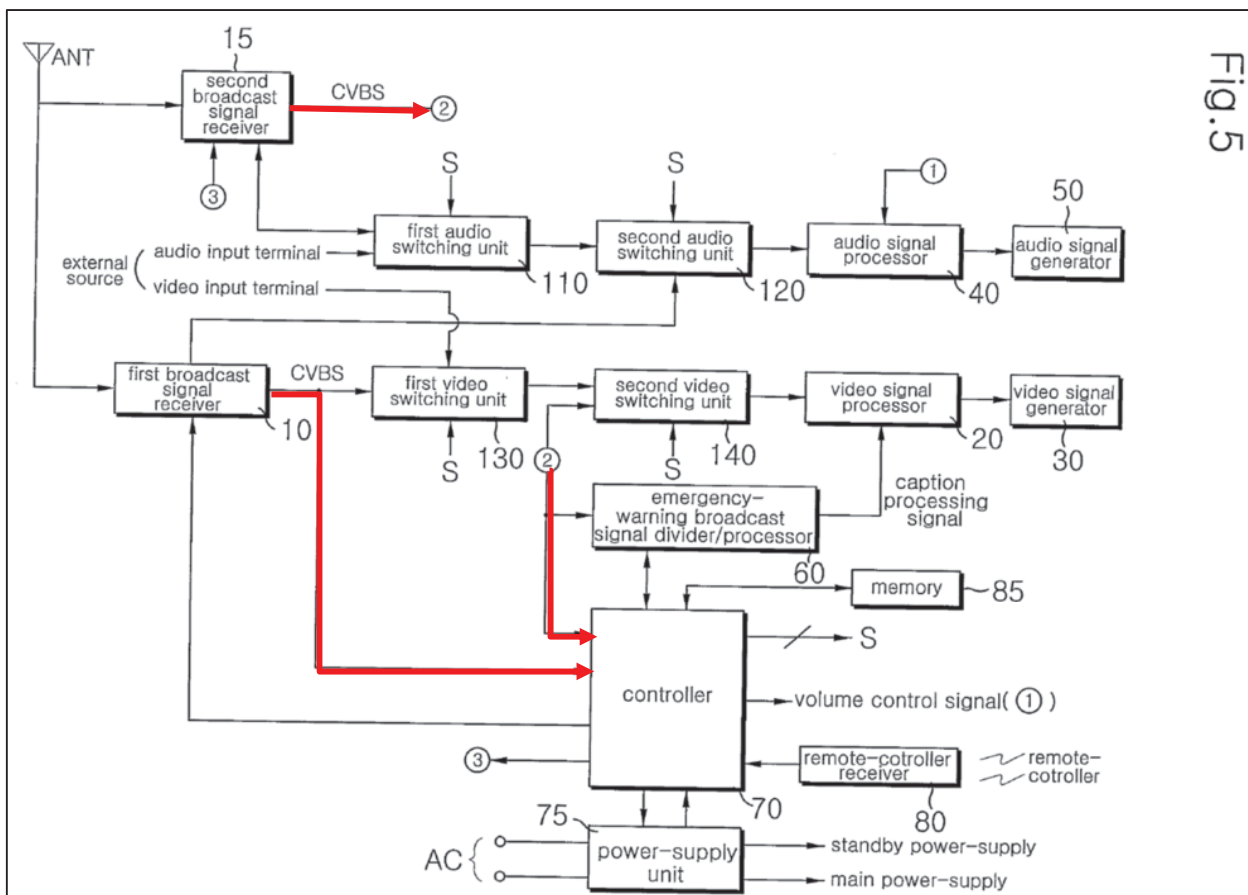
b. 1[a]: monitoring media streams associated with channels in a communication environment

261. Kim discloses “*monitoring [e.g., by controller 70] media streams associated with channels [e.g., digital broadcast signals] in a communication environment [e.g., television broadcast system].*”



262. Kim discloses a system containing two broadcast signal receivers, 10 and 15, and controller 70, shown in Figure 5. Controller 70 is connected to both of these broadcast signal receivers enabling it to “monitor[] individual channels.” *Id.*, 14:7-12. These channels are in a *communication environment* because they are in the television broadcast system. Each *channel* in this communication environment carries a “digital broadcast signal [that] is composed of data streams, adds a predetermined code to data in predetermined units (i.e., packet), divides each data stream into a plurality of data sections using the predetermined code, and transmits the divided data sections” *Id.*, 29:20-24. For example, specific channels ‘r’ and ‘s’

each carry “digital broadcast data [that] is composed of video data, audio data, and auxiliary data (i.e., emergency-warning broadcast data).” *Id.*, 29:24-30:13. This composition of “video data, audio data, and auxiliary data” make up the *media streams* associated with their respective channels ‘r’ and ‘s’. *Id.*, 29:20-30:13. The channels have differing priority (e.g., *id.*, 23:2-18) and are in a *communication environment* formed by the television broadcast system.



263. Thus, Kim discloses controller 70 which *monitors* television broadcast signals (*media streams*) that are *associated with channels* (e.g., channels “r” and “s”) *in a communication environment* (e.g., the television broadcast system).

264. Therefore, Kim renders *monitoring media streams associated with channels in a communication environment* obvious.

c. 1[b]: receiving an alert in one of the media streams

265. Kim discloses “*receiving an alert* [e.g., emergency-warning broadcast start code] *in one of the media streams* [e.g., the television broadcast signal associated with channel ‘r’ or ‘s’].”

266. Kim discloses that “controller 70 receives an emergency-warning broadcast signal (*alert*) shown in Fig. 1 [below].” Ex[1008], 14:13-14. This emergency-warning broadcast signal (*alert*) is one component of the “digital broadcast signal[, which] is composed of data streams.” *Id.*, 29:20-21. This “digital broadcast data [*media stream*] is [] composed of video data, audio data, and auxiliary data (i.e., emergency-warning broadcast data)” to which a “predetermined code,” (*id.*, 29:20-21) is added in predetermined units (i.e., packets). *Id.*, 29:25-30:2. An emergency-warning broadcast (*alert*) begins when the “emergency-warning broadcast signal is suddenly propagated” in the *media stream*. *Id.*, 23:4-5.

Fig. 1

Fig.1

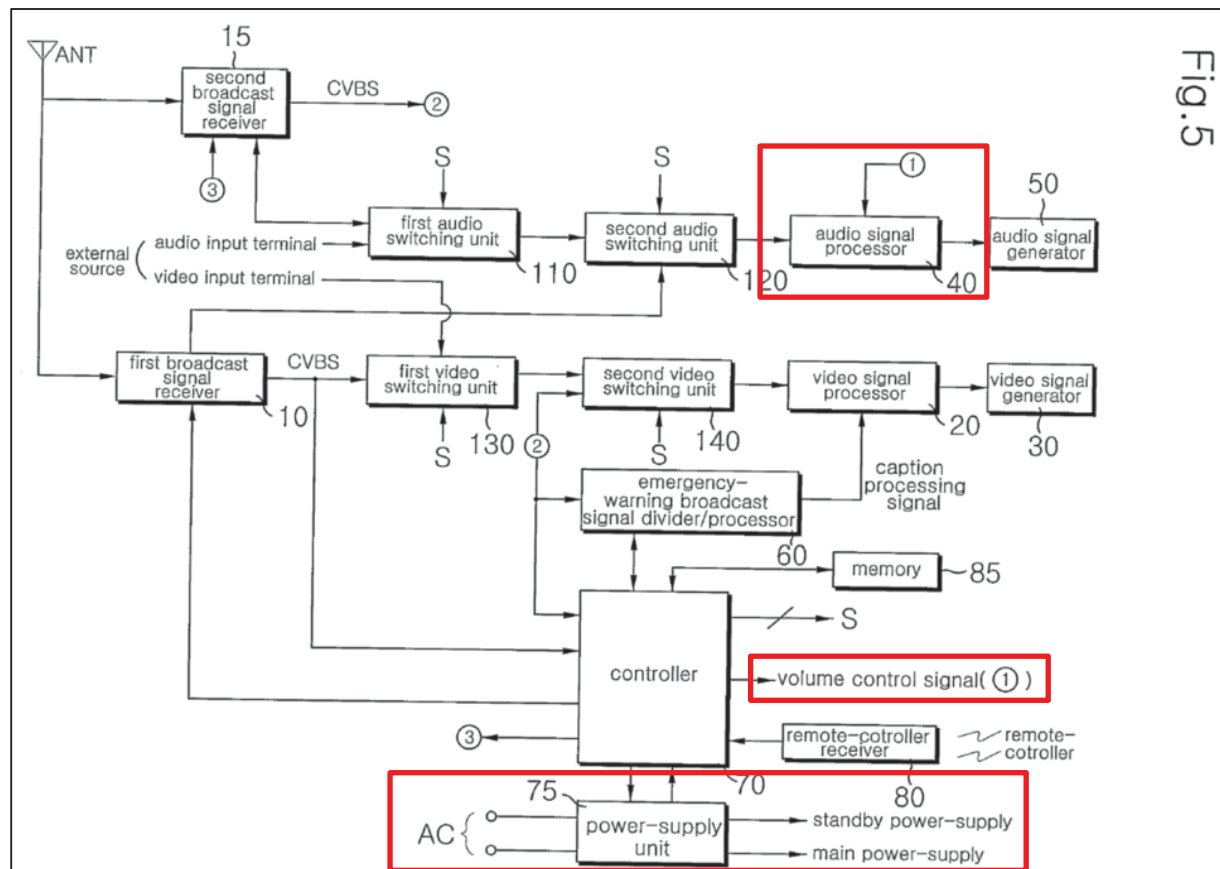
control code	TV automatic emergency-warning broadcast start		test code		TV automatic emergency-warning broadcast transmission time		TV automatic emergency-warning broadcast duration		The number of TV automatic emergency-warning broadcast reception areas		TV automatic emergency-warning broadcast reception area 1	
Hex	ID37	ID37			year/month/day/hour/minute	year/month/day/hour/minute	xx	xx	xx	xx	xx/xx/xx/xx	xx/xx/xx/xx
The number of bytes	2	2	1	1	5	5	1	1	1	1	4	4

TV automatic emergency-warning broadcast reception area 2			TV automatic emergency-warning broadcast reception area Nt		TV automatic emergency-warning broadcast reception group		TV automatic emergency-warning broadcast caption start		TV automatic emergency-warning broadcast caption data	TV automatic emergency-warning broadcast caption termination		TV automatic emergency-warning broadcast termination	
xx/xx/xx/xx	xx/xx/xx/xx		xx/xx/xx/xx	xx/xx/xx/xx	xx	xx	ID39	ID39	text	ID3A	ID3A	ID38	ID38
4	4		4	4	1	1	2	2		2	2	2	2

267. Thus, Kim renders *receiving an alert in one of the media streams* obvious.

- d. **1[c]: elevating a priority associated with the media stream receiving the alert, such that an adjustment is made to how the media stream is provisioned to an endpoint in the communication environment**

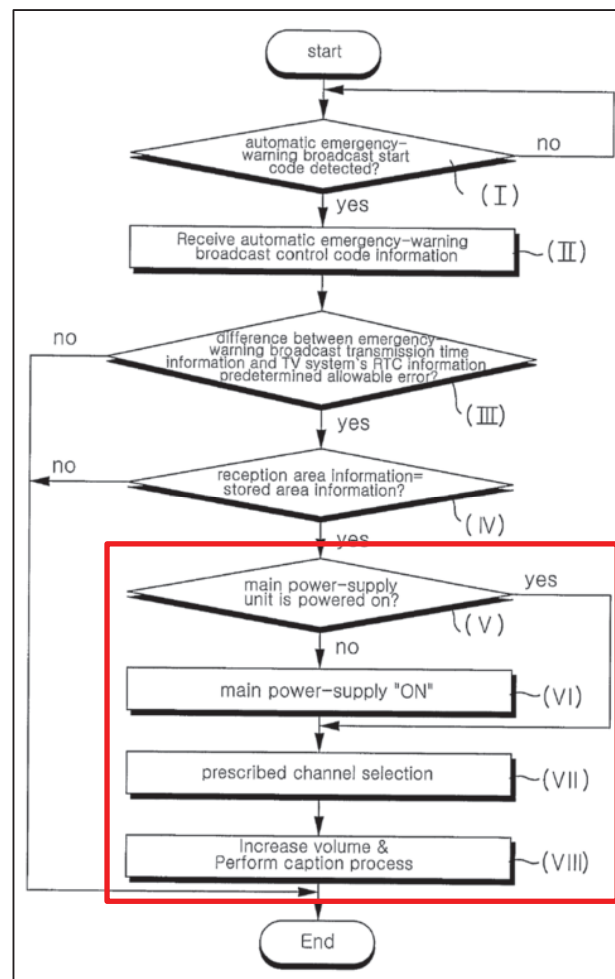
268. Kim discloses “*elevating a priority associated with the media stream* [e.g., digital broadcast data] *receiving the alert* [e.g., emergency-warning broadcast], *such that an adjustment is made to how the media stream is provisioned* [e.g., adjusting volume of the media stream relative to other broadcast data via audio signal processor 40 or controlling power supply unit 75] *to an endpoint in the communication environment* [e.g., the viewer’s television].”



