UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Hytera Communications Co. Ltd.

Petitioner

v.

Motorola Solutions, Inc.,

Patent Owner

Patent No. 6,591,111 B1
File Date: December 10, 1999
Issue Date: July 8, 2003

Title: Group Radio Communication System and Method Using Interconnected Radio Sub-Networks

Case No. IPR2018-00176

PETITION FOR *INTER PARTES* REVIEW

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Petitioner Hytera Communications Corp. Ltd. requests *inter partes* review of claims 1, 6–7, 11–13, and 15–16 of the '111 Patent (Ex. 1001), currently assigned to Motorola Solutions, Inc.

I. Preliminary Statement

Motorola's '111 Patent claims well-worn group call technology taught in multiple references ranging from public standards to Motorola's own earlier, prior-art patents. To be sure, group call systems are nothing new. In fact, Motorola's commercially-available radio system (iDEN), ***on sale years before filing the '111 Patent***, is the exemplar "radio sub-network" for the claims at issue. As such, Motorola directed the '111 Patent claims to a group call system created by linking radio sub-networks together using nothing more than a ubiquitous "packet-switched network." That network, however, is so broadly claimed in the '111 Patent that it literally encompasses "the Internet."

Despite working with well-worn concepts, Motorola never cited the most relevant prior art, including its own patents, to the Patent Office. Worse, when the Examiner found a matching reference and rejected each independent claim, Motorola amended its claims to merely move ***where*** certain known radio components were located in its system, not ***what*** those components did or ***how*** they did it. While successful for prosecution purposes, reshuffling the components' locations yielded claims that are taught in multiple references that the Patent Office never had an opportunity to consider. *See KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 417 (2007) (claims that "simply arrange[] old elements with each performing the same function it had been known to perform" are obvious). Accordingly, the challenged claims of the '111 Patent are unpatentable, and the Board should institute *inter partes* review.

II. STATEMENT OF PRECISE RELIEF REQUESTED FOR EACH CLAIM CHALLENGED

Hytera requests *inter partes* review and cancelation of claims 1, 6–7, 11–13, and 15–16 of U.S. Patent No. 6,591,111 ("the '111 Patent") (Ex. 1001) based on the following prior art and grounds and the Declaration of Michael Davies (Ex. 1002).

A. Prior Art Patents and Printed Publications

Ex. 1003: U.S. Patent No. 6,301,263 to Mark Maggenti ("Maggenti"), filed on March 24, 1999 and issued on October 9, 2001, is available as prior art under pre-AIA 35 U.S.C. § 102(e).

Ex. 1004: U.S. Patent No. 5,398,248 to Robert Shepherd ("Shepherd"), filed on July 1, 1993 and issued on March 14, 1995, is available as prior art under pre-AIA 35 U.S.C. §§ 102(a) and 102(b).

Ex. 1005: U.S. Patent No. 5,987,331 to Gary W. Grube et al. ("Grube"), filed on November 20, 1996 and issued on November 16, 1999, is available as prior art under pre-AIA 35 U.S.C. §§ 102(a) and 102(e).

Ex. 1006: Patent Cooperation Treaty Publication No. WO 99/63773 to Martin Stubbs ("Stubbs"), published on December 9, 1999, is available as prior art under pre-AIA 35 U.S.C. § 102(a).

Ex. 1007: U.S. Patent No. 5,659,881 to James S. Kent ("Kent"), filed on March 11, 1994 and issued on August 19, 1997, is available as prior art under pre-AIA 35 U.S.C. §§ 102(a) and 102(b).

B. Statutory Grounds for Challenge

(1) Claims 1, 6–7, 11–13, and 15–16 are rendered obvious under pre-AIA 35 U.S.C. §103 by Maggenti in view of Shepherd.

(2) Claims 1, 6–7, 11–13, and 15–16 are rendered obvious under pre-AIA 35 U.S.C. §103 by Grube in view of Shepherd.

(3) Claims 1, 6–7, 11–13, and 15–16 are rendered obvious under pre-AIA 35 U.S.C. §103 by Stubbs in view of Kent.

III. BACKGROUND

The '111 Patent is titled "Group Radio Communication System and Method Using Interconnected Radio Sub-networks." Ex. 1001. Specifically, it "relates to independent radio sub-networks each of which implement point-to-multipoint communications within their domains and are coupled together through a group controller to form an overall network for point-to-multipoint communications." *Id.* 1:6–12.

In essence, the '111 Patent takes several well-known aspects of general communication systems and patches them together in an expected way to obtain an expected result. These core elements of the '111 Patent claims are:

- ***Radio sub-networks***: networks for point-to-multipoint communication between subscriber radios;
- ***Sub-network controllers***: routes communications into and out of a sub-network and resolves conflicts between communications in the sub-network;
- ***Converters***: converts incoming and outgoing communications of a sub-network to a proper protocol;
- ***Group controller***: routes communications between sub-networks; and
- ***Packet switched network***: a network that connects the group controller and sub-networks.

The '111 Patent ***itself*** describes each of these claimed components as routine and conventional. For example, the claimed sub-networks are described as "[c]onventional radio sub-networks" such as "those radio sub-networks used for dispatching purposes by police, fire and other civic organizations and by military and businesses," including Motorola's own iDEN networks that were in public use years before the ‘111 Patent was filed. *Id.* 3:36–32. *See also* Ex. 1008 (describing details of Motorola’s iDEN networks as of 1996). The claimed group controller is described only as “implemented using conventional computer technology (not shown), including, for example, a processor unit, a memory unit, a hard drive unit, I/O units such as video display, keyboard, mouse, and the like, and an interface.” Ex. 1001 3:65–4:3. The claimed packet-switched network is described as “provided by the Internet.” *Id.* 4:28–29. The claimed converter and controller are disclosed as having basic and generic components, arranged as typically known in the art. *Id.* Figs. 2–3, 4:51–5:36; Ex. 1002 ¶¶ 56–57.

The claims of the ’111 Patent do nothing more than cobble together conventional aspects of decentralized radio networks (where control is at the sub-network level) and centralized networks (having a central controller), both of which are described in many references, including Motorola’s earlier patents. *See KSR*, 550 U.S. at 417 (claims that “simply arrange[] old elements with each performing the same function it had been known to perform” are obvious). The claimed hybrid system and method provide no new or unexpected result and are obvious to one of ordinary skill in the art.

A. Background of the Technology and Prior Art

In a point-to-multipoint communication system, messages are communicated from one user to a plurality of users. Ex. 1002 ¶ 46. These systems typically connect multiple communication subsystems, referred to as "radio sub-networks" in the '111 Patent, each serving numerous subscriber radios. *Id.* The end users of these group communications systems are often police, EMS, or other first responders. Ex. 1001 3:28–29.

Group calls between these various subsystems generally begin with a subscriber in a first radio sub-network requesting to send a message (referred to as a "monolog" in the '111 Patent) to the other subscribers. Ex. 1008, at 18; Ex. 1002 ¶ 47. Depending on the group targeted for communication, the message can go to subscribers in the same radio sub-network, to another radio sub-network, or multiple sub-networks. Ex. 1008, at 18; Ex. 1002 ¶ 47. To facilitate communication between subsystems, a group controller is associated with each radio sub-network that manages the point-to-multipoint communication between subscribers. Ex. 1003 50–54; Ex. 1002 ¶¶ 49–50. For example, if a subscriber in a first radio sub-network wants to communicate with subscribers in a second radio sub-network, the group controller manages the message. *Id.*

There is also a radio sub-network controller associated with each radio sub-network and its affiliated subscriber radios. Ex. 1008, at 34 (mobile switching center or "MSC"); Ex. 1002 ¶ 48. The role of a radio sub-network controller is to manage communications within the radio sub-network. *Id.* In addition, group call systems typically include an arbitration or prioritization mechanism that resolves conflicts between concurrent requests from more than one subscriber or allows for emergency calls. Ex. 1008, at 58; Ex. 1003 3:66–4:11; Ex. 1002 ¶ 51. This conflict resolution feature can be located in either a centralized control location (e.g., the group controller) or a decentralized location (e.g., each radio sub-network). Ex. 1003 6:1–3; Ex. 1002 ¶ 51.

As group call technology developed, the need arose to connect geographically dispersed radio communication networks. Ex. 1005 1:39–49; Ex. 1002 ¶ 52. Doing so, however, required accounting for two issues: conversion between protocols and the methods for linking networks. Ex. 1005 1:56–65; Ex. 1002 ¶ 53. Rather than develop techniques in a vacuum, various bodies developed standards to connect mobile communications networks. These included Terrestrial Trunked Radio (TETRA) and Global System for Mobile Communications (GSM) developed in connection with the European Telecommunications Standards (ETSI), and Project 25 developed in connection with the Association of Public-Safety Communications Officials-International (APCO). Ex. 1005 5:48–53; Ex. 1002 ¶ 52.

At the same time these standards were being developed, network technology was also transitioning from circuit-switched infrastructure (analog) to packet-switched infrastructure (digital). Ex. 1002 ¶ 53. In simple terms, voice or data messages were converted to "packets" for transmission over packet switched networks. *Id.* These networks employed processors that routed these data packets. These packets, however, required conversion at one or more points in the network to be usable by communication networks of various types. *Id.* Thus, the resulting communications systems prior to the filing of the '111 Patent were adapting existing circuit-switched infrastructure to packet-switched technology. *Id.* This typically involved adding converters and packet-network controls to existing radio systems and allowed for communications between a variety of networks (e.g., land lines, the Internet, satellite data networks, etc.). *Id.*

B. The '111 Patent Discloses Conventional Parts Arranged in a Conventional Way

The '111 Patent has 17 claims. Three are independent. Petitioner is only challenging claims 1, 6–7, 11–13, and 15–16. Of the challenged claims, claims 13, 15, and 16 are method claims and the remaining claims are system claims.

Claim 1 is directed to a group radio communication system having:

- first and second radio sub-networks that implement point-to-multipoint communication sessions within their respective sub-networks;
- a group controller configured to manage a point-to-multipoint communication session that involves both sub-networks;

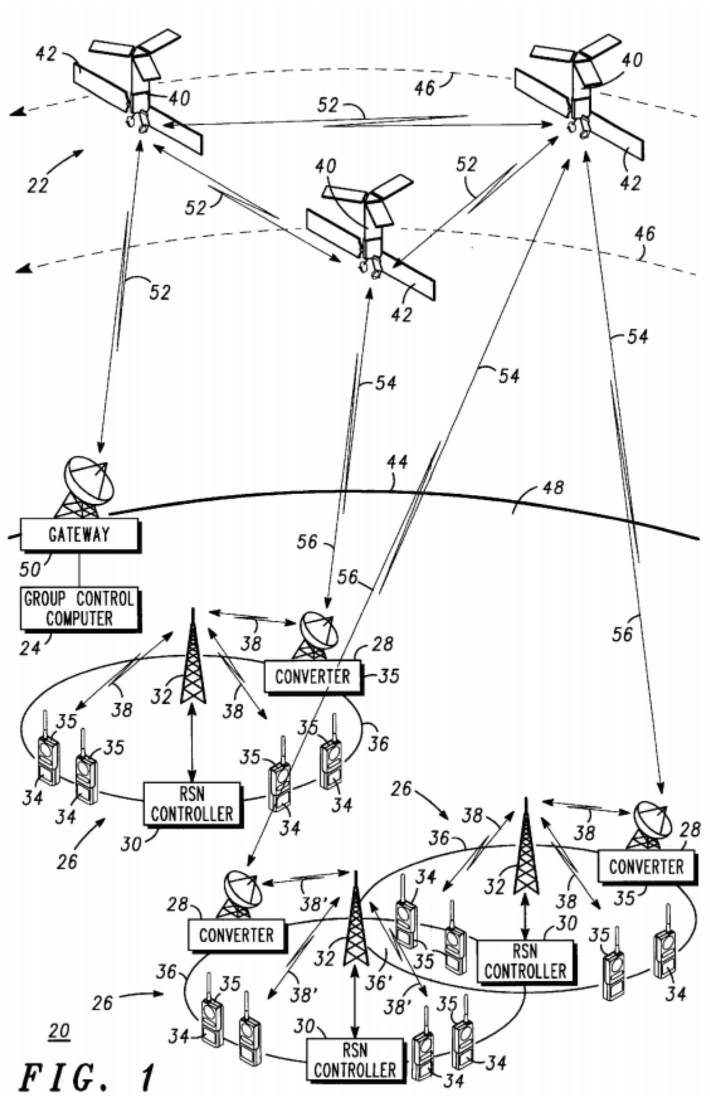
- a packet switched data communication network coupled between the first radio sub-network and group controller and between the second radio sub-network and group controller;
- a radio sub-network controller associated with each of the radio sub-networks and a plurality of subscriber radios in communication with radio sub-network controller, each radio sub-network controller being configured to resolve conflicts between substantially concurrent requests from subscriber radios within that radio sub-network.

Claims 6 and 7 depend from claim 1, and further recite the requirement that each of the radio sub-networks has a converter associated with it.

Claim 13 is directed to a method of implementing point-to-multipoint communication involving the network as recited in claim 1, and describes the routing of a "monolog" (call) from a subscriber in the first radio sub-network. Specifically, claim 13 requires:

- receiving a point-to-multipoint monolog from a subscriber;
- converting a monolog into packets for distribution through the packet switched data communication network and group controller; and
- transmitting the packets over the packet switched data communication network.

Figure 1 below illustrates a point-to-multipoint communication system according to the '111 Patent, and illustrates more than the required claim elements:



Ex. 1001 Fig. 1

While the '111 Patent is rife with figures and discussion about satellite data networks, none of the challenged claims require them. The data network described in the patent can either be satellite based or terrestrial—for example, "the Internet."

Ex. 1001 4:28–29. This demonstrates the sweeping scope of the claims to be reviewed.

The ’111 Patent tellingly admits that point-to-multipoint communication was well known and practiced by the “prior art.” *Id.* 1:15–23. For instance, the ‘111 Patent aims to connect “***conventional*** group radio systems” and that the claimed radio sub-networks “may be provided by substantially ***conventional*** radio sub-networks[,] which are configured to provide group or point-to-multipoint (PTM) communications.” *Id.* 3:12–15 (emphasis added). Motorola further acknowledges that these radio sub-networks encompass those already used by first responders: “Conventional radio sub-networks which would suitably serve as radio sub-networks 26 in group radio communication system 20 are those radio sub-networks used for dispatching purposes by police, fire and other civic organizations and by military and businesses.” *Id.* 3:26–32. Of critical importance, Motorola also admits that its branded communication networks, iDEN, are a prime example of the conventional radio sub-networks claimed in the ‘111 Patent. *Id.* 3:30–32. *See also* Ex. 1008 (laying out the details of iDEN networks). The only aspect of the radio sub-networks claimed in the ‘111 Patent that are allegedly not found in iDEN are the converters (though iDEN’s “Interworking Function” suggests that even converters were already part of the existing system, Ex. 1008, at 33). Regardless, as demonstrated below both converters and their use in point-to-multipoint communications systems were well known before Motorola filed the '111 Patent. This is certainly not a point of novelty for the '111 Patent.

C. Motorola Reshuffles Claim Elements During Prosecution

During prosecution, the Examiner rejected each independent claim, finding that Maggenti taught every claimed aspect. Ex. 1009, at 64–67. Rather than traverse the Examiner's findings, Motorola simply rewrote the independent claims to include limitations from various dependent claims and skirted any discussion of Maggenti. *Id.* at 77–78. The resulting notice of allowance detailed the narrow reasons each independent claim issued:

- Claim 23 (now claim 1) was allowed because "***each of said radio sub-network controllers is configured to resolve conflicts between substantially concurrent requests*** from said plurality of subscriber radios in communication with said radio sub-network controller to be origination points for a point to multipoint monolog and to provide subscriber traffic distribution to said plurality of subscriber radios in communication with said radio subnetwork controller" and
- Claim 25 (now claim 13) was allowed because "***receiving said point-to-multipoint monolog at a first converter*** configured to communicate in said first radio sub-network using a communication protocol established for said first radio sub network: and ***transmitting said point-to-multipoint monolog***

as packets over said packet switched data communication network using a protocol established for said packet switched data communication network."

Id. at 88–89 (emphasis added).

As demonstrated below, each of the grounds the Examiner cited for patentability are taught in the prior art, the bulk of which was never considered during prosecution. These references include Motorola's own patent for networking various communication sub-networks (Grube), a reference expressly relying on Motorola's iDEN system as the exemplary group call radio sub-networks (Stubbs), and a reference that taught exactly the same "token" system for conflict resolution several years before the '111 Patent (Shepherd). As such, each of the slim bases for allowing Motorola's claims are found in the prior art, and the '111 Patent is unpatentable.

IV. Level of Ordinary Skill in the Art

The level of skill is apparent from the cited art. *See In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). Petitioner submits that a person of ordinary skill in the art for the '111 Patent would have had a Bachelor's degree in electrical engineering, computer engineering, or computer science, or a related field, along with at least two to three years of experience in telecommunications and networking, or an equivalent degree and/or experience. Ex. 1002 ¶ 37. Additional education might compensate for a deficiency in experience, and vice-versa. *Id.*

V. Claim Construction

For the purposes of this *Inter Partes* Review only, claims 1, 6–7, 11–13, and 15–16 of the '111 Patent should be given the broadest reasonable construction as understood by a person of ordinary skill in the art in light of the disclosures made in the '111 Patent. 37 C.F.R. § 42.100(b).

VI. Detailed Explanation of How Claims 1, 6–7, 11–13 and 15–16 of the '111 Patent Are Unpatentable Over the Prior Art

A. Summary of Law on Obviousness

1. It is Obvious to Rearrange Known Elements to Yield Predictable Results

A patent claim is obvious where it "'simply arranges old elements with each performing the same function it had been known to perform' and yields no more than one would expect from such an arrangement." *In re Yufa*, 452 F. App'x 998, 1001 (Fed. Cir. 2012) (quoting *KSR*, 550 U.S. at 417). In *Yufa*, for example, the claim at issue disclosed a computer, a remote measuring means and processing performed at the remote measuring means. *Id.* at 1000. The prior art disclosed the same structures, but the processing was performed at the computer instead of the remote measuring means. *Id.* The Federal Circuit found that it would have been obvious for one of ordinary skill in the art to move the processing from the computer, as taught in the prior art, to the measuring means, as recited in the claim, the because it "is nothing more than a reconfiguration of a known system." *Id.* at 1001.

2. Overlapping Coverage Areas and Multiple Protocols Are Nothing More than Obvious Design Choices

Several claimed elements of the '111 Patent are not inventive aspects of the claimed system or method, but rather simple and obvious design choices that should be given no patentable weight. Such limitations include having overlapping or non-overlapping coverage areas, and having different protocols among sub-networks. It is long established that mere design choices "provide[] no novel or unexpected result" and are thus obvious. *In re Kuhle*, 526 F.2d 553, 555 (C.C.P.A. 1975). *See also PlaSmart, Inc. v. Kappos*, 482 F. App'x 568, 573–74 (Fed. Cir. 2012) (design choices are obvious because they are "nothing more than a predictable use of prior art elements . . . to address a known problem.")

Accordingly, as will be described further for each combination below, whether sub-networks overlap and whether they use different protocols are mere design choices that are not novel, provide no unexpected results, and have no bearing on the other claim limitations. These elements are obvious to a person of ordinary skill in the art.

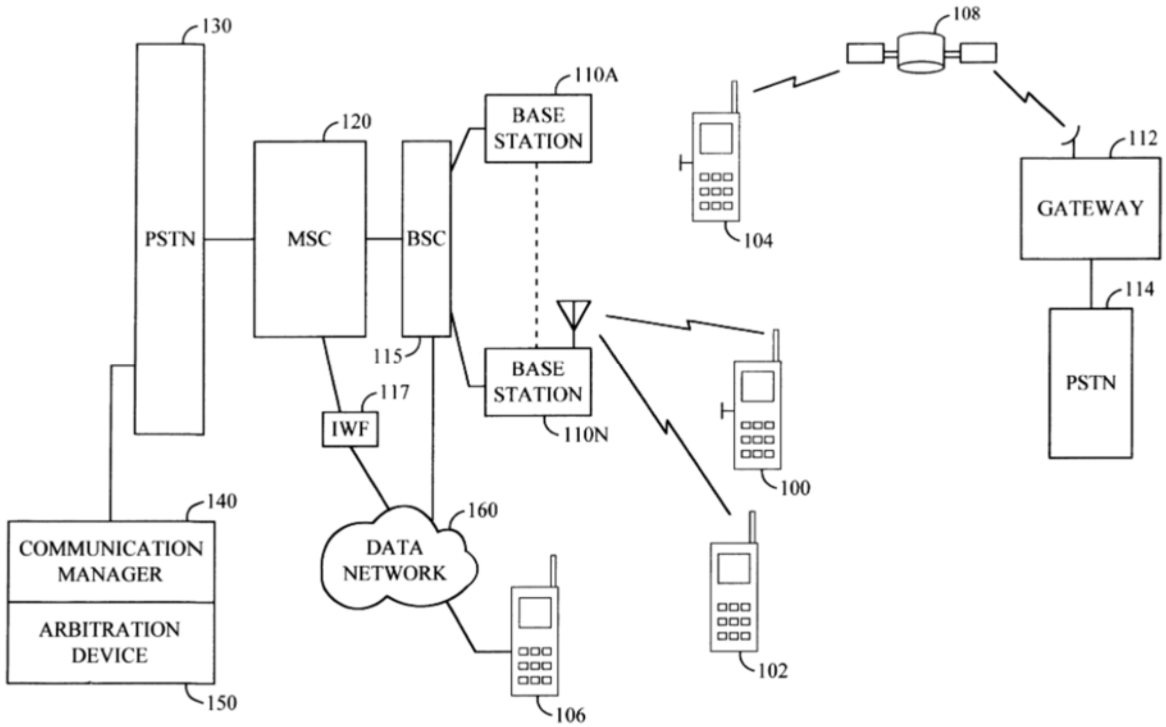
B. Claims 1, 6–7, 11-13 and 15–16 are Rendered Obvious by Maggenti in view of Shepherd

Maggenti and Shepherd teach all elements of the claims 1, 6–7, and 13 of the '111 Patent and the render them obvious. Notably, the Examiner found all but one of these limitations in Maggenti—conflict resolution at the radio sub-networks. Ex. 1009, at 64–67. While the Examiner's conclusion appears to overlook express language in Maggenti that its conflict resolution "arbitration device" can be at the group controller level or the sub-network level, Ex. 1003 6:1–3, conflict resolution at the sub-network level was well known in the art. Shepherd, for example, teaches a point-to-multipoint communication system wherein ***each radio sub-network*** has a "central station" that resolves conflicts caused by simultaneous calls. Ex. 1004 3:64–68.

One of ordinary skill in the art would have been motivated to combine the conflict resolution taught in Shepherd with the group communication system disclosed in Maggenti to avoid bottlenecks caused by centralized processing Ex. 1007 11:12–14; Ex. 1002 ¶ 97.