269. Kim teaches that controller 70 makes *an adjustment to how the media stream is provisioned to an endpoint in the communication environment* in order to ensure that a viewer “can quickly receive the emergency-warning broadcast signal [alert] via a dedicated emergency-warning broadcast tuner” whether or not the TV is off, muted, or “the TV viewer currently views and listen to a TV program of another channel.” Ex[1008], 29:16-19.

270. Upon receiving an emergency-warning broadcast (*alert*), controller 70 determines which of these adjustments need to be made based on the flowchart shown in Figure 3 below. For example, controller 70 could *adjust and elevate the*

priority of the media stream receiving the alert by “power[ing] the TV system on, convert[ing] a system operation mode into a TV viewing mode, and control[ing] the TV system to output broadcast data of the prescribed emergency-warning broadcast channel in the form of AV data.” *Id.*, 26:10-14. Additionally, the controller could “outputs a volume control signal to increase a volume level of the TV system.” *Id.*, 27:16-17.



271. These *adjustments* to power, mode, output, and volume all serve to *elevate* the visibility (*priority*) of the broadcast station (*media stream*) receiving the

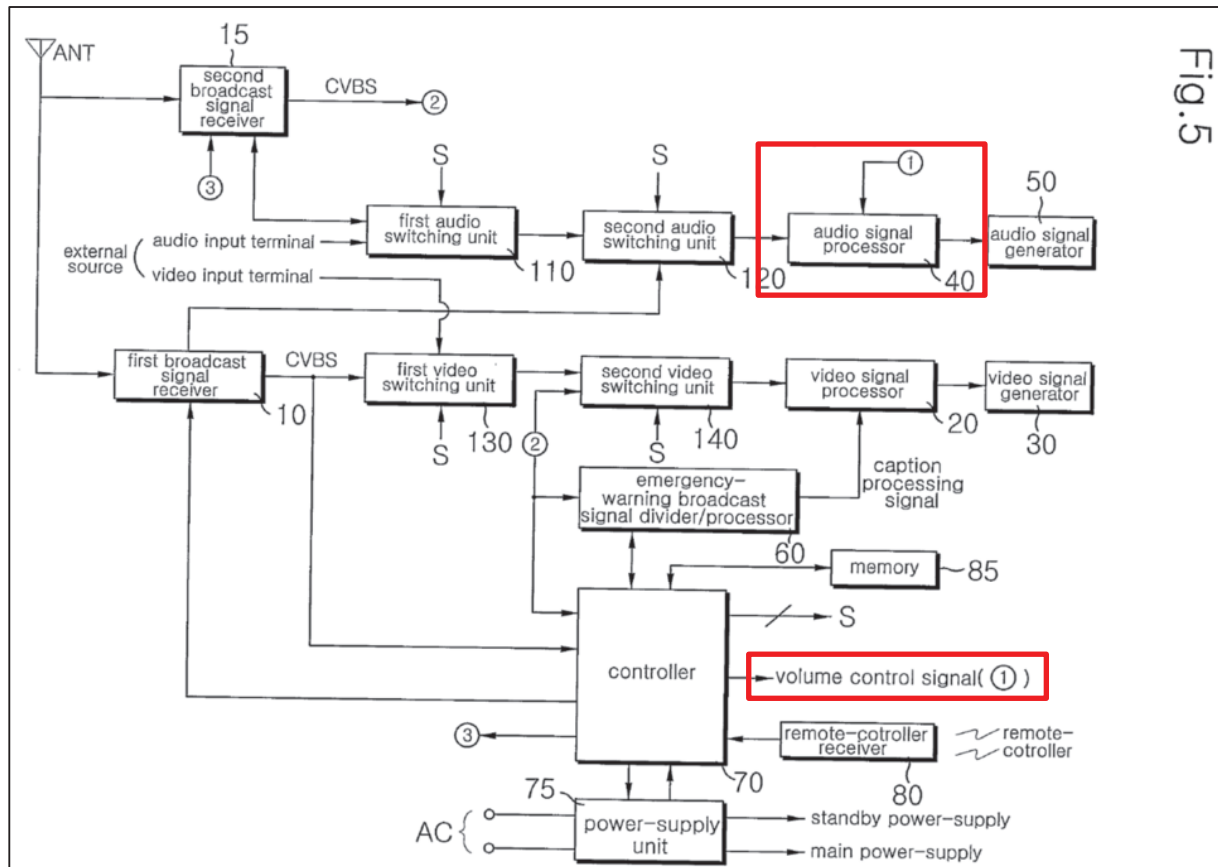
emergency-warning information (*alert*) by *adjusting* how that broadcast (*media stream*) is *provisioned* to the viewer's television⁴ (*endpoint in the communication environment*). *See also id.*, Abstract, 12:2-17, 16:6-14, 17:19-18:21, 19:15-20:6, 23:15-18, 26:5-17, 26:24-27:20, 29:16-19, 30:4-13, 33:22-34:8, 37:1-9, 39:9-21, 41:10-14.

272. Therefore, Kim renders *elevating a priority associated with the media stream receiving the alert, such that an adjustment is made to how the media stream is provisioned to an endpoint in the communication environment* obvious.

2. Claim 2: The method of claim 1, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert.

273. Kim discloses “[t]he method of claim 1, wherein elevating the priority comprises increasing the volume [e.g., adjusting volume via audio signal processor 40] of the media stream receiving the alert.”

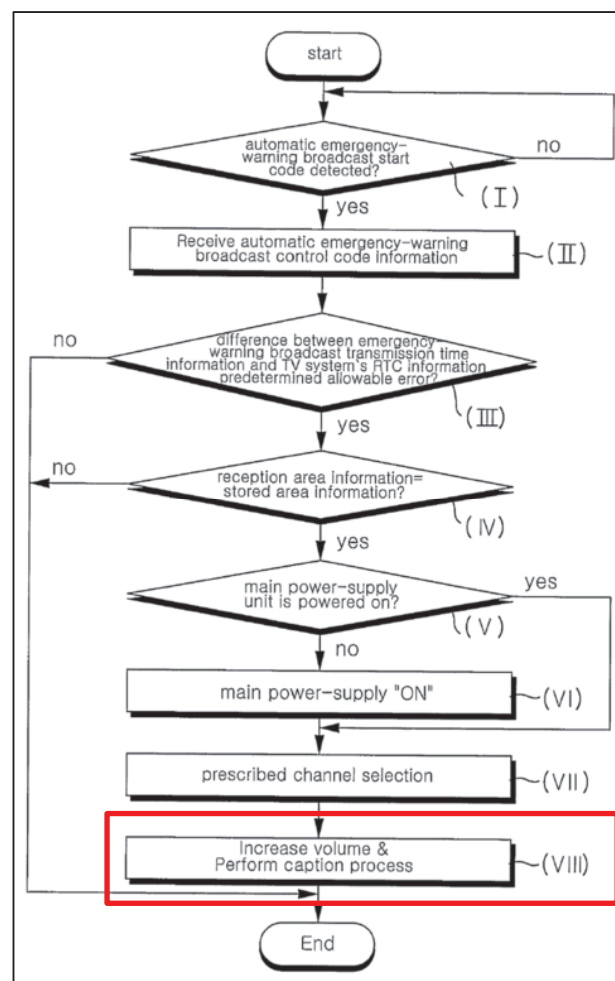
⁴ The viewer's television exchanges data; it receives broadcast signals from the receivers and sends remote control signals to the receiver. *E.g.*, Ex[1008], 11:9-12.



274. The '664 Patent discloses functionality that is substantially identical to Kim's method for handling emergency alerts. For example, "where a channel of an end-user device is set at a low priority and at a low volume" when an alert is received, "the volume of the channel is increased and/or, the system moves the channel to the high priority spatial position." Ex[1001], 7:62-8:5.

275. As discussed previously, Kim teaches *increasing the volume of the media stream receiving the alert* to ensure that a viewer "can quickly receive the emergency-warning broadcast signal (*alert*) via a dedicated emergency-warning broadcast tuner" whether or not the TV is muted. *Supra* §IX.F.1.d.

276. As shown in Figure 3, below, when an applicable emergency-warning broadcast signal (*alert*) is received and the start code is detected, controller 70 “outputs a volume control signal to increase a volume level of the TV system” associated with the broadcast signal (*media stream*) receiving the alert. Ex[1008], 14:13-22, 27:16-17. *see also id.*, 16:6-14, 19:15-20:6, 26:24-27:20, 33:22-34:8, 37:1-9.



277. Therefore, Kim renders *elevating the priority by increasing the volume of the media stream receiving the alert* obvious.

3. Claim 6: The method of claim 1, wherein elevating the priority includes identifying a primary channel and rendering the alert message to the primary channel.

278. Kim discloses “[t]he method of claim 1, wherein elevating the priority includes identifying a primary channel and rendering the alert message to the primary channel.”

279. Kim discloses that even in situations where “the TV viewer currently views and listen to a TV program of another channel, he or she can quickly receive the emergency-warning broadcast signal via a dedicated emergency-warning broadcast tuner.” Ex[1008], 29:16-19. For example, “[i]f the channel ‘s’ starts broadcasting an emergency-warning broadcast program on the condition that a TV viewer currently views a TV program of the channel ‘r’, the broadcasting station changes the channel code ‘r’ to the other channel code ‘s’ in such a way that it can compulsorily control the TV viewer of the channel r’ [sic] to view the emergency-warning broadcast program of the channel ‘s’. In other words, the broadcasting station can freely change a current channel code to another channel code if needed.” *Id.*, 30:4-13. Therefore, channel ‘s’ would be understood by a POSITA to be the *primary channel* because it is broadcasting information that takes precedence over the other program being broadcast and watched on channel ‘r’.

280. Thus, Kim discloses that the broadcasting station can *identify a primary channel code and elevate the priority of the emergency warning broadcast (alert)* by

freely changing the channel code and thereby *rendering* the emergency warning broadcast (*alert*) to the primary channel.”

281. Therefore, Kim renders *elevating the priority by identifying a primary channel and rendering the alert message to the primary channel* obvious.

4. Claim 7: The method of claim 1, wherein elevating the priority includes turning a volume down on media streams not receiving the alert.

282. Kim discloses “*turning a volume down on media streams not receiving the alert.*”

283. Kim changes “the channel code ‘r’ to the other channel code ‘s’...to view the emergency-warning broadcast program.” Ex[1008], 30:4-13; *supra* §IX.F.3. It would have been understood that changing from channel ‘r’ to ‘s’ would effectively turn the volume of channel ‘r’ to zero, thus rendering obvious this limitation.

284. Thus, Kim discloses or at least renders obvious *elevating the priority by turning a volume down on media streams not receiving the alert.*

5. Claim 8: The method of claim 1, wherein the alert is received in a header of a packet of the media stream.

285. Kim in view of Ishibashi discloses “[t]he method of claim 1, wherein the alert is received in a header of a packet of the media stream.”

286. Kim provides that the “emergency-warning broadcast signal divider/processor” separates the “emergency-warning broadcast signal” (*alert*)

which is “being overlapped with or inserted in reception broadcast signal” (*media stream*) Ex[1008], 3:21-4:3. For example, a “data streams” is added “in predetermined units (i.e., packet[s])” to a “digital broadcast signal.” *Id.*, 29:20-21; *see also id.*, 3:19-4:11, 29:20-24, 6:16-7:6, 29:20-30:13.

287. Figure 1 (below) depicts an example of an “emergency-warning broadcast signal” broken into its “predetermined units (i.e., packets).” *Id.*, 3:21-4:3, 29:20-21. The first packet (i.e., the *header packet*) of this digital data signal is shown to be a “TV emergency-warning broadcast start” code. *Id.*, 7:7-9. “If the emergency-warning broadcast start information is detected, it is determined that the emergency-warning broadcast signals are currently propagated.” *Id.*, 7:9-11

Fig. 1

control code	TV automatic emergency-warning broadcast start		test code		TV automatic emergency-warning broadcast transmission time		TV automatic emergency-warning broadcast duration		The number of TV automatic emergency-warning broadcast reception areas		TV automatic emergency-warning broadcast reception area 1	
Hex	ID37	ID37			year/month/day/hour/minute	year/month/day/hour/minute	XX	XX	XX	XX	XX/XX/XX/XX	XX/XX/XX/XX
The number of bytes	2	2	1	1	5	5	1	1	1	1	4	4

TV automatic emergency-warning broadcast reception area 2		TV automatic emergency-warning broadcast reception area Nt	TV automatic emergency-warning broadcast reception group		TV automatic emergency-warning broadcast caption start		TV automatic emergency-warning broadcast caption data	TV automatic emergency-warning broadcast caption termination	TV automatic emergency-warning broadcast termination		
XX/XX/XX/XX	XX/XX/XX/XX	XX/XX/XX/XX	XX	XX	ID39	ID39	text	ID3A	ID3A	ID38	ID38
4	4	4	1	1	2	2		2	2	2	2

288. Thus, Kim discloses *receiving* an emergency-warning broadcast start code (*alert*) in a *header packet* to indicate an emergency-warning broadcast in a digital broadcast signal composed of data streams (*media stream*).

289. Therefore, Kim renders receiving the alert *in a header packet of the media stream* obvious.

6. Claim 9: The method of claim 1, wherein the alert is received in a control packet of the media stream.

290. Kim discloses “*the alert is received in a control packet of the media stream.*”

291. Kim discloses that the “emergency-warning broadcast data (*alert*) being overlapped with or inserted in reception broadcast signal” (*media stream*) which contains “data with emergency-warning broadcast control information [*control packet*],” is separated by the “emergency-warning broadcast signal divider/processor.” Ex[1008], 3:21-4:3. Figure 1 (below), “is an exemplary view illustrating TV emergency-warning broadcast control codes in accordance with a preferred embodiment of the present invention.” *Id.*, 5:6-8.

Fig. 1

Fig. 1

control code	TV automatic emergency-warning broadcast start		test code		TV automatic emergency-warning broadcast transmission time		TV automatic emergency-warning broadcast duration		The number of TV automatic emergency-warning broadcast reception areas		TV automatic emergency-warning broadcast reception area 1	
Hex	ID37	ID37			year/month/day/hour/minute	year/month/day/hour/minute	xx	xx	xx	xx	xx/xx/xx/xx	xx/xx/xx/xx
The number of bytes	2	2	1	1	5	5	1	1	1	1	4	4

TV automatic emergency-warning broadcast reception area 2			TV automatic emergency-warning broadcast reception area Nt	TV automatic emergency-warning broadcast reception group		TV automatic emergency-warning broadcast caption start		TV automatic emergency-warning broadcast caption data	TV automatic emergency-warning broadcast caption termination	TV automatic emergency-warning broadcast termination			
xx/xx/xx/xx	xx/xx/xx/xx		xx/xx/xx/xx	xx/xx/xx/xx	xx	xx	ID39	ID39	text	ID3A	ID3A	ID38	ID38
4	4		4	4	1	1	2	2		2	2	2	2

292. For example, “emergency-warning broadcast signal or data to be transferred from the broadcasting station is composed of TV system control codes” in the broadcast signal. *Id.*, 6:22-7:5. Thus, an “emergency-warning broadcast control code[,]” (*id.*, 5:7) is added to the “digital broadcast signal [that] is composed of data streams,” in predetermined units (i.e., packets). *Id.*, 29:20-21; *see also id.*, 3:19-4:11, 29:20-24, 6:16-7:6, 29:20-30:13.

293. Therefore, Kim discloses that these *control packets* containing the emergency *alert* are overlapped with or inserted into the transmission of the *media stream* and then received by “the emergency-warning broadcast signal divider/processor 60.” *Id.*, 23:7-8.

294. Therefore, Kim renders receiving the alert *in a control packet of the media stream* obvious.

7. **Claim 11: Non-transitory readable media that includes code for execution and when executed by a processor operable to perform operations comprising: monitoring media streams associated with channels in a communication environment; receiving an alert in one of the media streams; and elevating a priority associated with the media stream receiving the alert.**

295. Claim 11 is nearly identical to claim 1. The only difference is that claim 11 recites “*non-transitory readable media that includes code for execution and when executed by a processor operable to perform operations comprising*” the same steps as the “*method*” in claim 1. Ex[1001], cls. 1, 11; *Bancorp*, 687 F.3d at 1277 (asserted system and medium claims treated as no different from the asserted method claims). The emergency-warning broadcast system disclosed by Kim is comprised of “emergency-warning broadcast signal divider/processor 60” which monitors the media streams received by the first and second broadcast receivers 10 and 15 for emergency-warning broadcast data, among other components and processors. Ex[1008], 23:2-14. “Controller 70 controls” this process “on the basis of control program data stored in a memory 85.” Ex[1008], 11:25-12:2. It would have been understood that memory 85 containing control program data includes *non-transitory computer readable media that includes code for execution by a processor [controller 70] to perform operations*. Further, as described for

limitation 1[c], Kim discloses increasing the volume of a broadcast signal receiving an emergency-warning broadcast, among other adjustments to ensure that the viewer is alerted to the priority information in the broadcast. §IX.F.1.d.

296. Thus, for all of the same reasons described for claim 1, incorporated here, Kim renders *non-transitory readable media that includes code for execution and when executed by a processor operable to perform operations comprising: monitoring media streams associated with channels in a communication environment; receiving an alert in one of the media streams; and elevating a priority associated with the media stream receiving the alert* obvious.

8. Claims 12 and 15

12	The non-transitory readable media of claim 11, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert.
15	The non-transitory readable media of claim 11, wherein elevating the priority includes identifying a primary channel and rendering the alert message to the primary channel.

297. Claims 12 and 15 are nearly identical to claims 2 and 6 respectively. The only difference is that claims 12 and 15 depend on claim 11. Ex[1001], cls. 2, 6, 12, and 15.

298. Thus, for all of the same reasons described for claims 2, 6, and 11, incorporated here, Kim in view of Ishibashi renders *elevating the priority* by

increasing the volume of the media stream receiving the alert, and identifying a primary channel and rendering the alert message to the primary channel obvious.

9. **Claim 16: An apparatus, comprising: a memory element; a processor; and a management element stored in the memory element and configured to interface with the processor such that the apparatus is configured for: monitoring media streams associated with channels in a communication environment; receiving an alert in one of the media streams; and elevating a priority associated with the media stream receiving the alert.**

299. Claim 16 is nearly identical to claim 1. The only difference is that claim 16 recites “*an apparatus, comprising: a memory element; a processor; and a management element stored in the memory element and configured to interface with the processor such that the apparatus is configured for*” performing the same steps as the “*method*” in claim 1. Ex[1001], cls. 1, 16; *Bancorp*, 687 F.3d at 1277 (asserted system and medium claims treated as no different from the asserted method claims). Kim discloses “a television (TV) apparatus for propagating an emergency-warning broadcast signal, comprising: an emergency-warning broadcast signal divider/processor for separating an emergency-warning broadcast signal or emergency-warning broadcast data being overlapped with or inserted in reception broadcast signal,” (Ex[1008], 3:19-4:1) received by a first and second broadcast receiver 10 and 15. *Id.*, 23:2-14; *see also id.*, claims 14-19. “Controller 70 controls” this process “on the basis of control program data stored in a memory 85.” *Id.*, 11:25-12:2. This would have been understood to indicate that the Kim system

includes a memory element (memory 85), a processor (controller 70), and a management element (control program data) stored in the memory element and configured to interface with the processor. Additionally, as described for limitation 1[c], Kim discloses increasing the volume of a broadcast signal receiving an emergency-warning broadcast, among other adjustments to ensure that the viewer is alerted to the priority information in the broadcast. §IX.F.1.d.

300. Thus, for all of the same reasons described for claim 1, incorporated here, Kim renders *an apparatus, comprising: a memory element; a processor; and a management element stored in the memory element and configured to interface with the processor such that the apparatus is configured for: monitoring media streams associated with channels in a communication environment; receiving an alert in one of the media streams; and elevating a priority associated with the media stream receiving the alert* obvious.

10. Claims 17 and 20

17	The apparatus of claim 16, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert.
20	The apparatus of claim 16, wherein elevating the priority includes identifying a primary channel and rendering the alert message to the primary channel.

301. Claims 17 and 20 are nearly identical to claims 2 and 6 respectively. The only difference is that claims 17 and 20 depend on claim 16. Ex[1001], cls. 2, 6, 17, and 20. Thus, for all of the same reasons described for claims 2, 6, and 11,

incorporated here, Kim in view of Ishibashi renders *elevating the priority* by *increasing the volume of the media stream receiving the alert*, and *identifying a primary channel and rendering the alert message to the primary channel* obvious.

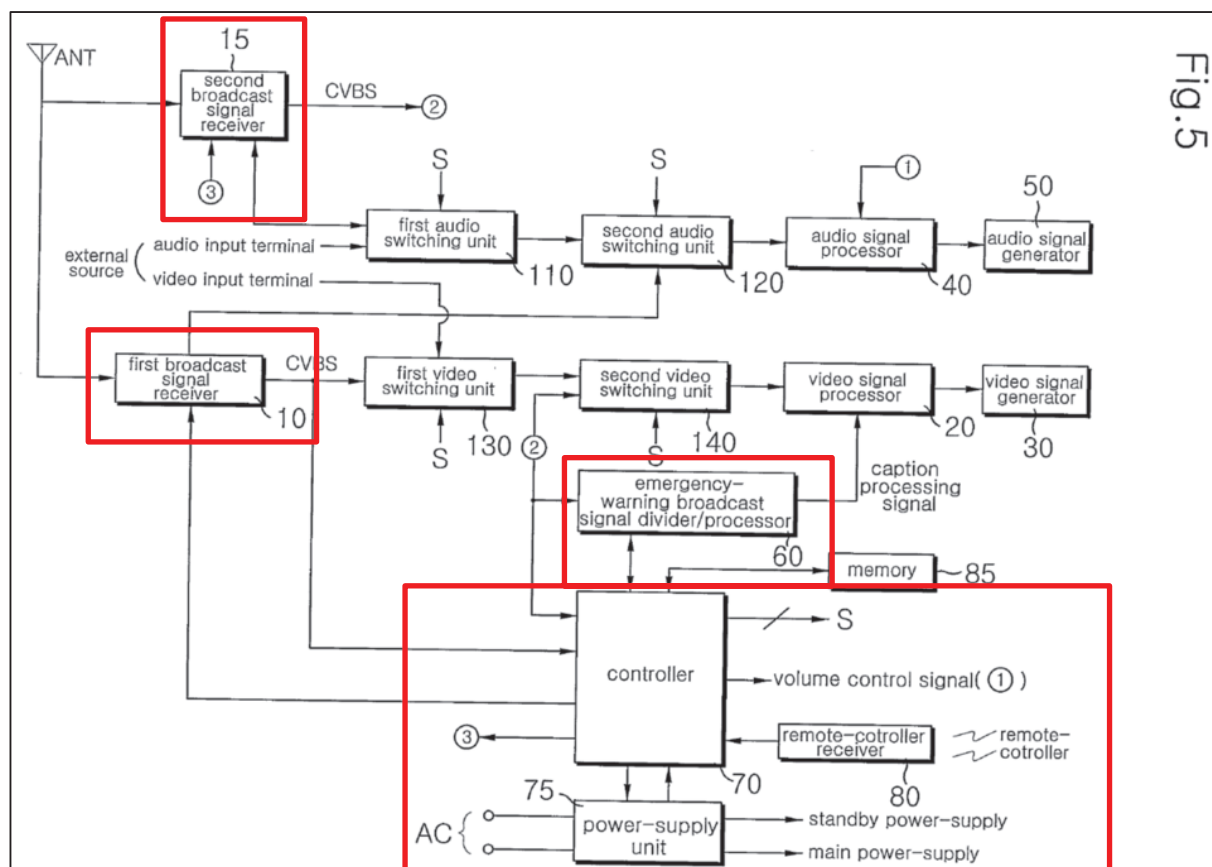
G. Ground 8: Claims 3-5, 13-14, and 18-19 are obvious over Kim in view of Ishibashi.

1. A POSITA Would Have Combined Kim with Ishibashi with a reasonable expectation of success.

302. There would have been motivation to combine Kim and Ishibashi to arrive at Claims 3-5, 13-14, and 18-19 of the '664 Patent, and a POSITA would have reasonably expected success in making this combination. Kim and Ishibashi are in the same field of endeavor as each other and the '664 Patent (*e.g.*, emergency communication systems) and both Kim and Ishibashi provide a method and apparatus for notifying a viewer of a disaster situation via a television which receives emergency warning information from a broadcast station. Ex[1001], 1:18-32; Ex[1008], Title, Abstract, 1:3-9, 3:19-4:11; Ex[1009], Title, [0001]-[0002], [0004]. Kim and Ishibashi are also directed to similar problems regarding ensuring the warning information is conveyed to the viewer. Ex[1008], 2:10-4:25; Ex[1009], [0004]-[0005].