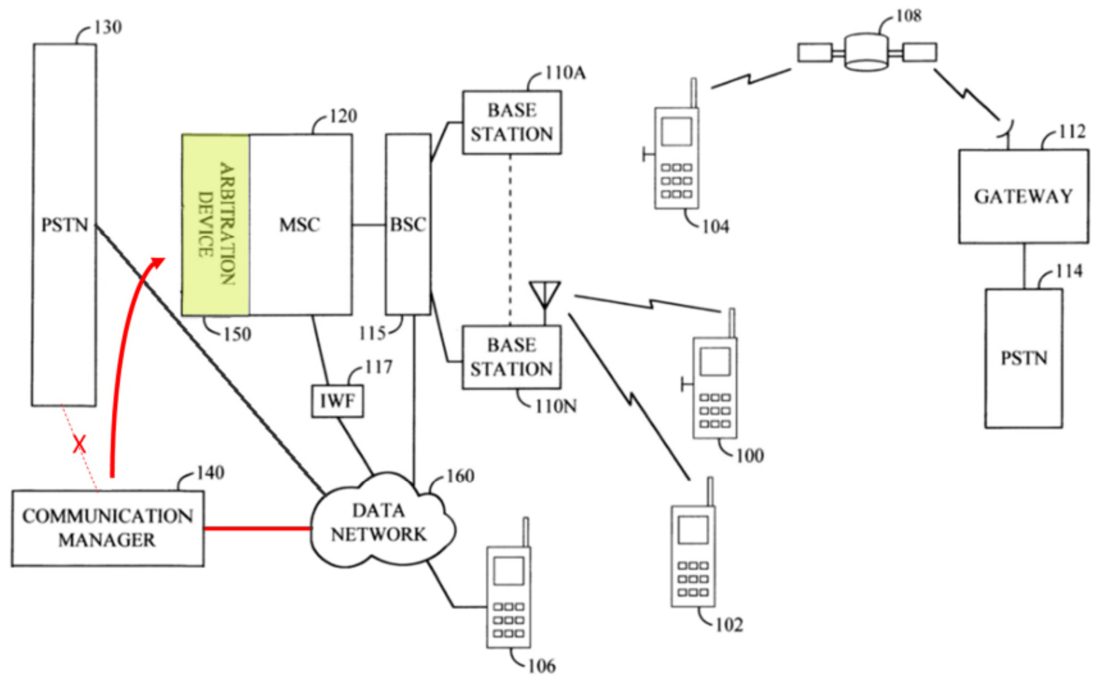
1. Maggenti Discloses the Same Alleged Invention

Maggenti discloses a system and method for controlling communication in a point-to-multipoint network. As seen in Figure 1 of Maggenti below, a network encompassing multiple sub-networks of different types, including radio (100, 102), data (106) and satellite (104) is disclosed:



Ex. 1001 Figure 1

Communications across the entire network are managed by a group communication manager 140, which is shown in Figure 1 as being connected to a public switched telephone network (PSTN). The communication manager may ***also*** be connected via data network 160. Ex. 1003 5:47–49. Likewise, while an arbitration device is shown in the embodiment of Figure 1 as part of the communication manager 140, it can ***also*** be located at the MSC. Ex. 1003 6:1–3. Thus, Maggenti teaches that Figure 1 can be also be arranged to look as follows:



Ex. 1002 ¶¶ 70–71.

As explained by the USPTO Examiner, nearly every element in the '111 Patent can be found in Maggenti. Ex. 1009 64–67. The examiner inexplicably submitted that conflict resolution at the radio sub-network was absent. Ex. 1009, at 89. Instead, he stated that the arbitration device 150 disclosed conflict resolution, but only at the group controller. Ex. 1009, at 65. Maggenti, however, expressly states that the arbitration device "can be located at communications manager 140, or it can be located at MSC 120, or at any one of base stations 110a through 110n." Ex. 1003 6:1–3. While this disclosure would teach one of ordinary skill that conflict resolution could, in fact, occur at the radio sub-networks, other references (e.g., Shepherd) leave no doubt that this was already well known in the art at the time Motorola filed the '111 Patent. Ex. 1002 ¶ 72.

2. Shepherd Discloses Decentralized Conflict Resolution

Shepherd discloses communication systems for point-to-multipoint communications linked across an interface. In Shepherd, subscriber radios are mobile and have a method of conflict resolution. Ex. 1004, Abstract; 2:54–68, 3:15–23. Shepherd discloses "A" as a first radio sub-network, "B" as a second radio sub-network, central stations as a radio sub-network controllers, and secondary stations A1–A6 as subscriber radios in a first radio sub-network. *Id.* 2:54–68, Fig. 1. While Shepherd's nomenclature denotes a "central station" for each radio sub-network, that controller is not centralized to control multiple sub-networks—it controls only the associated sub-network (A or B). Ex. 1002 ¶ 75. Hence, the use of "CSA" and "CSB" shown in Figure 1 below:

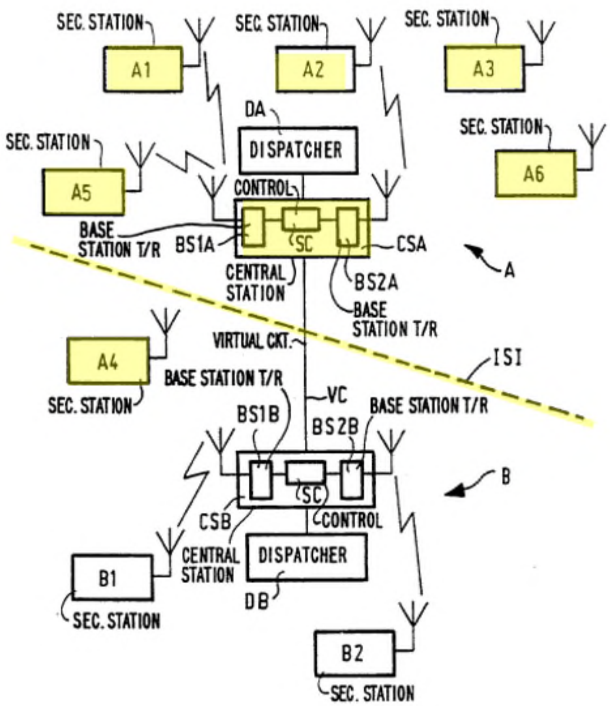


FIG.1

Ex. 1004 Fig. 1 (highlight added)

As in the '111 Patent, Shepherd discloses a central station that resolves conflict when two or more radio users try to transmit a signal at the same time. Ex. Ex. 1004 3:15–23. Specifically, the transmitting is controlled at the central station by a signaling system that requires the user to request permission to transmit from the system controller in the central station. *Id.* The central station disclosed in Shepherd is at the same level and serves the same purposes as the radio sub-network controller of the '111 Patent. Ex. 1002 ¶¶ 74–75.

Shepherd also discloses overlapping coverage areas. The secondary stations A1–A6 and B1–B6 can roam into and out of their coverage areas. Ex. 1004 2:54–68, Fig. 1. For example, figure 1 above illustrates secondary station A4 across the boundary (ISI) from its central station. Because A4 can still operate when it is across the boundary, Shepherd discloses overlapping coverage areas. Ex. 1002 ¶ 76. Undoubtedly, the combination of Maggenti and Shepherd renders challenged claims of the ‘111 Patent obvious.

3. Claim 1

(a) A group radio communication system

Maggenti certainly discloses a group radio communication—it is entitled “Method and apparatus for providing fair access to members of a group communication system in which the members experience differing signaling delays.” Ex. 1003. Further, Fig. 1 of Maggenti is described as “an illustration of a group communication system in which the present invention is used” and further described as “an illustration of a wireless push-to-talk communication system, otherwise known as a group communication system, a net broadcast system, a dispatch system, or a point-to-multipoint communication system.” *Id.* 3:51–54.

Shepherd likewise relates to “resolving conflicts in digital trunked private mobile radio systems,” and more specifically to conflicts arising in a “group call situation,” also “referred to as a point to multipoint call.” Ex. 1004 1:1–12, 3:6–10.

> *(b) a first radio sub-network configured to implement point-to-multipoint communication sessions within said first radio sub-network*

Maggenti teaches a group communication system having a first and second radio sub-network configured for point-to-multipoint communication. Maggenti expressly contemplates at least two radio sub-networks having different communication protocols referred to as "nets." Ex. 1003 4:7–11. And just as in the '111 Patent, Maggenti teaches use of both terrestrial and satellite communications sub-networks as part of the group call system. *Id.* 4:15–26. During prosecution of the '111 Patent, the Examiner also confirmed that Maggenti teaches this limitation. Ex. 1009, at 64.

Shepherd also teaches a system with two sub-networks, referred to as "[f]irst and second independent communication systems [that are] linked across an intersystem interface." Ex. 1004 Abstract. In fact, that whole point of Shepherd is to resolve conflicts arising from simultaneous communications in the two sub-networks. *Id.*

> *(c) a second radio sub-network configured to implement point-to-multipoint communication sessions within said second radio sub-network*

As explained above, Maggenti discloses at least two radio sub-networks ("nets"). Likewise, the Examiner also confirmed this claim element is present in

Maggenti. Ex. 1009 at 64. Shepherd also discloses two sub-networks. Ex. 1004 Abstract.

> *(d) a group controller in data communication with said first radio sub-network and said second radio sub-network, said group controller being configured to manage a common point-to-multipoint communication session involving said first radio sub-network and said second radio sub-network*

Maggenti discloses a group controller—referred to as the "communication manager"—in communication with the first and second radio sub-networks to manage common point-to-multipoint communications. On this point, Maggenti could not be clearer—the disclosed group controller ("communication manager") is configured to manage group communications between radio sub-networks ("nets"): "Communications manager 140 provides a traffic controller (described later) which is used to enable one net member to simultaneously communicate with other net members when broadcast communications are desired." Ex. 1003 5:50–54. This includes communications across disparate sub-networks, such as radio and satellite. *Id.* 7:40–55.

Not surprisingly, the presence of the group controller was also confirmed by the Examiner during prosecution. Ex. 1009, at 65.

> (e) *a packet switched data communication network coupled between said first radio sub-network and said group controller and between said second radio sub-network and said group controller*

Maggenti teaches coupling the radio sub-networks and the group controller using a packet switched data network. Maggenti expressly states that the group controller ("communications manager") can "may be connected to PSTN 130, as shown in FIG. 1, ***or* to data network 160 to provide push-to-talk communications in an existing point-to-point wireless communication system**." Ex. 1003 5:47–48 (emphasis added). The "data network 160" provides "communication signals in the form of data packets," and Maggenti uses the same broad example for a packet switched data network as the '111 Patent— "the Internet." *Id.* 6:4–6.

Again, the Examiner confirmed that Maggenti discloses this coupling the sub-networks to a packet-switched data network. Ex. 1009 at 65.

> (f) *a radio sub-network controller associated with each of said first and second radio sub-networks and a plurality of subscriber radios in communication with said radio sub-network controller*

Each of the radio sub-networks ("nets") disclosed in Maggenti is associated with a sub-network controller. Specifically, Maggenti teaches, "mobile switching centers" or "MSCs" at the sub-network level that "provide[] circuitry for routing communications between remote units operating in various base station coverage areas." Ex. 1003 5:28–30. Further, Maggenti makes clear that these MSCs are radio sub-network controllers can be networked either through land-line telephone (PSTN) or "alternatively, or in addition to, be connected to computer network 160" that uses "protocols suitable for use with computer network 160, generally the well-known TCP/IP protocol." *Id.* 5:33–43, The TCP/IP protocol is well known to be a packet-switched network and further confirms that the system taught by Maggenti would be packet switched. Ex. 1002 ¶¶ 92–93.