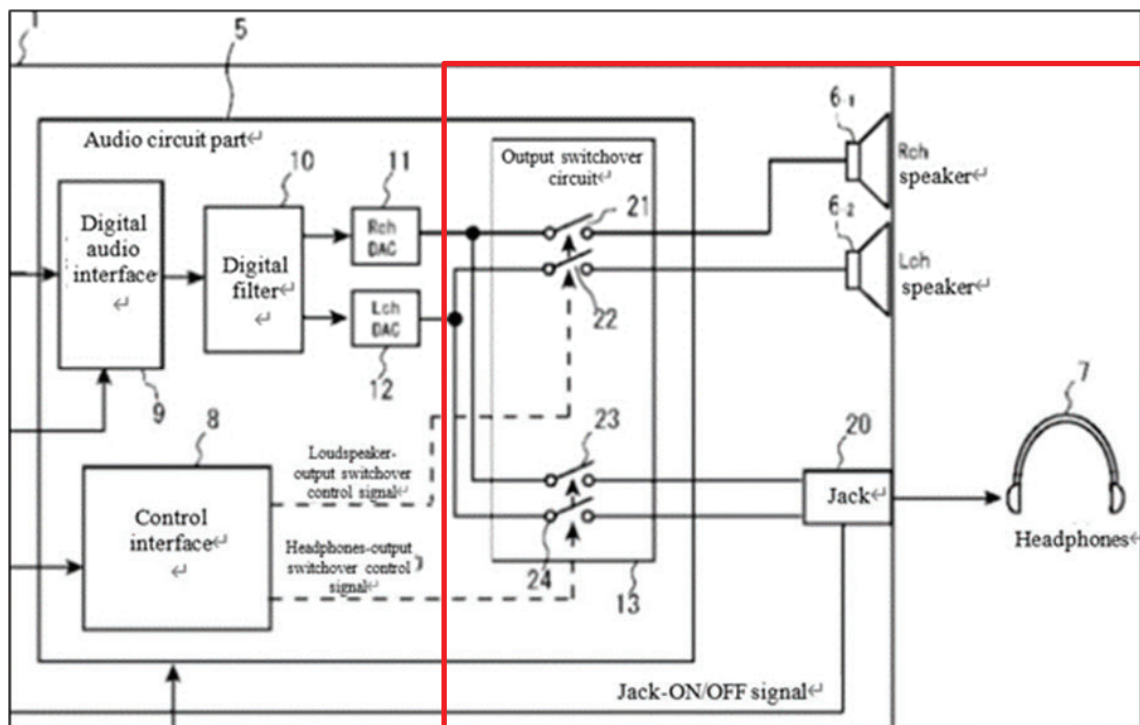
303. The system in Kim is designed for situations when the viewer is viewing a different channel than the one receiving the alert, the TV is muted, or the TV is turned off. Ex[1008], 14:7-12. Kim describes using “controller 70,” which

is connected to a “first broadcast signal receiver 10,” “second broadcast signal receiver 15,” “emergency-warning broadcast signal divider/processor 60”, and power-supply unit 75, among other components, that is able to “select[] a channel transferring the emergency-warning broadcast signal,” from one of the broadcast receivers, control[] the power state of the TV via power-supply unit 75, and control the volume of the TV via a volume control signal. *Id.*, 14:7-12, 23:2-8.



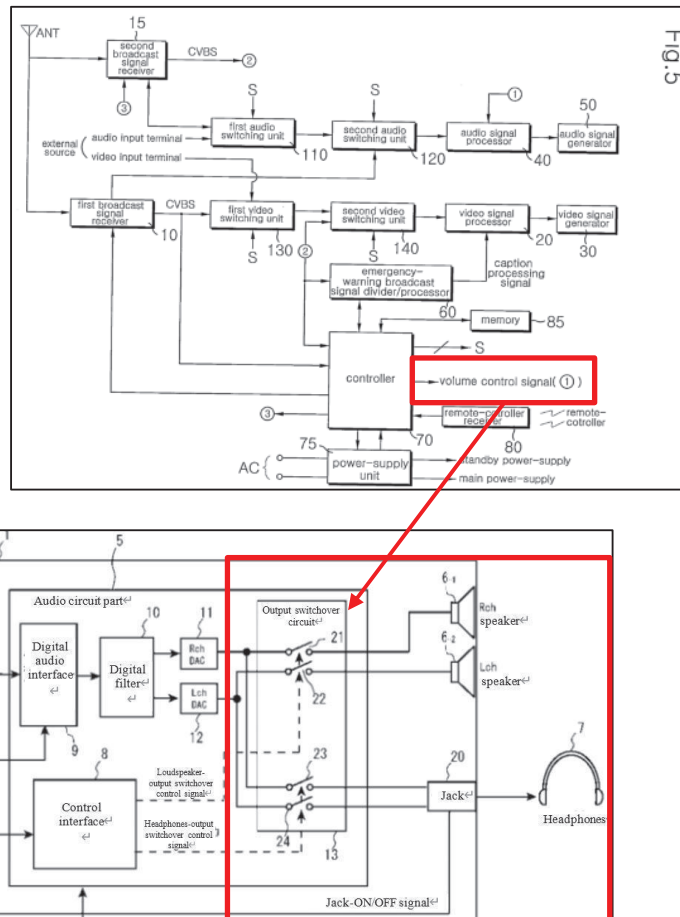
304. Kim discloses that a goal of emergency warning broadcast systems is to ensure that the viewer receives the emergency warning information. Ex[1008], 3:13-19. In this same vein, Ishibashi discloses that problems can arise, for

example, “when the audience has forgotten to unplug their headphones or earphones from the jack,” thus potentially preventing the viewer from hearing the audio portion of the warning. Ex[1009], [0005]. The system in Ishibashi solves this problem of headphones remaining plugged into the device by use of an “output-switchover circuit” which “switches the output of audio signals to loudspeaker 6.” *Id.*, [0015]. This ensures that sound is output from “at least the loudspeaker 6 during the broadcasting of an emergency-alert.” *Id.*, [0017].



305. Implementing Ishibashi’s audio output-switchover circuit in Kim’s controller system, as shown below in the combined figure, would have been motivating to a POSITA to further ensure that an emergency warning broadcast is

received by the viewer even in situations where a headphone jack is left plugged in but unattended (*e.g.*, not being worn) by the viewer.

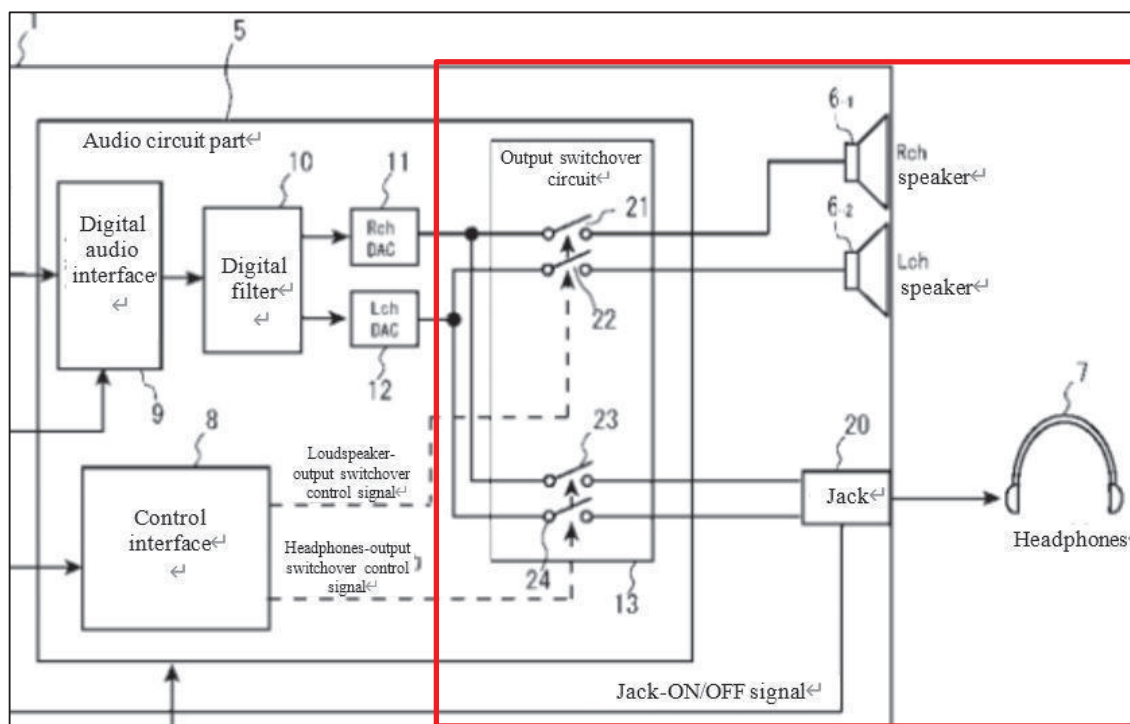


306. Additionally, a POSITA would have understood that Ishibashi's audio output-switchover circuit could be implemented as another option for Kim's controller unit. This would have been a simple, predictable combination reasonably expected to succeed because they are both emergency warning notification systems focused primarily on televisions. Further, this combination would have been within the abilities of a POSITA to do and would have provided the benefit of alerting the viewer even if they left their headphones plugged in.

307. Therefore, a POSITA would be both motivated and able to combine Kim and Ishibashi with an expectation of success.

2. Claim 3: The method of claim 1, wherein elevating the priority comprises changing a spatial direction for rendering the media stream receiving the alert.

308. Kim in view of Ishibashi discloses “*changing a spatial direction [e.g., from headphones to speakers] for rendering the media stream receiving the alert.*”



309. Ishibashi discloses an “Emergency-Alert Broadcast Receiver and Method for Receiving Emergency-Alert Broadcasts.” Ex[1009], Title. In order to ensure that a viewer is informed of an emergency warning broadcast, Ishibashi teaches that “even if headphones or earphones are left plugged into the jack,” the audio signal is output “at the maximum volume, at least on the loudspeaker.” *Id.*,

[0007]. Ishibashi uses an “[o]utput-switchover circuit 13 that switches the output of audio signals to loudspeaker 6 or headphones 7” to accomplish this. *Id.*, [0015]. This output-switchover circuit *changes the spatial direction* at which *the media stream receiving the alert is rendered* “so that the audio sound is output... from at least loudspeaker 6 during the broadcasting of an emergency-alert.”. *Id.*, [0017].

310. Additionally, Ishibashi discloses that audio can be “output through both loudspeaker 6 and headphones 7” when “the audience is viewing/listening to a broadcast, etc., on headphones 7.” Ex[1009], [0043]. These audio output options, and the output-switchover circuit are shown in the excerpt from Figure 1, shown above. *See also id.*, [0006], [0007], [0015]-[0017], [0026], [0028], [0032], [0038], [0043], and Fig. 1.

311. Thus, Kim in view of Ishibashi discloses the ability to *change* the audio output (*spatial direction*) from headphones to speakers that the audio from the broadcast station (*media stream*) receiving the emergency warning broadcast (*alert*) is *rendered* on. As discussed above, there would have been motivation for a POSITA to combine Ishibashi with Kim in order to expand the reach of emergency messaging systems and ensure that the emergency warning broadcast is heard by the user. *Supra* §IX.G.1.

312. Therefore, Kim in view of Ishibashi renders *elevating the priority* by *changing a spatial direction for rendering the media stream receiving the alert* obvious.

3. Claim 4: The method of claim 1, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert and changing a spatial direction for rendering the media stream receiving the alert.

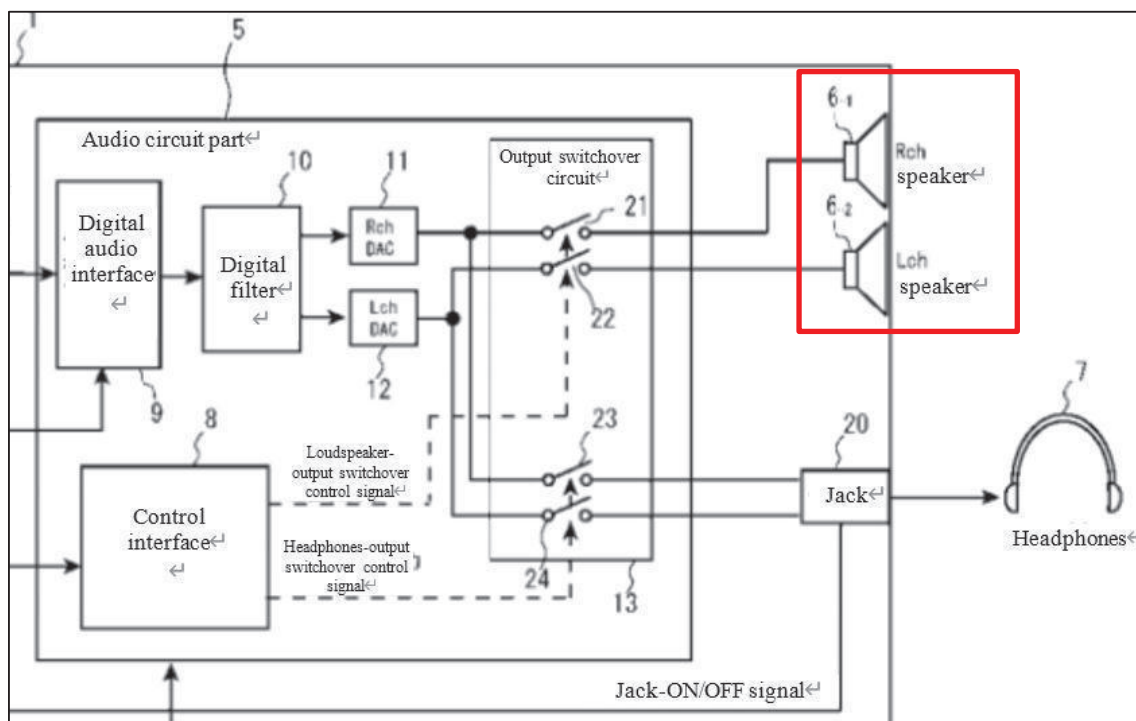
313. Claim 4 is a combination of, and identical to, claims 2 and 3. Ex[1001], cls. 2, 3, 4. Ishibashi, like Kim (*supra* §IX.F.2), discloses that the “audio circuit part adjusts the audio output to the maximum volume when the aforementioned tuner part receives a pilot signal for the activation of the emergency-alert broadcast.” Ex[1009], [0006]. Additionally, as previously discussed, Ishibashi discloses that the “switchover means is controlled so as to cause the audio data, which is output from the aforementioned audio circuit part, to be output through both the [] loudspeaker and the [] jack.” *Id.*, [0006]. A POSTIA would recognize that this would be an effective combination “because, if an emergency alert is broadcast, the audience can hear the emergency-alert broadcast at the maximum volume, at least on the loudspeaker,” the system can help to “prevent[] the audience from missing an emergency-alert broadcast.” *Id.*, [0007].

314. Thus, for these and all of the same reasons described for claims 2 and 3, incorporated here, Kim in view of Ishibashi, renders *elevating the priority* by

increasing the volume of the media stream receiving the alert and changing a spatial direction for rendering the media stream receiving the alert obvious.

- 4. Claim 5: The method of claim 1, wherein elevating the priority comprises rendering the media stream receiving the alert to a priority spatial direction.**

315. Kim in view of Ishibashi discloses “*elevating the priority comprises rendering the media stream receiving the alert to a priority spatial direction [e.g., loudspeaker 6].*”



316. As previously discussed, Ishibashi discloses an “Emergency-Alert Broadcast Receiver and Method for Receiving Emergency-Alert Broadcasts.” Ex[1009], Title. In order to ensure that a viewer is informed of an emergency warning broadcast, Ishibashi teaches that “even if headphones or earphones are left

plugged into the jack,” the audio signal is output “at the maximum volume, at least on the loudspeaker.” *Id.*, [0007]. Ishibashi uses an “[o]utput-switchover circuit 13 that switches the output of audio signals to loudspeaker 6 or headphones 7” to accomplish this. *Id.*, [0015]. This output-switchover circuit *elevates the priority of the media stream receiving the alert by rendering on the priority spatial direction* “so that the audio signal is output...from at least loudspeaker 6 during the broadcasting of an emergency-alert.” *Id.*, [0017].

317. The loudspeaker would have been understood by a POSITA to be a priority spatial direction because “allow[ing] audio to be output through the loudspeaker when an emergency-alert broadcast starts” and “prevent[s] the audience from missing an emergency-alert broadcast.”

318. Additionally, Ishibashi discloses that audio can be “output through both loudspeaker 6 and headphones 7” when “the audience is viewing/listening to a broadcast, etc., on headphones 7.” Ex[1009], [0043]. Thereby the alert audio is rendered in multiple *spatial directions*, including the *priority directions*. These audio output options are shown in the excerpt from Figure 1, shown above. *See also id.*, [0006], [0007], [0015]-[0017], [0026], [0028], [0032], [0038], [0043], and Fig. 1.

319. Thus, Kim in view of Ishibashi discloses the ability to *render* the audio from the broadcast station (*media stream*) receiving the emergency warning

broadcast (*alert*) to the speakers (*priority spatial direction*) even if headphones are still plugged into the device.

320. Therefore, Kim in view of Ishibashi renders *elevating the priority* by *rendering the media stream receiving the alert to a priority spatial direction* obvious.

5. Claims 13-14

13	The non-transitory readable media of claim 11, wherein elevating the priority comprises changing a spatial direction for rendering the media stream receiving the alert.
14	The non-transitory readable media of claim 11, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert and changing a spatial direction for rendering the media stream receiving the alert.

321. Claims 13-14 are nearly identical to claims 3 and 4 respectively. The only difference is that claims 13-14 depend on claim 11. Ex[1001], cls. 3-4, and 13-14.

322. Thus, for all of the same reasons described for claims 3-4, and 11, incorporated here, Kim in view of Ishibashi renders *elevating the priority* by *increasing the volume and changing a spatial direction for rendering the media stream receiving the alert* obvious.

6. Claims 18-19

18	The apparatus of claim 16, wherein elevating the priority comprises changing a spatial direction for rendering the media stream receiving the alert.
19	The apparatus of claim 16, wherein elevating the priority comprises increasing the volume of the media stream receiving the alert and

	changing a spatial direction for rendering the media stream receiving the alert.
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323. Claims 18-19 are nearly identical to claims 3 and 4 respectively. The only difference is that claims 18-19 depend on claim 16. Ex[1001], cls. 3-4, and 18-19. Thus, for all of the same reasons described for claims 3-4, and 11, incorporated here, Kim in view of Ishibashi renders *elevating the priority by increasing the volume and/or changing a spatial direction for rendering the media stream receiving the alert* obvious.

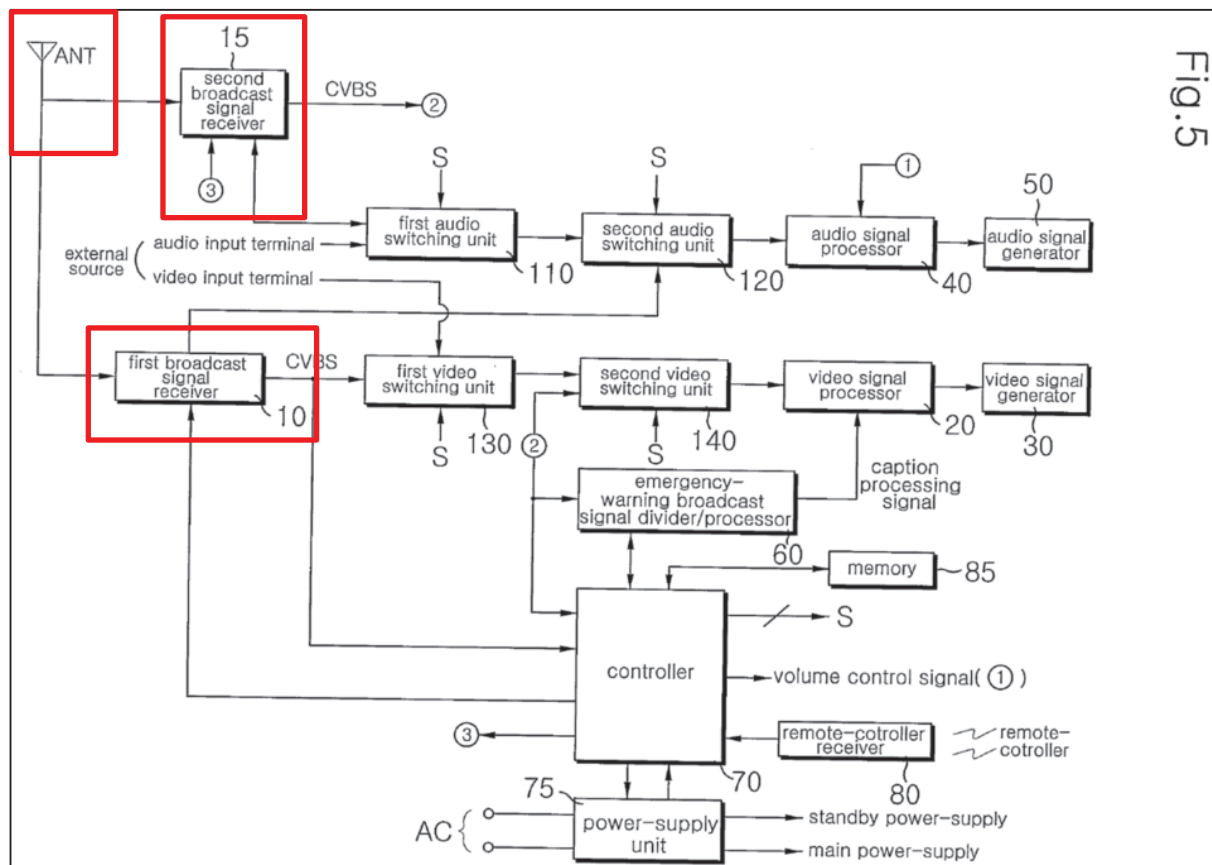
H. Ground 9: Claim 10 is obvious over Kim in view of Goss.

1. A POSITA Would Have Combined Kim with Goss with a reasonable expectation of success.

324. Kim and Goss both disclose emergency warning communication systems that provide a method for notifying a user of an emergency situation via a broadcast system. Ex[1008], Title, Abstract, 3:19-4:11; Ex[1010], 1:31-37.

325. Combining Kim and Goss would have been obvious to a POSITA. Kim and Goss are in the same field of endeavor (*e.g.*, emergency communication systems) as each other, as well as the '664 Patent. Ex[1001], 1:18-32; Ex[1008], Abstract, 1:3-21; Ex[1010], Abstract, 1:31-55; 3:24-26. Further, Kim, Goss, and '664 are all directed to similar problems regarding ensuring the warning information is conveyed to the user. Ex[1008], 2:10-4:25; Ex[1010], 6:4-7; 7:55-57.

326. Kim is designed for situations when the viewer is watching a different channel or TV input than the one receiving the alert, the TV is muted, and/or the TV is turned off. Ex[1008], 3:13-18. Kim describes the implementation of an “antenna,” which “received digital TV broadcast data,” connected to a “first broadcast signal receiver 10,” and a “second broadcast signal receiver 15,” among other components, which is able to “select[] a channel transferring the emergency-warning broadcast signal,” from one of the broadcast receivers, and provide it to the user. *Id.*, 24:15-16, 14:7-12.



327. Kim recognizes that a goal of emergency warning broadcast systems is ensuring that the viewer receives the emergency warning information Ex[1008], 3:13-19. Goss solves the problems that can arise when, for example, users do “not receive the message when first transmitted.” Ex[1010], 6:6-7. For example, Goss prevents missed alerts by providing that “[b]roadcast announcement messages may be retransmitted from time to time.” *Id.*, 6:4-6. Additionally, Goss discloses the potential to “transmit one or more broadcast messages on an occasional basis.” *Id.*, 7:55-56. Thus, “alerting users to an urgent situation.” *Id.*, 7:57.

328. Therefore, a POSITA would have been motivated to improve the likelihood that an emergency warning broadcast is received by the viewer by implementing Goss’s retransmissions in Kim’s emergency warning system.

329. Implementing Goss’s broadcast retransmissions as another option to be received by Kim’s antenna and broadcast signal receivers would have been an understandable, simple, predictable combination that a POSITA would reasonably expect to succeed. Because Kim and Goss describe similar receiving systems and the technique is already being used in Goss’s receivers, this would have been easy for a POSITA to do and this combination would have provided numerous obvious benefits.