Once again, the Examiner confirmed that Maggenti disclosed a controller at each radio sub-network. Ex. 1009, at 65.

Shepherd discloses similar sub-network controllers that it calls "central stations." For example, in the figure below, Shepherd shows two sub-networks, each having its own "central station," denoted "CSA" and "CSB," respectively:

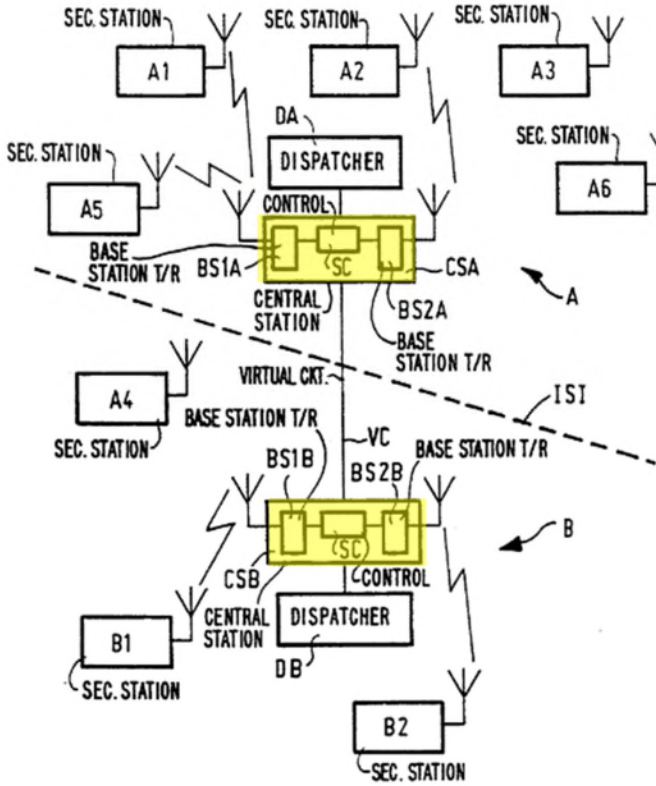


FIG.1

Ex. 1004 Fig. 1 (highlights added)

> *(g) each of said radio sub-network controllers is configured to resolve conflicts between substantially concurrent requests from said plurality of subscriber radios in communication with said radio sub-network controller to be origination points for a point-to-multipoint monolog and to provide subscriber traffic distribution to said plurality of subscriber radios in communication with said radio sub-network controller.*

Notably, the only element of claim 1 the Examiner did not find in Maggenti during prosecution (and the reason for allowance of that claim) was each of the radio sub-networks must be "configured to resolve conflicts between substantially concurrent requests" and "provid[ing] subscriber traffic distribution to said plurality of subscriber radios." Respectfully, the Examiner erred by misreading or missing clear statements in Maggenti to this effect.

Without issue, Maggenti expressly discloses resolving conflicts and distributing radio traffic between the subscribers ***at the radio sub-network level***. Maggenti teaches use of an "arbitration device 150" whose "primary function . . . is to assign the exclusive transmission privilege to one member at a time." Ex. 1003 6:13–14. Indeed, Maggenti makes clear that the arbitration device addresses the exact conflict scenario recited in the '111 Patent, where "two or more transmission requests from two or more communication devices are received by the arbitration device at or substantially the same time." *Id.* 3:66–4:11.

Having established that the arbitration device of Maggenti most certainly resolves conflicts, the only remaining issue is where those conflicts are resolved. While for some unknown reason the Examiner concluded that the function occurred at the group controller level (and expressly found so, Ex. 1009, at 65), ***Maggenti explicitly states otherwise***. Specifically, Maggenti teaches that the arbitration device 150 need not be located at the group controller level. Rather, conflict resolution with an arbitration device "can be located at communications manager 140, ***or it can be located at MSC 120, or at any one of base stations 110a through 110n***." Ex. 1003 6:1–3. As explained above, the MSC of Maggenti is a sub-network controller.

Moreover, Maggenti teaches an embodiment exactly as claimed in the '111 Patent—resolving conflicts between "net members," as distinguished from "non-net members":

> When a net member wishes to transmit voice or data to other net members, permission must first be sought by the member and granted by arbitration device 150 before transmissions are allowed to take place. . . . ***If no other net member holds the transmission privilege, permission to transmit is granted by the arbitration device, and the requesting net member is permitted to begin transmitting voice and/or data to other net members or non-net members, depending on who the transmitting net member has chosen to communicate with.***

Ex. 1003 7:3–17 (emphasis added).

As the "nets members" in Maggenti are at the radio sub-networks level as claimed in the '111 Patent, Maggenti clearly discloses conflict resolution and traffic distribution ***at the radio sub-network level***, not simply group control as the Examiner found.[1]

[1] It should also be noted that resolution of conflicts between net members, not different nets, is disclosed in the background as being well known in the prior art. Ex. 1003 1:66–2:12.

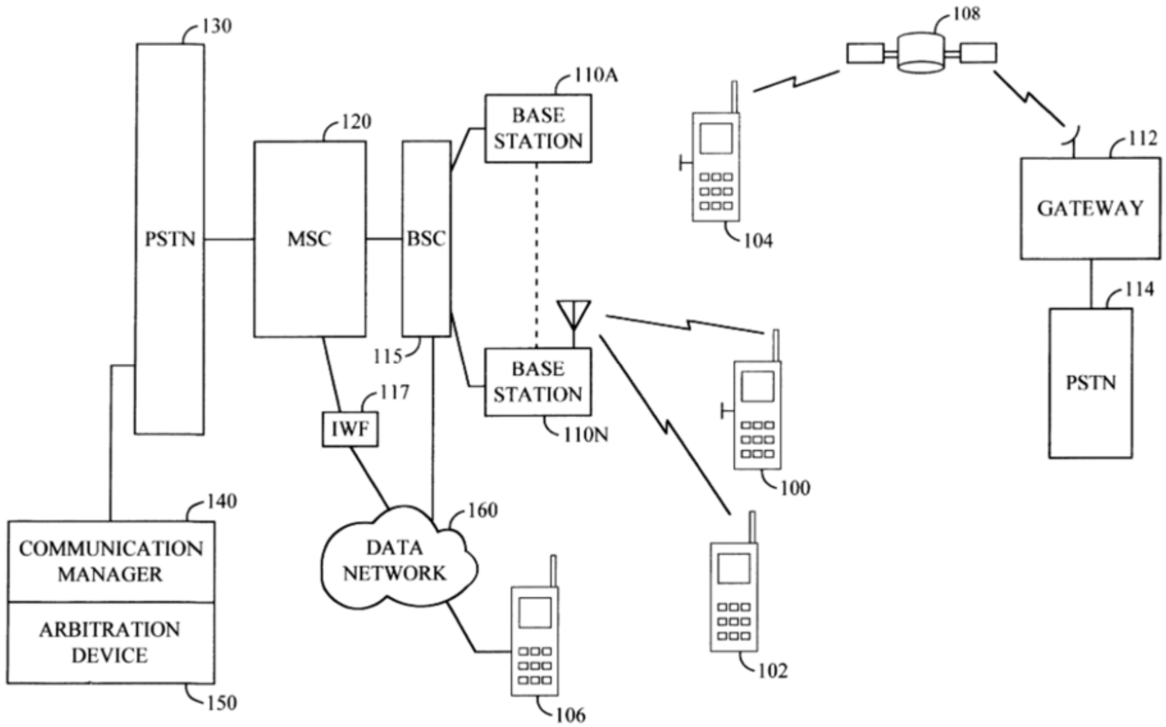
If it is found that Maggenti fails to fully disclose conflict resolution at the sub-network level, Shepherd clearly discloses this feature. The bulk of Shepherd's disclosure is directed to a method of decentralized conflict resolution using multiple "central stations" (i.e., sub-network controllers). Specifically, Shepherd discloses passing a token between central stations, where the token controls which central station has permission to transmit over the link connecting the sub-networks. Ex. 1004 3:64–4:12. The method of Shepherd is highly similar to the tokenized method disclosed in the '111 Patent for conflict resolution. Ex. 1001 6:36–57.

One of ordinary skill in the art would be motivated to use the decentralized arbitration of Shepherd with the radio system of Maggenti for several reasons. First, as Shepherd points out, without such conflict resolution, in the event of attempted simultaneous communications between sub-networks, the sub-network controller would have "retry at a random interval later which is less efficient." Ex. 1004 1:58–59; Ex. 1002 ¶ 97. Moreover, as explained in the art, consolidation of conflict resolution at a central location causes bottlenecks that can decrease system efficiency. Ex. 1007 11:12–14; Ex. 1002 ¶ 97. Accordingly, it would be obvious to combine the decentralized conflict resolution of Shepherd with the multi-sub-net system of Maggenti to achieve the alleged invention of the '111 Patent. Ex. 1002 ¶ 97.

4. Claim 6

Claim 6 further limits the system of claim 1 by including that each of the first and second radio sub-network comprises a "converter configured to translate between said [first/second] radio sub-network and said packet switched data communication network."

Maggenti discloses that conversion take place at the radio sub-network level, particularly as used with the packet-switched network: "[c]ommunications to and from remote units are converted into data packets suitable for transmission over data network 160." Ex. 1003 6:8–10. Likewise, Maggenti teaches the same conversion from remote units when the PSTN is included in the radio sub-network, as the "request is downconverted and sent to the MSC 120, and routed to a PSTN 130, and then arrives at arbitration device 150." *Id.* 7:33–35.



Ex. 1001 Figure 1

In each case, this conversion necessarily has to take place prior to reaching the group controller—i.e., at the radio sub-network level—because the converted payload could not be transmitted from the remote unit in packet form without doing so. Ex. 1002 ¶¶ 98–99.

Notably, reading Maggenti to exclude a converter at the radio sub-network level ignores the express disclosure that arbitration device 150 ***receives*** packet data. Indeed, if Motorola were to contend that an arbitration device of Maggenti could not be part of the radio sub-networks, that would only serve to confirm that conversion occurs at the sub-networks. Ex. 1003 6:1–8; Ex. 1002 ¶ 98. Finally, given that Maggenti discloses multiple radio sub-networks, each serving remote subscriber units, Maggenti discloses this conversion limitation for each of the radio sub-networks. Ex. 1002 ¶ 99.

5. Claim 7

Claim 7 adds the following limitations to the system of claim 1: “said [first/second] radio sub-network comprises a [first/second]radio sub-network controller and at least one [first/second]radio sub-network subscriber radio, said at least one [first/second]radio sub-network subscriber radio and said [first/second]converter being configured to communicate with said [first/second]radio sub-network controller using a communication protocol established for said [first/second]radio sub-network.”

In addition to disclosures detailed above in Maggenti regarding converters and radio sub-networks (claims 1 and 6), Maggenti discloses radio sub-networks configured to communicate using a protocol: “For instance, a first net may be defined having ten members and a second net may be defined, having 20 members. The ten members of the first net can communicate with each other, but generally not to members of the second net.” Ex. 1003 4:7–11; Ex. 1002 ¶ 100.