330. A POSITA would thus be both motivated and able to combine Kim and Goss with an expectation of success.

2. Claim 10: The method of claim 1, wherein the alert is duplicated and rendered at a higher volume.

331. Kim in view of Goss discloses “*the alert is duplicated [e.g., retransmitted] and rendered at a higher volume [e.g., by control 70].*”

332. Goss discloses “repeatedly transmitting an alert message on a periodic basis while said broadcast message is transmitted.” Ex[1010], 11:26-29. This is done because “[b]roadcast announcement messages [*alerts*] may be retransmitted [*duplicated*] from time to time to alert users who did not receive the message when first transmitted.” *Id.*, 6:4-7.

333. A POSITA would be able and motivated to combine this functionality with the Kim system. For example, Goss’s retransmitted messages would be received by the antenna and broadcast signal receivers in the Kim system. These signals would then be processed by controller 70 which results in *increasing the volume of the alert* as previously discussed. §IX.F.2.

334. Therefore, Kim in view of Goss renders *duplicating the alert and rendering it at a higher volume* obvious.

X. SECONDARY CONSIDERATIONS

335. During prosecution of the ’664 Patent, the applicant did not identify any evidence of secondary considerations of non-obviousness tied to the claimed invention of the ’664 Patent. I understand from counsel for Petitioner that Patent Owner in the co-pending district court litigation has not identified any evidence with

respect to secondary considerations of non-obviousness. I am aware of no evidence of secondary considerations that would meaningfully rebut a finding of obviousness.

336. Accordingly, there is no objective evidence of non-obviousness that might warrant a finding that Claims 1-20 are patentable. To the extent Patent Owner at a later date cites or provides any other evidence regarding secondary considerations, including any expert opinions, I reserve the right to supplement my analysis and opinions to address it.

XI. CONCLUSION

337. For at least the above-described reasons, in my opinion, Claims 1-20 of the '664 Patent would have been obvious to a POSITA based on the prior art references that I have cited and analyzed above.

338. In signing this declaration, I recognize that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross-examination in the case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

339. I reserve the right to supplement my opinions in the future to respond to any arguments raised by Patent Owner and to consider any new information that becomes available to me.

340. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further 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.

Executed in St. Louis, Missouri,
on August 21, 2023.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "David Hilliard Williams", written in a cursive style.

David Hilliard Williams

Appendix A

David Hilliard Williams

203-423-9015; dwilliams@LBSGlobe.com; www.E911-LBS.com

Expertise

- Location-Based Services (LBS)
- GPS Systems; Network-Based Location Determination Systems
- Wireless 911 (E911); NG911 Technology, Processes, Operations, and Funding
- Internet of Things (IoT); Edge Computing; Real-Time Location Systems (RTLS)
- Non-Cellular/Indoor/Sensor-based Location Systems, including: RFID, Wi-Fi/WPS, BLE/Bluetooth, Beacon-based RTLS; NFC/DSRC; RF Fingerprint systems; Wearable systems; Hybrids/Combinations
- Expert Witness Litigation Support, Patent/Intellectual Property Services
- GPS/Cellphone Criminal and Civil Matter Forensics, using CDRs, RTT, PCMD, NELOS, EVDO, Geotab, Paraben, CellHawk, and Cellebrite
- Accident/Incident Reconstruction
- Internet of Things (IoT) Ecosystem (Sensors, Identification, Verification, Authentication, Interfaces, Edge, Network, Cloud, Data Network Management, Data Management, Analytics, Network Topologies, Integration)
- Location & IoT Data Privacy and Security; Location Sharing Policies, Systems/Methods; Device/User ID, Verification, Authentication
- Sensor Design; Sensor System Architecture and Interface Design; Sensor Arrays
- Wireless Communications Standards, e.g. Bluetooth/BLE, Zigbee, Wi-Fi, WPAN, etc.
- Microcontroller Design, Sensor Controls Design, IoT Design/Systems Integration
- Channel, Bandwidth Management; Network Design; Path Loss Management
- Location Data Aggregation, Anonymizing
- LIDAR/Radar Data Sourcing; Crowdsourcing
- Indoor Positioning & App Ecosystem Design
- Artificial Intelligence (AI), Machine Learning, Virtual/Augmented Reality in Mobile Apps
- Short/Longer-range Positioning Technologies
- LBS and IoT Enterprise/Consumer Product & Technical Strategy, Design and Buy/Build
- Mobile Devices/Systems Power Management
- Internet of Things (IoT), Cellular IoT (LTE-M, NB-IoT), LAN/PAN (WiFi, BLE), LPWAN (Sigfox, LoRaWAN, Mesh (Zigbee, RFID), Consumer/Industrial/Commercial/Govt. IoT
- Home, Office, and Industrial Automation System Design and Integration; Control System Design, including Remote Management, Monitoring, and Control; User Interface Design (visible, audible, tactile, virtual, augmented, context-sensitive, GUI-based, directional, wearables, implants, holographic, others)
- Health, Wearables Monitoring & Tracking
- Safety and Security, Surveillance Systems, Home Energy Management Systems
- Smart Card/Wallet/Purse, Contactless Payment Systems (e.g. Google Pay); SEs.
- Mobile Resource Management (MRM) Tracking and Management; Vehicle, Drone, Fleet/ELD/AOBRD, Worker/Driver, and Freight/Trailer & Asset Tracking/Mgmt.
- Telematics; ITS, Vehicle/Engine/ECM, PGN/SPN Tracking/Monitoring, V2V, V2I, V2N, Vehicle Communications Networks and Operating and Analytics Ecosystems including SAE standards (J1939, CAN, etc.)
- Connected Cars/Autonomous Vehicles (AV)
- Navigation Systems; PNDs; Geofencing; Route Optimization; Infotainment Apps/Interfaces
- Location-Based/Dependent Advertising, Search
- Map Data, Digital Mapping, Media/Advertising Interfacing/Management, GIS, & IoT IT
- Mobile Social/Business Networking;
- Location/Context-Centric Enterprise Process Reengineering, Integration, & Interoperability
- SMART location, Home, Wearables; SMART Buildings, Cities; All forms of location-related alerts, notifications, alarms; Barcodes, QR Codes
- Context/Presence-Based LBS and IoT; AI-based context determination and utilization
- M2M, Smart Grid/Energy Systems
- Engineering, Network, and IT Process Design and Organizational Capabilities Assessment
- LBS Big Data and Cloud Computing
- AI, MV, VR/AR Context/Location Integration

Professional Summary

David Hilliard Williams is an internationally-known expert in the wireless/mobile location and Internet of Things (IoT) fields and President and Founder of E911-LBS Consulting and E911-LBS Forensics Engineering, LLC. He specializes in wireless and IoT-based product and technology development and implementation, as well as Intellectual Property (IP)/patent and forensics litigation services involving technologies such as Global Positioning Satellite (GPS) systems; Network-based location determination technologies such as TDOA, ECID, and AFLT; Wireless 911 (E911) and Next Generation 911; Real-Time Location Systems (RTLS) including Radio Frequency Identification (RFID) systems, Wi-Fi-based positioning systems (WPS), BLE/Beacon-based location systems, Bluetooth, Near Field Communications (NFC), and alternative RTLS (Ultrasound, Infrared); Wearable Tags/Sensor tracking systems; Zigbee/Mesh networks; Pattern Matching; and various hybrids and combinations, as well as a broad array of IoT sensors and other systems, network (wireline and wireless, all generations), user interface, and technology enablers for management, monitoring, tracking, and control purposes, including in remote control/distributed ecosystems and associated use cases.

Mr. Williams is expert in the full range of business and consumer location-based services (LBS) and IoT applications enabled by these technologies, including safety, security, and intruder detection/monitoring, energy management, vehicle/fleet tracking/management, telematics and vehicle/engine/component/driver monitoring and analytics, local search, navigation systems, presence/context-aware apps, mobile resource management, asset and freight management, wearable tags/sensors, financial/mobile wallet, mobile hospitality/POS systems, supply chain management, family tracking, mobile social and business networking, proximity-based entertainment and leisure, gaming, and intelligent transportation systems.

Mr. Williams has extensive expertise in all aspects of LBS and IoT delivery across the mobile and IoT ecosystems including enabling sensors, network communications, location determination technologies, geofencing design, map data, location data/database management, geospatial platform/Geographical Information Systems, GPS and other chipsets, data management, control system design, remote management/utilization of such control systems, and device, infrastructure and integration provider integration and management. Mr. Williams has developed and implemented industry-leading product and technology solutions for numerous LBS and IoT applications and markets and provides consulting and research services to some of the leading carriers and enterprises in the U.S., Asia, and Europe. His client list includes Apple, AT&T, BJ's Wholesale Club, Draft Kings, Ecobee, Ericsson, FedEx, GE, Geotab, Green Mountain Grill, Google, Heil, the Houston Police Department, HP/Aruba, the L.A. County District Attorney's Office (both prosecution and public defender), Lyft, Macropoint, Motorola, Nextel, NAVTEQ, Overhead Door, Peschke, Prova, Qualcomm, Samsung, Snap, Sprint, Target, Toyota, Twilio, Verizon Wireless, VIVINT, Volkswagen, Zillow, and ZIM.

Mr. Williams has successfully served as an expert for plaintiffs, prosecutors and defendants in patent, ITC, and criminal litigation (including assisting State Public Defender entities including California, Florida, Maryland, New York, and Tennessee), as well as both sides of civil trade secrets, product liability, fraud, and other litigation. He has been deposed 35 times

and has testified 11 times, including [successfully](#) in The Eastern District Court of Texas (winning both infringement and invalidity matters), and in [winning](#) in ITC Court. In total he has provided expertise in matters involving over 225 patents and over 50 criminal and civil matters. His credentials in wireless/mobile/IT technologies and associated applications, infrastructure, systems, and enablers are established to the 1980s.

Mr. Williams is expert in smart location technology issues in the Internet of Things (IoT), telematics, and connected/driverless car fields, particularly in their utilization of sensor, location and context information through the practical envisioning and design of: consumer/enterprise use matters and associated application and user interface design; sensor design and deployment strategies; process (re)engineering; IT integration; data aggregation, segmentation, analysis, and management; scalability; and security and privacy issues, requirements, collaboration structures, and ongoing management. He is expert on Big Data, data mining/analytics, and emerging Artificial Intelligence issues associated with location, context and IoT data, as well as its potential usage in the criminal forensics field.

With nearly forty (40) years in location, networking/communications, control, and information technology solutions design, selection, implementation and ongoing management, Mr. Williams has extensive experience in the activities and issues needed to get applications to market, including planning and design at the application, system, interface/integration, network, IT, operational and customer facing levels. He has been published and quoted by leading magazines and newspapers about mobile services, including The New York Times, CBS News.com, The Columbus (Ohio) Dispatch, The Boston Globe, Computerworld, Directions Mag, Mission Critical Communications, Popular Mechanics, and RFID Journal. Mr. Williams has authored five books on wireless location, including *The Definitive Guide to IoT Sensors (In Development)*, *The Definitive Guide to GPS, RFID, Wi-Fi, and Other Wireless Location-Based Services (two versions, third in development)*, *The Definitive Guide to Wireless E911*, and (co-authored) *The Definitive Guide to Mobile Positioning and Location Management*. Mr. Williams has authored dozens of research reports, and tracks and analyzes leading companies in the LBS, IoT, and public safety industries particularly with respect to their product and technology strategies, competitive capabilities and implementation issues. He is expert on all public policy and technology issues related to emergency services/public safety, location data privacy and security, and LBS and IoT privacy protection policies, systems, and support infrastructure. He opines on location privacy issues in various forums. He is the sole or named inventor on nine (9) patents involving mobile location and context, sensors, IoT, and various other technologies and associated methods, with 10 pending.