6. Claims 11 and 15

Claims 11 and 15 both add the following limitation to claims 1 and 13, respectively: “first and second radio sub-networks have overlapping radio coverage areas.” Shepherd discloses overlapping radio coverage areas. Ex. 1004 2:54–68. It would have been obvious to combine the overlapping coverage areas of Shepherd to the first and second nets of Maggenti. Ex. 1002 ¶ 101. With overlapping coverage areas, a radio subscriber can connect to a second net if the first one is unavailable. *Id.* It further allows a subscriber radio to send a message originating in a network that uses the same protocol when it is incompatible with another network located in an overlapping coverage area that might rely on a protocol incompatible with the subscriber radio. *Id.* In this way, emergency notifications can be sent at a more rapid speed and more reliably. *Id.* Therefore, it would have been obvious to provide at least some overlapping coverage when linking the radio sub-networks together. *Id.* ¶ 103.

Claims 11 and 15 both also add the following limitation to claims 1 and 13, respectively: "first and second radio sub-networks have incompatible communication protocols." Maggenti discloses that each of its nets can be of a different type, such as radio, phone or satellite. Ex. 1003 4:21–26. Maggenti explicitly discloses that the communication manger (via PSTN or data network) can bridge these different systems, thus teaching incompatible systems linked together. *Id.* 5:50–54; Ex. 1002 ¶ 102.

In addition to the disclosure in Maggenti, the decision to have radio sub-networks with incompatible protocols would be an obvious design choice depending on the systems being linked for group communication. Ex. 1002 ¶ 103.

Put another way, the resulting communication would not be novel based on protocol and obvious to one of skill in the art. *Id.*

7. Claims 12 and 16

Claims 12 and 16 each add the following limitation to claims 1 and 13, respectively: "first and second radio sub-networks have non-overlapping radio coverage area." Maggenti discloses some nets, for example a satellite-based net, can be "located many thousands of miles away." Ex. 1003 7:40–41.

Moreover, as explained in Section IV.A, having wireless coverage areas overlap or not does not provide any novel or unexpected result. Indeed, the fact that there are dependent claims directed to both scenarios proves that the state of overlap has no bearing on the rest of the claim elements. The alleged invention functions the same way under both conditions, as one of ordinary skill in the art would readily expect. Ex. 1002 ¶ 104. Accordingly, having non-overlapping coverage areas is an obvious design choice and renders claims 11 and 15 obvious in light of Maggenti and Shepherd. *Id.*

8. Claim 13

(a) A method of implementing a common point-to-multipoint communication session involving first and second radio sub-networks

Maggenti discloses a point-to-multipoint communication system with at least first and second "nets." Ex. 1003 4:7–9. Maggenti specifically contemplates communications between the nets. *Id.* 4:6–14. Shepherd also teaches a system with two sub-networks, referred to as "[f]irst and second independent communication systems [that are] linked across an intersystem interface." Ex. 1004 Abstract. In fact, the whole point of Shepherd is to resolve conflicts arising from simultaneous communications in the two sub-networks. *Id.*

Thus, Maggenti with Shepard discloses the method of implementing a point-to-multipoint communication session involving a first radio sub-network and a second radio sub-network. 1002 ¶ 106.

(b) coupling said [first/second] radio sub-network to a packet switched communication network

Maggenti teaches coupling the radio sub-networks and the group controller using a packet switched data network. Maggenti expressly states that the group controller ("communications manager") "may be connected to a "data network 160" that is, for example, the Internet. Ex. 1003 6:4–6; 1002 ¶ 107.

(c) coupling a group controller to said data communication network

Maggenti discloses a group controller—referred to as the "communication manager"—in communication with the first and second radio sub-networks to manage common point-to-multipoint communications. Maggenti could not be clearer that the disclosed group controller ("communication manager") is configured to manage group communications between radio sub-networks ("nets"). Ex. 1003 5:50–54; 1002 ¶ 108.

> *(d)* *routing a point-to-multipoint monolog from said first radio sub-network through said group controller to said second radio sub-network*

Maggenti explains that a communication (a monolog in point-to-multipoint communications) can be routed from one net to another via the communication manager. For example, Maggenti discloses in one example, that a communication from a "remote unit 104" in a satellite-based net can routed via gateway 112, through PTSN 114 and to the arbitration device 150, which in that embodiment is "located within communication manager 140." Ex. 1003 7:33–55. Thus, Maggenti teaches routing a monologue through the group controller. 1002 ¶ 109.

> *(e)* *converting said point-to-multipoint monolog into packets for distribution through said packet switched data communication network and said group controller*
>
> *receiving said point-to-multipoint monolog at a first converter configured to communicate in said first radio sub-network using a communication protocol established for said first radio sub-network*
>
> *transmitting said point-to-multipoint monolog as packets over said packet switched data communication network using a protocol established for said packet switched data communication network.*

The last three limitations of claim 13 all involve conversion of communication data between a sub-network and the packet-switched network.

Maggenti discloses that communications (monologs) are transmitted as data packets and that conversion takes place at the radio sub-network level, particularly as used with the packet-switched network: "[c]ommunications to and from remote units are converted into data packets suitable for transmission over data network 160." Ex. 1003 6:9–10; 1002 ¶ 110.

C. Claims 1, 6, 7, 11–13 and 15–16 Are Rendered Obvious by Grube in view of Shepherd

In addition to teaching interconnected radio networks for group communications like Maggenti, Grube discloses group communication systems comprised of the same radio sub-networks referenced in the '111 patent—Motorola's own iDEN system. Ex. 1005 3:14–32. Moreover, like the '111 patent, Grube discloses:

> a method and apparatus is described that permits a communication unit to operate from a first system type 101 while communicating with other members of a common talkgroup where those other members are operating from at least one or more other communication systems 113 and 115 where the one or more other communication systems are of at least a second type.

Ex. 1005 2:44–50. The only aspect of the '111 Patent not covered in detail in Grube is the resolution of conflicts which, as shown above, is taught by Shepherd in the same language as that of the '111 patent. Ex. 1004 3:64–4:12.

One of ordinary skill would have readily recognized the wide range of benefits and predictable results provided by combining the packet-switched group call system taught by Grube with the decentralized conflict resolution in Shepherd. Ex. 1002 ¶ 114. Accordingly, claims 1, 6–7, 11–13, 15–16 are unpatentable over Grube in view of Shepherd.

1. Grube Discloses a Group Communication System with Multiple Networks and Different Protocols, Connected by a Packet-Switched Network

Grube teaches a group call communication system that links multiple "systems" (akin to the radio sub-networks in the '111 Patent) of various protocols, geography, and complexity using a packet-switched data network. This stands to reason. Grube specifically references public projects aimed at linking radio networks—TETRA and Project 25—that predated the '111 Patent by several years. Ex. 1005 5:48–53; Ex. 1002 ¶¶77–80.

Of particular importance, the embodiments demonstrated in Figures 1 and 3 of Grube teach linking multiple communication systems through a packet-switched network and central interface:

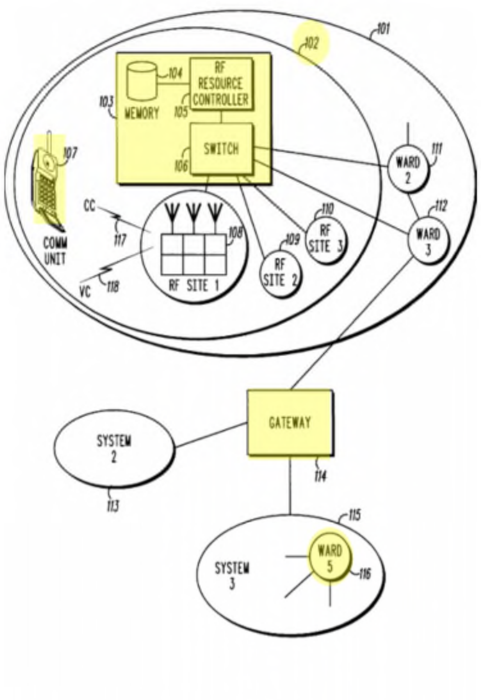


FIG. 1

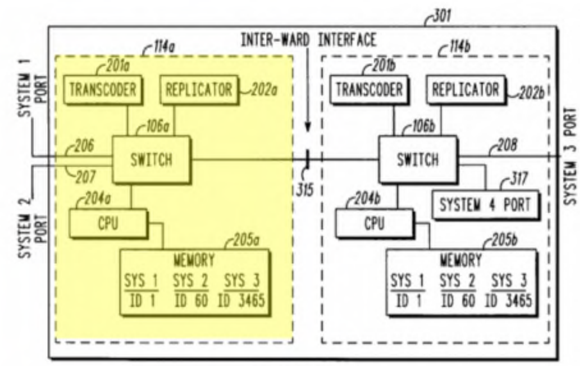


FIG. 3

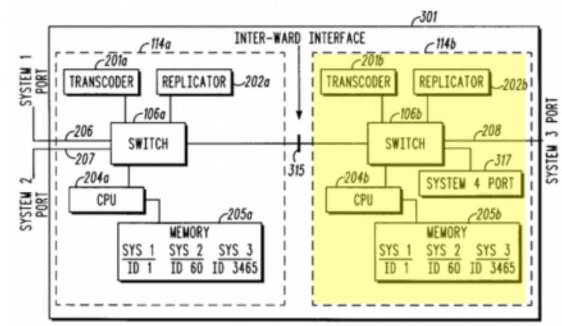


FIG. 3

Ex. 1005 Figs. 1, 3 (highlights added)

The basic radio network building blocks for Grube are shown in Figure 1 above—for example, "system 101" that is "comprised of at least one ward 102." Ex. 1005 3:34–35. Referring to Figure 1, each "system" taught by Grube contains one or more wards having "communication units" 107, one or more "master sites" 103 that contain base station and RF controls, and a "gateway ward controller" 114 in communication with other systems (e.g., 115). *Id.* 3:17–19, 3:34–40, 3:51–54.

Of particular importance for invalidity, Figure 3 discloses a group communication system that teaches every aspect of the system claimed in the '111 Patent. As shown in Figure 3, Grube teaches linking systems of different types for group communications using a multi-ward gateway 301, which includes two or more “gateway ward controllers” 114A and 114B. Each of 114A and 114B controls a subsystem comprised of one or more of the systems described in Figure 1. Further, Grube teaches linking these systems using an “Inter-Ward Interface” 315, that allows for group calls between systems. Finally, each of the subsystems controlled by 114A and 114B communicate over a packet-switched network, defined in Grube to include well known packet-switched network protocols (e.g., “TCP/IP, X.25 and others”). *Id.* 5:26–34.

Accordingly, with the exception of the Shepherd, which teaches the same conflict resolution mechanism as the ‘111 patent, Grube discloses all of the essential elements of the challenged claims. Ex. 1002 ¶ 114. Further, Grube in view of Shepherd renders the ‘111 patent obvious and the claims at issue unpatentable. *Id.*

2. Claim 1

(a) A group radio communication system

Grube discloses a group radio communication method and system “that permits a communication unit to operate . . . while communicating with other members of a common talkgroup.” Ex. 1004, 2:34–50. Thus, the preamble of claim 1 is disclosed in Grube. Ex. 1002 ¶ 115.

Shepherd also discloses group communication systems linked across an interface and having a method of conflict resolution. Ex. 1004, Abstract, 3:15–23.

(b) a first radio sub-network configured to implement point-to-multipoint communication sessions within said first radio sub-network

As illustrated in the Figures above, Grube discloses a first radio sub-network, configured to implement point-to-multipoint communication sessions within the first radio sub-network. Ex. 1005 2:44–50, 5:40–53, Figs. 1, 3. Grube discloses that point-to-multipoint communications are implemented within the first radio sub-network. *Id.* 5:64–6:6. This is confirmed by distribution of translated message payloads from a first communication system to each of communication systems 113 and 115, which are then broadcast to the communication units within the other communication systems. *Id.* 2:51–3:5; Ex. 1002 ¶ 116. Therefore, Grube discloses point-to-multipoint communications implemented within a first radio sub-network. Ex. 1002 ¶ 116.

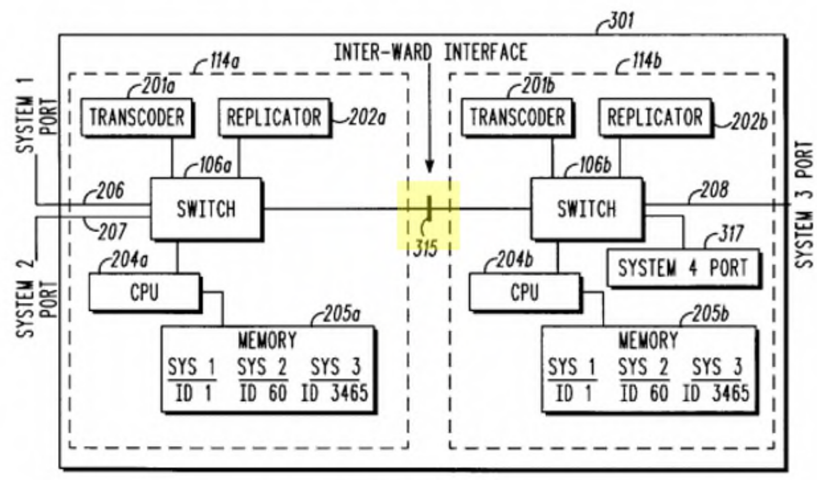
(c) a second radio sub-network configured to implement point-to-multipoint communication sessions within said second radio sub-network

As shown in Figures 1 and 3, Grube also discloses a second radio sub-network configured to implement point-to-multipoint communication sessions. Ex. 1005 2:44–3:5, 10:5–8, Fig. 1. The implementation of point-to-multipoint communication sessions is described above with respect to the first radio sub-network. Ex. 1005 2:51–3:5; 5:64-6:6; Ex. 1002 ¶¶ 116–17. Therefore, Grube discloses a second radio sub-network configured to implement point-to-multipoint communication sessions within the second radio sub-network. Ex. 1002 ¶ 117.

(d) a group controller in data communication with said first radio sub-network and said second radio sub-network, said group controller being configured to manage a common point-to-multipoint communication session involving said first radio sub-network and said second radio sub-network

Grube discloses a group controller. Ex. 1005 5:40–53, 6:27–34, 6:52–59. As shown in Figure 3, the inter-ward interface 315 manages communication from the various gateway ward controllers (e.g., 114A and 114B). Further, the inter-ward interface is taught with reference to known standard interface designed for group call communications, such as the TETRA Inter-System Interface (ISI), or other ISIs known in the art. Ex. 1005 5:40–52; Ex. 1002 ¶ 118. A person of ordinary skill in the art would know that the ISI taught would be the same as the group controller claimed in the '111 patent (a simple computer/processor). Ex. 1002 ¶ 118. Thus, Grube discloses a group controller.

Further, Figure 3 illustrates the interface 315 is in communication with the first and second ward controllers 114A and 114B. Ex. 1005 5:40–52.



Ex. 1005 Fig. 3

Thus, Grube discloses that the group controller is in communication with the first and second radio sub-networks. Ex. 1002 ¶ 118.

Grube also discloses that the inter-ward interface 315 is configured to distribute a payload (the data/communication) to multiple communication systems and from there to multiple communication units. Ex. 1005 7:29–36, 7:45–50, 8:43–48. Thus, the interface disclosed in Grube is not only a group controller, but one configured to manage a point-to-multipoint communication session between a first radio sub-network and second radio sub-network. Ex. 1002 ¶ 119.

> *(e) a packet switched data communication network coupled between said first radio sub-network and said group controller and between said second radio sub-network and said group controller*

Grube discloses a packet switched data network. Ex. 1005 4:18–32. Figure 3 discloses that the data at 114A can be sent to and from interface 315, and similarly data at 114B can be sent to and from interface 315. The protocol for doing so can "any suitable protocol known in the art (e.g., TCP/IP, X.25, and others)." *Id.* 5:30–35. Not only are these protocols examples of packet-switched networks, but one of ordinary skill in the art would understand them to be packet-switched networks between the sub-network controllers (114A and 114B) and the group controller (315). Ex. 1002 ¶ 120.

> *(f) a radio sub-network controller associated with each of said first and second radio sub-networks and a plurality of subscriber radios in communication with said radio sub-network controller*

Grube discloses ward controller 114A as a first radio sub-network controller, and ward controller 114B as a second radio sub-network controller. Ex. 1005, 3:27–31; 3:34–35; Ex. 1002 ¶ 121.

Figures 1 and 3 illustrate each gateway ward controller 114A and 114B being associated with at least one ward having a master site 103, RF sites and communication units. Ex. 1005, 4:6–11, Fig. 1. As shown in Figure 1, each of the communication units 107 in Grube comprise the claimed subscriber radios in the '111 patent. *Id*. Thus, Grube discloses a radio sub-network controllers associated with first and second radio sub-networks and a plurality of subscriber radios in communication with the radio sub-network controllers. Ex. 1002 ¶ 121.

> (g) *each of said radio sub-network controllers is configured to resolve conflicts between substantially concurrent requests from said plurality of subscriber radios in communication with said radio sub-network controller to be origination points for a point-to-multipoint monolog and to provide subscriber traffic distribution to said plurality of subscriber radios in communication with said radio sub-network controller.*

Grube discloses that a radio sub-network produces a call request, which is transmitted to ward controller 114A. Ex. 1005 6:65–7:1. The ward controller 114A acts as an origination point for a point-to-multipoint communication *Id.* 5:64–6:6, 8:35–48. As explained above, ward controller 114A is a radio sub-network controller. *Id.* 3:17–19, 3:34–40, 3:51–54; Ex. 1002 ¶ 121. A message payload is sent from the CPU 204a to the transcoder 201A so that it can be converted to a payload that is transmittable to other systems. Ex. 1005 8:43–48. A translated message payload is then distributed by the switch 106A via the inter-ward interface 315 to switch 106B in ward controller 114B, to a ward associated with 114B, and then to the targeted communication systems. *Id.* 5:64-6:6; 8:43–48. Thus, Grube discloses said radio sub-network controller is "an origination point for a point-to-multipoint monolog," where the origination occurs with the call request. Ex. 1002 ¶ 122.

Grube 's disclosure of the distribution to the targeted communication systems is "subscriber traffic distribution to a plurality of subscriber radios in communication with each radio sub-network controller," as recited in claim 1 of the ‘111 Patent. Ex. 1005 8:43–48; Ex. 1002 ¶ 122.

Grube does not appear to disclose conflict resolution. However, it would have been obvious to combine the conflict resolution described in Shepherd with the system of Grube. Ex. 1002 ¶ 123. As discussed above in connection with Maggenti, Shepherd discloses radio sub-network controllers configured to resolve conflicts between substantially concurrent requests from said plurality of subscriber radios in communication with said radio sub-network controller. Ex. 1004 3:15–23.

It would have been obvious to add the transmission privilege of Shepherd to the system of Grube at the location of each radio sub-network controller. Grube already has the necessary components to implement conflict resolution at the radio sub-network controller. Ex. 1005 6:35–40. A person of ordinary skill in the art would be motivated to make this combination for the obvious benefit of reducing congestion and allow more important or urgent communications to take place first. Ex. 1007 11:12–14; Ex. 1002 ¶ 123. Further, it would have been obvious to configure each radio sub-network controller, rather than at the group controller level, for conflict resolution because it allows for group calls within the same radio sub-network. 1002 ¶ 123.

3. Claim 6

As explained in Section IV.B.4, dependent claim 6 requires that each sub-network have a converter to communicate with the packet-switched network. Grube discloses converters associated with each radio sub-network.

As shown in Figure 3 and explained in Grube, the first and second radio sub-network controllers 114A and 114B contain "CPUs" 104A and 104B that direct payloads from the "switches" 106A and 106B to "transcoders" 201A and 201B to translate communications. Ex. 1005 5:53–6:6. The CPUs 104A and 104B direct the transcoders 201A and B to "take a selected inbound payload (e.g., VSELP voice frames) from the switch 106A or B and ***convert the payload to a standard*** payload (e.g., IMBE voice frames) and ***address the standard payload to the counterpart ward controller*** 114A or B." *Id.* (emphasis added); *id.* Fig. 3. These converted payloads are transmitted in a packet-switched network (e.g., TCP/IP protocol) to other networks. *Id.* 5:26–34. Thus, Grube discloses the elements required by claim 6. Ex. 1002 ¶ 124.

4. Claim 7

As explained in Section IV.B.5, dependent claim 7 recites that each sub-network has protocol for communication between its respective controller and subscriber radios. Grube discloses a first and second radio sub-network having subscriber radios (e.g., 107), radio sub-network controllers (114A and 114B), and converters (transcoders 201A and 201B). Ex. 1005 5:54–6:6. Grube further discloses that the radios and converters are configured to communicate with the controllers in the protocols for the applicable sub-network. Messages received from switches 106A and 106B in the respective sub-network controllers are directed by CPU (e.g., 104A and 104B in Figure 3) for conversion for other sub-networks (via transcoders 201A or 201B as discussed in claim 6) or replicated through replicators (202A and 202B in Figure 3) to be distributed to systems that use the "same standard payload format." *Id.* 5:64–6:6; Ex. 1002 ¶ 125.

5. Claims 11 and 15

As explained in Section VI.B.6, claims 11 and 15 add that the radio sub-networks have overlapping radio coverage areas and incompatible protocols. One of ordinary skill in the art would appreciate that both sets of limitations are taught by Grube in view of Shepherd. Ex. 1002 ¶ 126;

With respect to coverage areas, Grube discloses a ward (one or more making up each subsystem covered by ward controller 114) provides coverage for a "regional geographic area, such as a county or part of a state," and that wards can be linked together to provide a multi-region communications system. Ex. 1005 3:44–47, Fig. 1. There is no limitation on the geographic location of these two units; they could indeed be located in close proximity to each other, and even right next to each other. To the extent that Grube does not specifically disclose overlapping radio coverage areas, Shepherd clearly discloses overlapping radio coverage areas. Ex. 1004 Fig. 1; Ex. 1002 ¶ 126. It would have been obvious to combine the overlapping coverage areas of Shepherd to the first and second radio sub-networks of Grube because overlapping coverage of the systems allows a radio subscriber to have the option of being converted and sent through a second radio sub-network controller in the event the first one is obstructed or otherwise occupied. Ex. 1002 ¶ 127.

Moreover, systems having overlapping radio sub-networks are an obvious design choice. Overlapping radio sub-networks "provide[] no novel or unexpected result" and are thus obvious. Ex. 1002 ¶ 128. Indeed, the overlapping networks claimed in the '111 patent do not change the claimed operation; they simply provide the predictable result in the event the radio infrastructure happens to overlap geographically. *Id.*

Similarly, Grube teaches radio sub-networks having incompatible protocols. As explained above, the group communication system taught in Grube accounts for either communications in the same protocol (routed through replicators) or incompatible protocols (converted by transcoders). Ex. 1005 5:64–6:6.