Employment History

From:	2002	E911-LBS Consulting; E911-LBS Forensics Engineering (2015+)
To:	Present	
Position:	<i>President and Founder</i>	
	Provides services across the entire wireless value chain, particularly with respect to technology and business strategic planning and product design, development, implementation, and ongoing management and operations, plus specialized services such IP/Patent litigation associated with Location Based Services and applications, GPS, E911, IoT,	

RTLS, RFID, Wi-Fi, NFC, BLE/Bluetooth, beacons, & other location technologies and associated ecosystems. Projects include:

- Provided expert witness, technical consulting, and research analysis services with respect to location-based services-related intellectual property/patent protection, licensing, and litigation (details in separate litigation support section).
- Provide forensics expertise in examination of mobile location-related events and associated data for civil and criminal matters (both prosecutor/plaintiff and defense entities).
- Developed, implemented, managed, and marketed a portfolio of LBS applications and broader offers for leading North American wireless carrier. Responsible for all dimensions of product lifecycle and associated budgets. Work included the development and launch of several LBS applications including mobile social networking, family tracking, local search, 411 w/ location, and mobile worker, fleet, and asset management. Location technologies utilized include GPS, Wi-Fi positioning, RFID, Bluetooth, Cell ID (CID), ECID, and TDOA. Worked extensively with network engineering to troubleshoot/refine new location-determination infrastructure to address/improve location accuracy, privacy and security issues.
- Conducted geofencing accuracy compliance analysis for ride-sharing company auditing their driver airport compliance record. Involved extensive use of JSON/GeoJSON records.
- Conducted comprehensive technical and intellectual property analysis of Real-Time Location Systems (e.g. RFID, Wi-Fi Positioning, Bluetooth, Infrared/Ultrasound, Others) market for European client looking to assert location-related patents.
- Provided technical guidance for mobile payments/wallet startup utilizing RFID, NFC and other technologies as key location enablers. Identified key issues and redeveloped successful patent application after initial USPTO rejection.
- Conducted technical and intellectual property analysis for Fleet Management/Telematics operator and service provider assessing potential infringement candidates.
- Conducted market research and developed market research on Telematics industry, both overall as well as tailored for specific auto manufacturers.

- Conducted analysis of location aggregation market for client interested in acquisition in that industry space.
- Ghost-wrote comprehensive study on Traffic data collection, processing, and reporting technologies, markets, and associated companies on behalf of ABI Research.
- Provided E911 consulting expertise in support of new spectrum regulatory approval and technical implementation issues for startup carrier.
- Managed the design, collection, and analysis of E911 infrastructure deployment of western region of major wireless carrier. Data collected focused on technical issues associated with TDOA (Time Difference of Arrival) technology implementation, and collection and reporting of location accuracy data for FCC reporting purposes.
- Developed the site map and primary content for the NAVTEQ (now HERE) Network for Developers (N4D) LBS web ecosystem – <http://developer.navteq.com>. Responsible for designing and managing the site map and overall content, identifying key contributors and materials, and utilizing a variety of fragmented information to develop broad and deep technical, digital media and business content to assist various expertise levels of application developers and business management to become intimately familiar with map data, GIS platforms, and LBS applications and underlying technologies and to provide the information and guidance to successfully develop and launch their LBS applications.
- Managed the development of the Nextel (now Sprint/T-Mobile) Location-Based Services strategy. Efforts included market and technical analysis of likely LBS offerings and integrating those findings with Nextel's broader wireless voice and data strategies. Work included prioritizing applications based on focus group findings, business matter attractiveness, ease of implementation, impact on network infrastructure, and synchronization and integration with GPS terminal and E911 mandate rollout plans. Managed network engineering and consulting team to design network modifications to best support the additional demands of LBS applications and underlying bandwidth-consuming digital media content. Product strategy including researching and incorporating context-aware/presence concepts into product/device and network engineering plans.
- Developed navigation platform strategy for major international

auto manufacturer. Assessed direction and technology requirements of in-car and portable navigation device (PND) technologies; developed strategy for in-car navigation platform.

- Developed numerous LBS company research reports using proprietary multi-point “report card” addressing numerous business and technology strategy dimensions and issues.
- Authored multiple books on wireless location, including *The Definitive Guide to IoT Sensors and IoT Use Cases (In Development)*, *The Definitive Guide to GPS, RFID, Wi-Fi, and Other Wireless Location-Based Services (2005/2009 versions, new version in development)*, *The Definitive Guide to Wireless E911*, and (co-authored) *The Definitive Guide to Mobile Positioning and Location Management*.
- Advised numerous small companies and startups such as i360Hygiene, LOCAID, Finder Technologies, Orion GPS, and XYVerify on LBS-related issues to enhance value propositions on business, product and technology dimensions to enhance attractiveness to potential investors/acquisition candidates.

From: 2009 **AT&T Mobility**

To: 2010

Position: *Senior Product Manager – Enterprise LBS*

Led the development, implementation, and marketing of numerous enterprise location-based services across all sales, marketing and operational channels. Work included responsibility for all dimensions of product lifecycle and associated budgets. Products managed included telematics, fleet/vehicle management, asset/freight management, and mobile resource management GPS/LBS apps on a variety of platforms such as Telenav. Played key role in design of company-wide location services product and implementation roadmap.

From: 2007 **AT&T Mobility**

To: 2009

Position: *Consumer LBS Product Realization Manager (Consultant)*

Responsible for the design, development, implementation, and ongoing lifecycle management of several high-profile Consumer LBS applications and associated operational support. Overall application design and implementation responsibilities included AT&T FamilyMap, Loopt Mobile Social Networking, 411 with location, Slifter Local Search, and CaddyHawk Game systems. Work included design, troubleshooting, and implementation of AT&T location-related network, application, user interface, digital media and content delivery, and privacy infrastructure and associated issues such as accuracy and privacy (efforts resulted in patent co-invention).

From: 1993 **Accenture**
To: 2002
Position: *Associate Partner - Communications & High-Technology Strategy; Information & Technology Strategy practices*
Responsible for development of wireless location practice. Led development of business, technology, and product strategies for numerous communications and technology-centric companies looking to enter new markets. Specialized in new product design, development, and implementation, as well as network infrastructure design need to support next generation, high bandwidth-consuming digital media content and associated infrastructure. Efforts included assisting AT&T (re)enter local service, (then) Bell Atlantic launch long distance services, (then) GTE design and implement Intelligent Network and High Value Network services, Nextel (later part of Sprint, and now T-Mobile) develop their location-based services product strategy and enabling network and IT architectures, and Omnipoint (later part of T-Mobile) network integration strategy, as well as leading the design and implementation of voice and data communications networks and associated data management capabilities in numerous industries including communications, computer, transportation, hospitality/retail, energy, agriculture, and banking/financial services. Worked with utilities such as Ameren, Georgia Power, and Duke Energy to identify strategic opportunities utilizing technology and communications in utility-associated infrastructure and other capabilities.

From: 1991 **Booz Allen & Hamilton**
To: 1993
Position: *Senior Associate – Information Technology Practice*
Provided and led consulting services for communications industry and other Information Technology-intensive companies in developing technology strategies for addressing new marketing opportunities and internal operational issues.

From: 1987 **Deloitte Consulting (Originally Touche Ross)**
To: 1991
Position: *Senior Manager*
Provided consulting services for technology-intensive companies in developing business and product strategies for addressing new marketing opportunities and internal operational issues.

From: 1983 **Hughes Aircraft Company**
To: 1985
Position: *Electrical Engineer – Radar Development*
Microcomputer and digital system design engineer on the F-15 fighter radar system as part of analog to digital platform conversion and associated tracking and control systems design. System involved

designing multi-microprocessor-based system to interface to/with wide array of on-board, ground control, and other in-flight communications/control sensors/sensor arrays and systems.

Litigation Support Experience

- | | | |
|----------|-----------|--|
| Date: | 2023 | Baker Botts |
| Matter: | | Tile |
| Project: | | Providing expert consulting, support, analysis, and declarations for IPR matter for patent involving systems and methods for finding lost or stolen property. Deposition. |
| | | |
| Date: | 2023 | Buchanan |
| Matter: | | Google |
| Project: | | Providing expert consulting, support, and declarations for 6 patents/4 groups involving indoor/outdoor location, signal strengths, rf fingerprinting and grid point analysis; use of network calibration data in location determination; and incorporating path loss with calibration, fingerprinting, and location determination/ |
| | | |
| Date: | 2023 | Jenner & Block LLP |
| Matter: | | Uber |
| Project: | | Providing expert consulting, support, and declarations for matter involving Taxi/ride sharing systems and methods. |
| | | |
| Date: | 2022-2023 | Vorys |
| Matter: | | BJ's Wholesale Club |
| Project: | | Providing expert consulting, support, and declarations for matters involving location-related in-store ordering, fulfillment, and customer service aspects of e-commerce and m-commerce services. Deposition. |
| | | |
| Date: | 2023 | Wilson Sonsini |
| Matter: | | Rocateq |
| Project: | | Provided expert consulting, support, and declaration work involving connected shopping cart technology and applications IP. |
| | | |
| Date: | 2023 | Finnegan, Henderson, Farabow, Garrett & Dunner, LLP |
| Matter: | | Google |
| Project: | | Providing expert consulting, support, and declarations for IPR matters directions, video, wearables/spatial orientation detection. |
| | | |
| Date: | 2022-2023 | Kilpatrick Townsend & Stockton LLP |
| Matter: | | Apple |
| Project: | | Provide expert consulting, support, and reports for IPRs, invalidity and non-infringement proceedings involving eight (8) patents involving sharing of location information between multiple devices |

for a variety of use cases. Six IPRs instituted and in process.
Depositions (2 covering 6 IPRs).

- Date: 2022-2023 **Venable LLP**
Matter: Verizon Wireless dba Cellco Partnership
Project: Provide expert consulting, support, and declaration for IPR matters involving georeferencing and specialty messaging techniques.
- Date: 2022-2023 **Hall Griffin**
Matter: Ben's Asphalt
Project: Provided technical expertise in assessing technical aspects of telematics breach-of-contract lawsuit. Successfully settled.
- Date: 2022-2023 **Wolf, Greenfield & Sacks, P.C.**
Matter: Snap
Project: Providing expert consulting, support, and report for IPR matter involving social-based location, mapping, matching, and display technologies. Deposition.
- Date: 2022-2023 **Dreifuss Bonacci & Parker**
Matter: Pacific Controls Inc.
Project: Providing expert consulting, report, and testimony in regards to contractual dispute between Telematics Service Provider and equipment manufacturer. Deposition and Testimony (SDNY).
- Date: 2021-2022 **Greenberg Trauig**
Matter: HP Enterprises, Aruba
Project: Providing expert consulting, report, and testimony in support of non-infringement and invalidity analysis in EDTX matter involving beacons/beaconing technologies, methods, and associated systems. Depositions (2).
- Date: 2021-2023 **Keker, Van Nest & Peters LLP**
Matter: Google, Ecobee, and VIVINT (v. Ecofactor) (WDTX)
Project: Provided/ing expert consulting, report, and testimony in support of invalidity analysis involving HVAC remote monitoring and control and associated sensors, systems, and communications capabilities. Deposition and Testimony; VIVINT trial pending.
- Date: 2021-2022 **Baker Botts**
Matter: Lyft (multiple matters)
Project: Providing expert consulting, support, and report for matters involving location-related applications technologies including GPS, Bluetooth, Wi-Fi positioning, RFID, and road sensors/readers.
- Date: 2022 **Winston & Strawn LLP**
Matter: ZIM Integrated Shipping

Project:	Provided expert consulting in EDTX invalidity and non-infringement case involving method and apparatus for shipping information patents.
Date:	2020-2021 Lowe Graham Jones
Matter:	Green Mountain Grill (IoT Connected Grill) (ITC Court)
Project:	Provided expert consulting, report, and testimony in ITC case involving Internet of Things (IoT), remote monitoring and control, cloud services, and various short-range communications technologies. Involves non-infringement, DI, Invalidity, and Inventorship. Deposition and Testimony.
Date:	2021 Munger, Tolles & Olson LLP
Matter:	Google
Project:	Provided expert consulting and support for EDTX matter involving invalidity/non-infringement of smart cards and payment systems and associated capabilities such as Secure Elements.
Date:	2021 Jackson Walker L.L.P.
Matter:	Prova
Project:	Provide expert consulting, support, and report for IPR involving buyer verification/tracking and inventory management/tracking utilizing RFID technology.
Date:	2020-2023 Latham & Watkins LLP
Matter:	Overhead Door (OHD-Garage Door Manufacturer) (ITC Court)
Project:	Provided expert consulting, report, and testimony in ITC case involving Internet of Things (IoT), remote monitoring and control, and various short-range communications technologies. Deposition and Testimony in ITC court. Support in Customs and Enforcement.
Date:	2020-2021 Ropes & Gray LLP
Matter:	Target
Project:	Providing expert consulting, support, and report for IPRs for several patents involving short-range communications technologies and associated identification and location determination methods and techniques including Bluetooth, RFID, and Wi-Fi. Depositions seven (7) involving nine (9) patents.
Date:	2020-2022 Baker Botts
Matter:	Draft Kings
Project:	Providing expert consulting, support, and report for IPRs for several patents involving validating gaming customers location in appropriate online gaming jurisdictions/geofencing. Depositions (2)
Date:	2020 Baker Botts
Matter:	Lyft

Project: Provided expert consulting, support, and report for IPRs involving Intelligent Transportation systems, geofences, and location technologies including GPS, Bluetooth, Wi-Fi positioning, RFID, and road sensors/readers. Deposition.