In addition to the disclosure in Grube, the decision to have radio sub-networks with incompatible protocols would be an obvious design choice depending on the systems being linked for group communication. Ex. 1002 ¶ 129. Put another way, the resulting communication would not be novel based on protocol and obvious to one of skill in the art. *Id.*

6. Claims 12 and 16

As explained in Section IV.B.7, dependent claims 12 and 16 require that the radio sub-networks have non-overlapping radio coverage area. For the reasons set forth in connection with claims 11 and 15, this limitation is taught by Grube and is also an obvious design choice. Nothing in Grube requires the subsystems linked for group calls to be overlapping. Ex. 1002 ¶ 130. One of ordinary skill in the art would recognize that having non-overlapping sub-networks has no novel effect on group communications, yields no unexpected results, and would operate in exactly the same manner as taught in Grube. *Id.*

7. Claim 13

(a) A method of implementing a common point-to-multipoint communication session involving first and second radio sub-networks

Grube discloses gateway 114 is configured to send a message from one radio sub-network to another radio sub-network, as explained in Section IV.C.2(d). Specifically, Grube discloses a payload sent from within one system to its ward controller 114A, to an inter-ward interface 315, from there to at least one other system containing ward controller 114B, where the message will be distributed to multiple communication units 107. Ex. 1005 7:29–36, 7:45–50, 8:43–48. Thus, Grube discloses the method of implementing a point-to-multipoint communication session involving a first radio sub-network and a second radio sub-network. Ex. 1002 ¶ 131.

(b) coupling said [first/second] radio sub-network to a packet switched communication network

As explained in connection with claim 1 above, Grube discloses first and second radio sub-networks that are coupled to a packet switched network, at a minimum, through the sub-network controller 114A. Packets originating in the first radio sub-network are transmitted in packet format, such as TCP/IP. Ex. 1005 5:26–34, 5:41–53, 5:64–6:6. One of ordinary skill in the art would understand that the TCP/IP protocol is a packet-switched data network. Ex. 1002 ¶ 132.

(c) coupling a group controller to said data communication network

As explained in connection with claim 1 above, Grube discloses that inter-ward interface 315 is a group controller for communications between radio sub-networks controlled by 114A and 114B. Inter-ward interface 315 is coupled to a packet-switched network and each radio sub-network controller, for example a TCP/IP network. Ex. 1005 5:26-34, 5:41-52, Fig. 3; Ex. 1002 ¶ 133. Therefore, Grube discloses the step of coupling a group controller to a data communication network. Ex. 1002 ¶ 133.

(d) *routing a point-to-multipoint monolog from said first radio sub-network through said group controller to said second radio sub-network*

Grube discloses transmitting a payload from a communication unit in one system to one or more communication units in another system. Specifically, Grube discloses an inbound payload received by the first radio sub-network controller 114A is converted by transcoder 201A to "standard payload" suitable for transmission over the packet-switched network to the second radio sub-network at 114B. Ex. 1005 5:64–6:3. The payload is sent through inter-ward interface 315 to distribute to multiple communication systems. *Id.* 1005 7:29–36, 7:45–50, 8:43–48. Therefore, Grube discloses routing a point-to-multipoint monolog from a first radio sub-network through a group controller to a second radio sub-network. Ex. 1002 ¶ 135.

> *(e) converting said point-to-multipoint monolog into packets for distribution through said packet switched data communication network and said group controller*
>
> *receiving said point-to-multipoint monolog at a first converter configured to communicate in said first radio sub-network using a communication protocol established for said first radio sub-network*
>
> *transmitting said point-to-multipoint monolog as packets over said packet switched data communication network using a protocol established for said packet switched data communication network.*

The last three limitations of claim 13 all involve conversion of communication data between a sub-network and the packet-switched network. Grube discloses that transcoder 201A translates an incoming payload so that it can be distributed among a packet-switched data network. Ex. 1005 5:53–6:6. Transcoder 201A converts the payload received from the first radio sub-network to a standard payload suitable for distribution the second radio sub-network. Ex. 1005 5:53–6:6. Grube discloses distributing that payload in packet form over a TCP/IP protocol, known by one of ordinary skill in the art to be a packet-switched data networks. Ex. 1005 5:26–34; Ex. 1002 ¶¶ 136–38. Transcoder 201A is located within ward controller 114A. Ex. 1005 Fig. 3. Thus, Grube teaches converting a point-to-multipoint monolog into packets and distributing the packets through a packet-switched data network and a group controller. Ex. 1002 ¶ 136–38.

Grube also discloses that a monolog from the first radio sub-network is received in radio sub-network controller 114A, including switch 106A and CPU 204A. Ex. 1005 4:21–33. The payload is routed to a replicator 202A for distribution in the communication protocol used by the first radio sub-network (the originating sub-network). Ex. 1005 5:64–66. Ex. 1002 ¶ 136–38.

D. Claims 1, 6, 7, 11-13 and 15–16 Are Rendered Obvious by Stubbs in view of Kent

According to Motorola, the '111 Patent links conventional radio systems infrastructures, such as its iDEN system, using a packet-switched networks for point-to-multipoint communications. Motorola, however, was not the first to teach this group call system even with respect to the iDEN system. Making specific reference to the iDEN system, Stubbs teaches linking conventional radio sub-network infrastructure using a packet-switched network (*e.g.,* the Internet) through converters in each radio sub-network. Moreover, it discloses that conflicting requests for group call monologs can be resolved at the sub-network level. Likewise, Kent teaches the advantages of decentralizing conflict resolution at the sub-network level. As such, one of ordinary skill in the art would have readily recognized the benefits and results provided by adding the express conflict resolution functions taught by Kent to the system and method disclosed in Stubbs. Ex. 1002 ¶¶ 140, 154–57, 178.

1. Stubbs Teaches Point-to-Multipoint Sub-Networks Connected by a Packet-Switched Network

Stubbs teaches a system and method for group communication using a packet-switched network. Ex. 1006 Abstract, 1:3–5, 2:1–3. Like the '111 Patent, Stubbs discloses the need to adapt existing infrastructure for point-to-multipoint communications. *Id.* 2:17–20, 6–16. In fact, Stubbs expressly describes incorporating new GSM technology, including group call features and packet-switching, into Motorola's iDEN radio communication system. *Id.* 1:3–5, 18–20.

Using iDEN as its starting point, Stubbs describes a system for group calls using a packet-switched network—e.g., the Internet—and converters. Stubbs essentially teaches that multiple communication sub-systems can be linked using the packet-switched network and centralized group controllers. *Id.* 9:11–16, 10:14–17, 16:1–5, 14:6–9. Stubbs's communication system begins with a mobile subscriber initiating a group call. *Id.* 15:15–16. The subscriber's voice is packetized and converted for transmission in the sub-network to the packet-switched network residing between each communication subsystem—referred to as an "external" network linking the various subsystems. *Id.* 15:15–22, 10:12–13, 16:8–11. The converted voice information is transmitted from the packet-switched network to the group control level and sent to another subsystem where the voice packets are converted back to a format usable with other mobile units in that network. *Id.* 16:1–11.

In short, Stubbs discloses exactly what the '111 Patents purports to invent—a group call system linking various sub-networks by converting the voice from one subsystem into packets transmittable to another subsystem. Ex. 1002 ¶¶ 81–83.

2. Kent Discloses Localized Conflict Resolution in Point-to-Multipoint Networks

Kent, quite simply, teaches resolving call conflicts in a multisite setting. Like the '111 Patent, it discloses arbitrating call conflicts outside of a centralized group controller in favor of a "distributed call arbitration processes to avoid the performance bottleneck and the 'single point of failure' mode that would arise from using a conventional central arbitration scheme." Ex. 1007 11:12–14. Moving conflict resolution from a central controller to the subsystem level is precisely what Motorola added to the '111 Patent to overcome the sole rejection during prosecution.

Kent describes exactly the type of conflicts contemplated by the '111 Patent: "Call contention in a multisite environment can occur when multiple callers at different sites attempt to transmit on a common talk group (Call Group) ***at nearly the same moment.***" *Id.* 3:55–60 (emphasis added). Moreover, Kent teaches call arbitration in the same manner at the site (sub-network) control that is claimed in the '111 Patent, the only difference being Kent's "flags" versus "tokens" in the '111 Patent. *Compare id.* 11:44–63 *with* Ex. 1001 6:66–7:24. Kent touts its decentralized arbitration as advantageous "to avoid the performance bottleneck and the ‘single point of failure’ mode that would arise from using a conventional central arbitration scheme.” Ex. 1007 11:12–14. This clear advantage would motivate one of ordinary skill in the art to decentralize the arbitration of Stubbs, and thus it would be obvious to combine the two systems. Ex. 1002 ¶¶ 84–85.

3. Claim 1

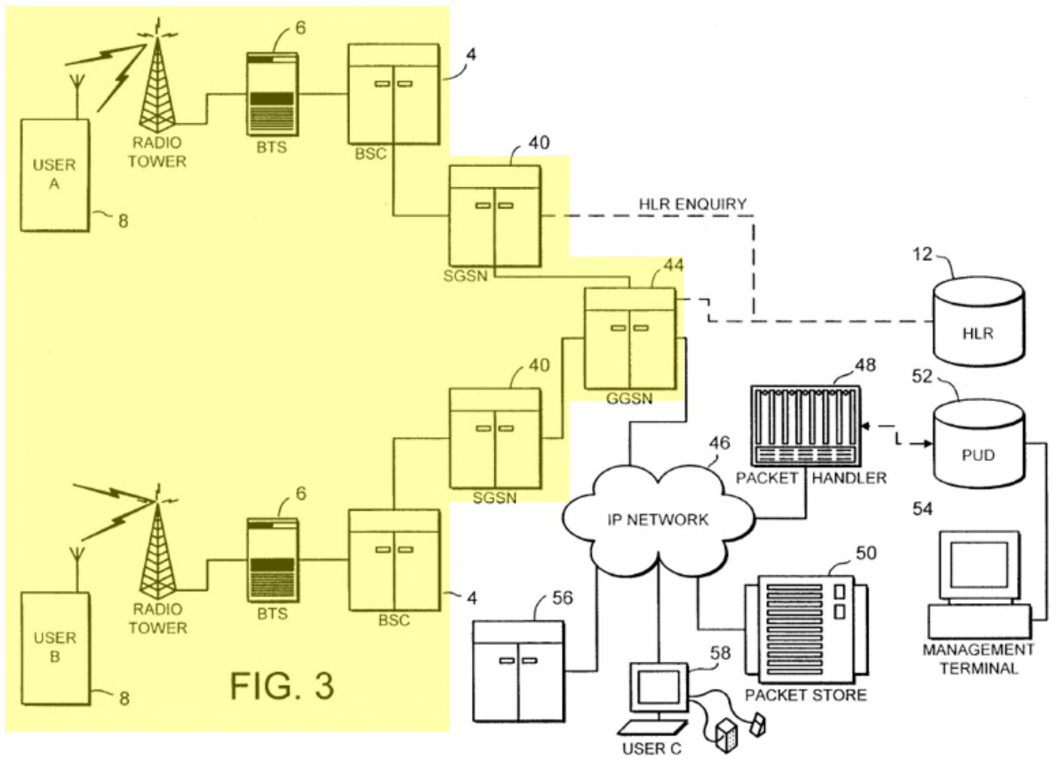
(a) A group radio communication system

Stubbs discloses a mobile communications system with a radio interface. Ex. Ex. 1006 5:1–4, Abstract. Thus, Stubbs discloses a group radio communication system as recited in the preamble of claim 1. Ex. 1002 ¶ 141.

(b) a first radio sub-network configured to implement point-to-multipoint communication sessions within said first radio sub-network

Stubbs discloses a public land mobile network (PLMN) that is a well-known GSM network including general packet radio service (GPRS) support nodes, at least one serving GPRS support node (SGSN) and a gateway GPRS support node (GGSN). Ex. 1006 2:6–7, 3:22–4:229:4–8. Stubbs also discloses base station controllers (BSCs), radio towers, and mobile stations as elements of a PLMN. *Id.* 2:7–12. This is a first radio sub-network just like the radio sub-network recited in the ‘111 Patent claims. Ex. 1002 ¶ 142. The GGSN is a component that interfaces a PLMN with an external packet data network and allows components capable of point-to-multipoint communication to transmit data. Ex. 1006 9:12–16, 4:6–11.