Date: 2020-2023 **Finnegan & Henderson**
Matter: Google (3)
Project: Providing expert consulting, support, and report for IPRs involving user experience sharing, software registration, and device/user tracking involving a variety of location technologies.

Date: 2019-2023 **Lynch Thompson LLP**
Matter: Heil
Project: Providing technical/engineering expertise in trade secrets matter involving Internet of Things, RFID, Telematics, Vehicle Sensors, & Big Data for waste vehicle manufacturer. Deposition.

Date: 2018-2020 **Lawgivers (Trinidad and Tobago)**
Matter: A&V Oil and Gas
Project: Provided expert support, report, and testimony in arbitration matter involving government of T&T. Focused on (in)accuracies of GPS-based vehicle tracking system relative to a variety of key events. Testimony at trial.

Date: 2019-2020 **Perkins Coie**
Matter: Zillow
Project: Provided expert support, report, and deposition for non-Infringement matter for major real estate services firm and associated subsidiaries involving a wide array of location determination technologies on smartphones.

Date: 2019-2020 **Baker Botts**
Matter: Lyft
Project: Provided expert support, report, and deposition in support of Claim Construction brief associated with non-infringement matter.

Date: 2016-2021 **Sterne Kessler Goldstein Fox**
Matters: Google (Multiple matters); Google (Nest, Multiple matters)
Projects: Providing expert support, reports, and deposition for several IPRs of location/context-related patents on behalf of leading Internet services company utilizing a wide variety of communications and location technologies.

Date: 2013, **XYVerify (3)**
2019/2020 Patent Re-Submission and Approval; Patent Application Creation
Projects: (Re)wrote patent applications for LBS/financial verification system using multiple location determination methods including RFID,

Bluetooth, WPS, and GPS. Efforts enabled patents to be approved after initial rejection by USPTO.

Date: 2013-2023 **Civil and Criminal Forensics**
Matters: Various
Project: Provided/Providing cellphone, vehicle/telematics, specialty device, and computer-based location forensics expertise in over 50 criminal and civil matters involving numerous location determination technologies and associated applications and systems. Criminal matters include homicide, attempted murder, assault (multiple types), arson (building and land), armed robbery, breaking and entering, assault (various types), and property crime. Civil matters include trade secrets, product liability, accident liability, fraud, contract disputes, and employment matters.

Applications/Platforms for criminal and civil forensics analysis include cellular records, 911 records, Facebook/Instagram/Messenger/social media apps, Google/search, Google tracking apps (e.g. Timeline, others), vehicle tracking systems, specialty GPS (e.g. GPS ankle bracelets, specialty devices) surveillance and safety systems, smart home systems, aviation, vehicle infotainment systems, and connected cars, Expert/knowledgeable in numerous forensic technologies, tools, and accident/incident reconstruction methods including CDR, NELOS, PCMD, RTT, EVDO, Cellebrite, Paraben, Google Earth/Timeline, and Hawk Analytics/CellHawk, as well as specialized knowledge on iOS and Android smartphone location determination techniques and data collection, analysis, and management of all types including KML/KMZ, (Geo)JSON, CSV, (E)WKT/WKB, Shapefile, ESRI, and other GIS vector/raster systems, technologies, formats, and models.

Date: 2019 **Sterne Kessler Goldstein Fox**
Matter: Volkswagen
Project: Provided expert support for IPR involving Location-Based Messaging in automotive related use matter/environments.

Date: 2017-2018 **Finnegan & Henderson**
Matter: Fed Ex
Project: Provided expert support, consulting, reports, deposition, and trial testifying for infringement and district court invalidity proceedings on behalf of leading transportation/shipping company in The Eastern District Court of Texas. Deposition and Testimony.

Date: 2017-2018 **Polsinelli**
Matter: Uber
Project: Provided expert support and reports for Trade Secrets matter involving major shared transportation provider.

Date: 2017-2018 **Renner Otto**
Matters: Macropoint; Timekeeping Systems Inc.
Projects: Providing consulting, expert services, report and deposition in invalidity matters for transportation and employee tracking patents.

Date: 2016-2018 **Paul Hastings**
Matters: Samsung (2 matters)
Project: Provided expert services for Inter Partes Review (IPR) of multiple location, safety, and security patents on behalf of major telecommunications equipment and services provider.

Date: 2016-2017 **European Firm**
Matter: Patent Infringement/Claim Chart Analysis
Project: Provided consulting, market analysis, and claim chart development for patent holder involving RTLS-related repeater technologies, particularly using WPAN/Zigbee networks.

Date: 2016-2017 **Baker Botts**
Matter: Twilio
Project: Provided location/E911-related expert services, report, and deposition for IPR of mobile registration patent on behalf of Voice & Video, Messaging, and Authentication APIs provider.

Date: 2016 **Los Angeles District Attorney's Office**
Matter: People v. Dawud Abdulwali
Project: Provided expert services on location technologies used to identify and trace accused arsonist on behalf of L.A. District Attorney's (Prosecutors) office.

Date: 2016-2017 **Fitzpatrick, Cella, Harper & Scinto**
Matter: Geotab
Project: Providing expert support, reports, and deposition for infringement defense of multiple asserted patents on behalf of fleet management/telematics provider in EDTX.

Date: 2015-2016 **The Ogg Law Firm PLLC**
Matter: City of Houston Police Department
Project: Provided expert services/testimony regarding veracity of Automatic Vehicle Locator (AVL) systems in officer suspension matter.

Date: 2015-2016 **Sterne Kessler Goldstein Fox**
Matter: VIVINT
Project: Providing expert support, reports, and deposition for IPR involving several location-related patents for home security/energy company.

Date: 2015 **Hogan Lovells**
Matter: Apple

	Project:	Provided expert support for multiple location-related patent Inter Parties Review (IPR) and infringement proceedings for leading mobile platform, application and services provider.
Date:	2015	Thompson Hine LLP
	Matters:	Macropoint
	Project:	Provided expert support for patent litigation efforts involving fleet management devices, software, and services.
Date:	2013-2014	Williams & Connolly
	Matter:	State of Maryland
	Project:	Provided expert services in assessing validity of GPS tracking bracelet/system in parole violation matter.
Date:	2013-2014	Cravath, Swaine & Moore
	Matter:	Qualcomm
	Project:	Provided expert litigation support, technical consulting, and advisory services in Anti-Trust matter regarding location services technologies, platforms, and standards.
Date:	2014	Patterson Thuent Pedersen, P.A.
	Matter:	Kaspersky Internet Security
	Project:	Provided expert litigation support and technical consulting in patent countersuit involving internet security services.
Date:	2014	Sullivan & Cromwell LLP, others
	Matter:	Peschke
	Project:	Provided expert support and technical consulting in location services infringement patent dispute involving interactive mapping applications. Effort included providing deposition testimony.
Date:	2012-2013	Covington & Burling
	Matter:	Samsung (ITC Court)
	Project:	Provided expert litigation support and technical consulting and advisory services in International Trade Commission matter.
Date:	2011-2013	Connolly Bove Lodge & Hutz
	Matter:	Enovsys
	Project:	Provided expert litigation support and technical consulting and advisory services for pursuit of LBS patent royalties and infringement settlements.
Date:	2011-2013	Voxson
	Matters:	Various
	Project:	Provided expert litigation support and technical consulting and advisory services for pursuit of E911 and LBS patent infringement royalties and settlements.

Date: 2010-2012 **Morrison & Foerster LLP**
Matter: Cellco Partnership (dba Verizon Wireless)
Project: Provided expert advisory and report services in support of IPR re-examination process of E911 and LBS patents.

Date: 2011-2012 **Dovel & Luner**
Matter: TrackBeam
Project: Provided market/technical consulting, expertise and research analysis of LBS patents to identify potential licensing candidates.

Date: 2011 **SNR Denton**
Matter: Wavemarket
Project: Provided market and technical consulting and advisory services for defense of LBS patent lawsuits.

Date: 2010 **State of New Jersey**
Project: Provided wireless location consulting expertise in development of economic growth strategy for State of New Jersey.

Date: 2007-2008 **General Electric**
Project: Provided consulting research and guidance on LBS and E911 technology, GE-owned patents, prior artwork, technology direction.

Education

<u>Year</u>	<u>College/University</u>	<u>Degree</u>
1987	The University of Texas at Austin (1 st in graduating class)	MBA, Information Systems Management
1983	Purdue University, West Lafayette, Indiana (Top honors; Tau Beta Pi, Eta Kappa Nu)	BSEE, Digital System Design emphasis

Patents

- "Method and apparatus for providing mobile social networking privacy." (U.S. Patent Number 8,613,109, issued on December 17, 2013).
- "Systems and methods of using wireless location, context, and/or one or more communication networks for monitoring for, preempting, and/or mitigating pre-identified behavior." (U.S. Patent Number 10,477,342, Issued November 12, 2019).
- "Systems and methods for monitoring for and preempting pre-identified restriction violation-related behavior(s) of persons under restriction." (U.S. Patent Number 10,497,242, Issued December 3, 2019).
- "Systems and methods for providing location-based security and/or privacy for restricting user access." (U.S. Patent Number 10,555,112, Issued February 4, 2020).
- "Systems and methods for developing, monitoring, and enforcing agreements, understandings, and/or contracts." (U.S. Patent Number 10,853,897, Issued 12/1/2020).

- “Systems and methods for monitoring for and preempting pre-identified restriction violation-related behavior(s) of persons under restriction.” (U.S. Patent Number 10,861,307, Issued December 8, 2020).
- “Systems and methods for monitoring for and lowering the risk of addiction-related or restriction violation-related behavior(s).” (U.S. Patent Number 11,388,546, Issued July 12, 2022).
- “Systems and methods for monitoring for and preempting the risk of a future occurrence of a quarantine violation.” (U.S. Patent Number 11,412,353, Issued August 9, 2022).
- “Dynamic and adaptive systems and methods for rewarding and/or disincentivizing behaviors” (U.S. Patent Number 11,636,941, Issued April 25, 2023).
- Numerous other patents pending.

Publications

Books:

1. The Definitive Guide to IoT Sensors (In development)
2. The Definitive Guide to IoT Use Cases (In development)
3. The Practical Guide to The Internet of Things (IoT): Use Matters and Enabling Technologies (In development)
4. The Definitive Guide to GPS, RFID, Wi-Fi, and Other Wireless Location-Based Services (2 versions, plus version in development)
5. The Definitive Guide to Wireless E911
6. The Definitive Guide to Mobile Positioning and Location Management (Co-authored)

Articles/Quotations:

1. Medium.com (Predict). January 31, 2023. “ChatGPT and Its Impact on Criminal Forensics (and Criminals)”
2. Medium.com. October 3, 2022. “What if GPS Fails?”
3. Location Data Privacy posts/blog. Ongoing at www.E911-LBS.com.
4. Linked In. March 3, 2020. “Facial Recognition: Good, Bad, or Ugly?”
5. The Columbus Dispatch. February 17, 2017. “Experts: GPS monitors couldn’t save OSU student’s life”
6. E911-LBS.com. May 2012. “The Pacifier Generation – How Wireless is Impacting Our Society”
7. Nbizmag.com. Summer 2008. “How Will the Convergence of LBS Technologies Affect Business?”
8. Directions Magazine. November 30, 2005. “The Deadline for the E911 Mandate Approaches...Where Do Things Stand?”
9. Computerworld. May 23, 2005. “Beyond The Supply Chain: The Impact of RFID on Business Operations and IT Infrastructure”
10. RFID Journal. June 12, 2005. “IT’s Impact on RFID”
11. Directions Magazine. July 29, 2004. “The Strategic Implications of the Wal-Mart RFID Mandate”
12. Directions Magazine. February 25, 2004. “RFID-Hot Technology with Wide-Ranging Applications”
13. WirelessDevNet.com. 1/30/2003. “It’s The (Location-Based) Applications – Stupid!”

Languages/Tools

- C/C++, Java, Basic, Cobol, Fortran, Pascal, APL, Assembly, Python, Others
- CDR, NELOS, PCMD, RTT, EVDO, Cellebrite, Paraben, Google Earth/Timeline, Hawk Analytics/CellHawk, as well as specialized knowledge on iOS and Android smartphone location determination techniques.
- Data collection, analysis, and management of all types including KML/KMZ, (Geo)JSON, CSV, (E)WKT/WKB, Binary, Shapefile, ESRI, and other GIS vector/raster systems, technologies, formats, and models.

Associations and Achievements

- IEEE, NENA, APCO. Certified in Emergency Management Response (CERT)