The data is transferred to all the cells—made of mobile stations—in a defined region. *Id.* 4:7–8, 10:18–21. Figure 3 below illustrates the first radio sub-network as disclosed by Stubbs:

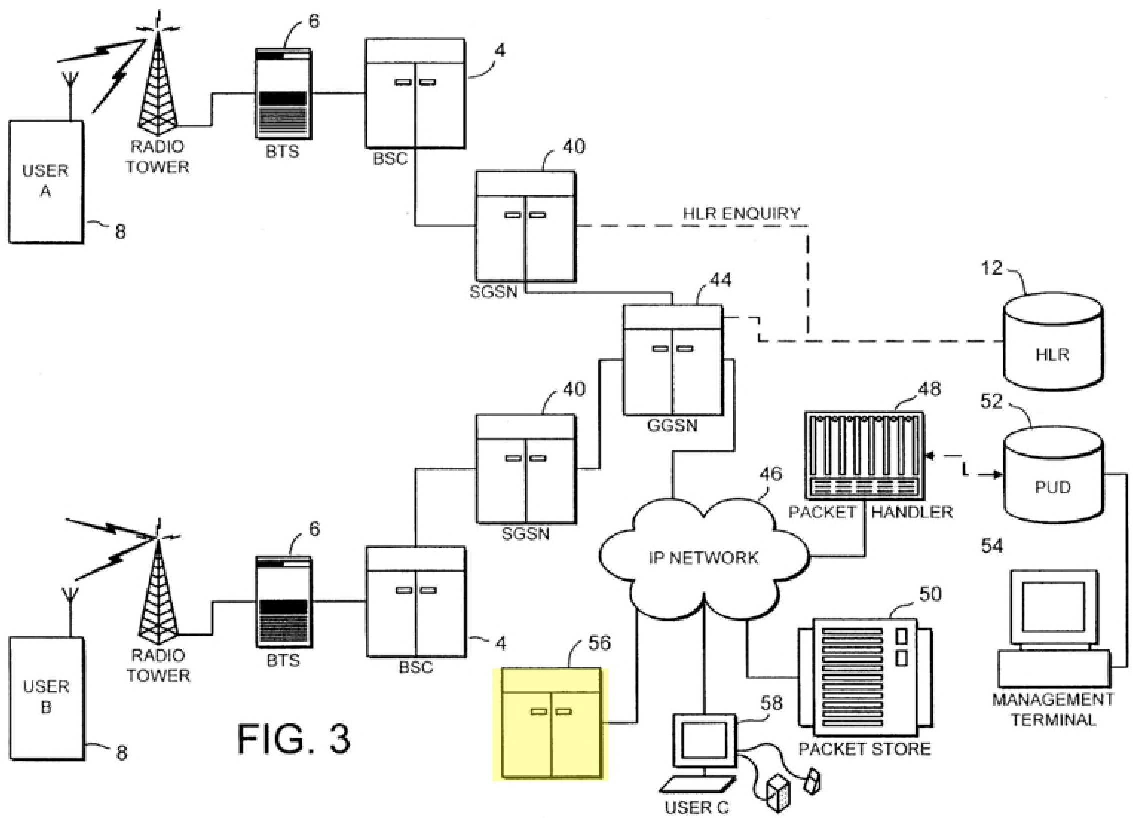


Ex. 1006 Fig. 3 (highlight added)

The GGSN is thus configured to implement point-to-multipoint communication sessions within a first radio sub-network. Ex. 1002 ¶ 142.

> (c) *a second radio sub-network configured to implement point-to-multipoint communication sessions within said second radio sub-network*

Stubbs discloses a second GGSN 56 as part of another PLMN, where this second PLMN has all the same components within it as the first PLMN. Ex. 1006 28:14–22. The second GGSN is also depicted in Figure 3 of Stubbs:



Ex. 1006 Fig. 3 (highlight added)

Thus, all disclosures pertaining to the first PLMN apply to the second PLMN. *Id.* 4:9–8; Ex. 1002 ¶ 143. Stubbs discloses a second radio sub-network configured to implement point-to-multipoint communication sessions within a second radio sub-network as recited in the '111 Patent.

(d) a group controller in data communication with said first radio sub-network and said second radio sub-network, said group controller being configured to manage a common point-to-multipoint communication session involving said first radio sub-network and said second radio sub-network

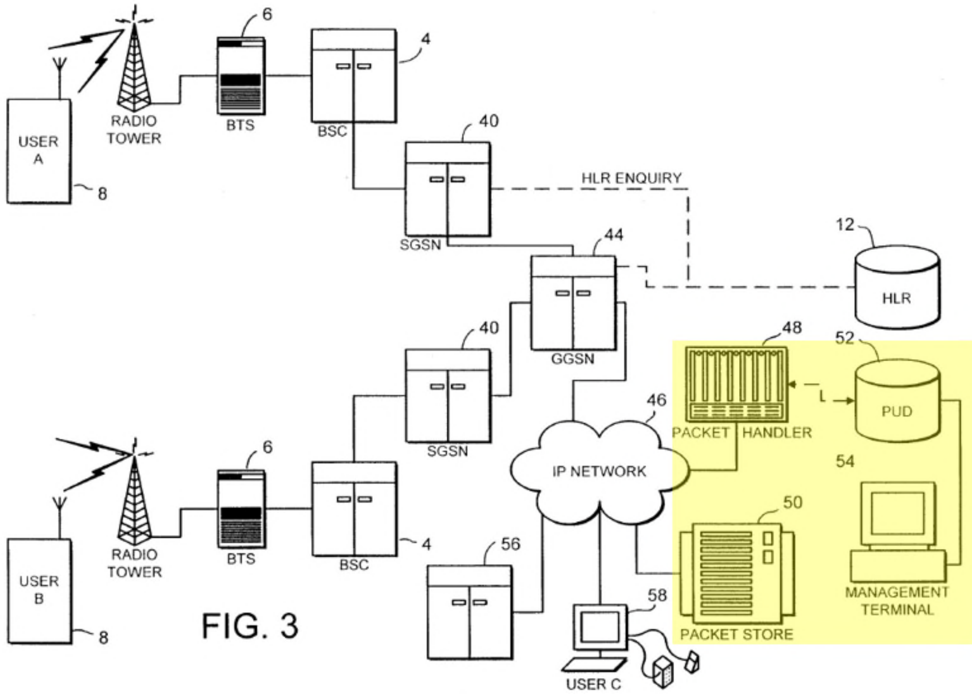
Stubbs discloses a management terminal 54 acting as a group controller. While the '111 Patent provides no more nuance than a computer for its claimed group controller, Stubbs discloses group control of the various sub-networks in a much more detailed manner. In addition to the megamenu terminal 54, Stubbs discloses a home location register (HLR) and packet user database (PUD), each of which facilitate group calls across the various sub-networks. Ex. 1006 15:4–12.

Turning to the group control components disclosed in Stubbs, the HLR stores subscriber information from each mobile station affiliated with the PLMN in the form of a PDP address, which serves as identifying information for message origination or delivery arriving from a packet-switched data network. *Id.* 14:14–19, 15:4–12. The PUD determines whether mobile stations requesting to transmit data are members of a network, and therefore in communication with the other elements of the PLMN. Ex. 1002 ¶¶ 144–48.

Stubbs also discloses a management terminal 54 and PUD 52, where the PUD assists in identifying members of a group, and the management terminal is a computer that updates service data in the PUD. Ex. 1006 12:9–18, 12: 5–8; Ex. 1002 ¶¶ 144–48. Together, these elements define a group controller in data communication with a first radio sub-network and second radio sub-network. *Id.* Packet handler 48 can also be a part of the group controller, or in the alternative, it can be a part of the GGSN.

The packet handler 48 is used to control connections between mobile stations operating in one PLMN and mobile stations operating in other PLMNs. Ex. 1006 28:13–22. Specifically, the packet handler may set up virtual connections between mobile stations operating within the PLMN illustrated in Figure 3. *Id.* 28:16–19. Further, the packet handler specifically sets up virtual connections between mobile stations operating in the illustrated PLMN and mobile stations of other PLMNs. *Id.*

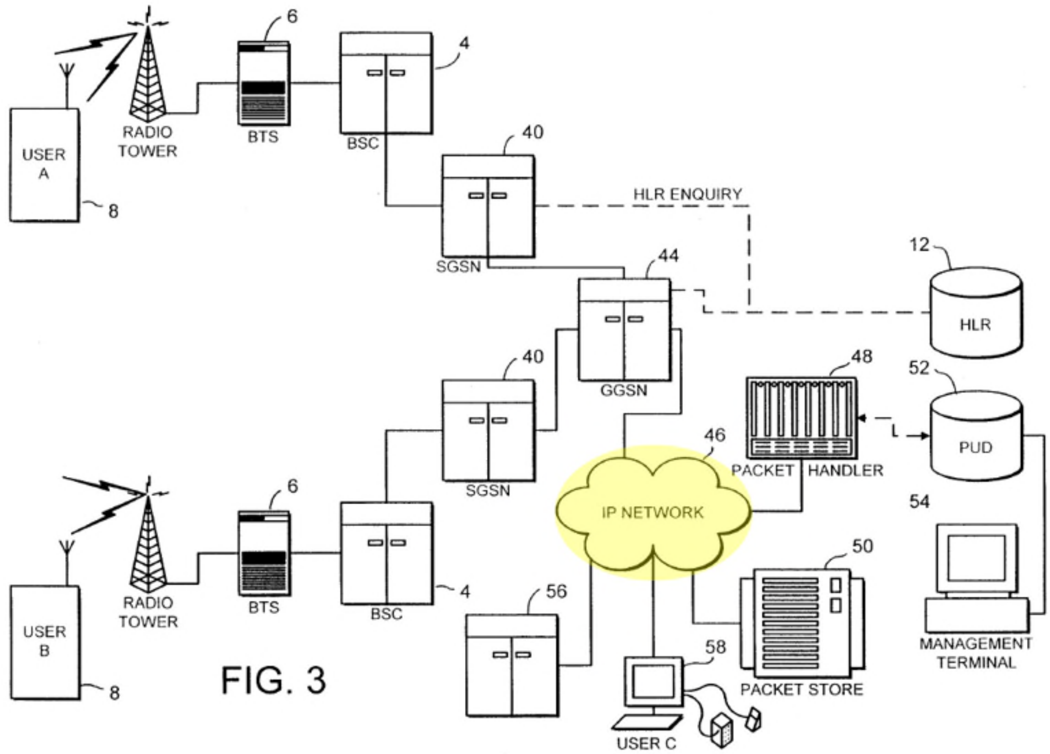
Finally, as shown in Figure 3 below, this group controller structure is located between each of the radio sub-networks described in Stubbs and communicates with each sub-network (the first and second GGSN) and via the packet-switched network. 1002 ¶¶ 144–48.



Ex. 1006 Fig. 3 (highlight added)

> *(e) a packet switched data communication network coupled between said first radio sub-network and said group controller and between said second radio sub-network and said group controller*

Stubbs describes an IP network 46 as a known external packet-switched data network such as a TCP/IP network. Ex. 1006 9:11–12.



Ex. 1006 Fig. 3 (highlight added)

Stubbs also discloses that GGSN 44 interfaces the PLMN with this external packet data network 46, which is coupled to the management terminal by way of the PUD. *Id.* 9:11–16. The data packets originating from the packet handler are transmitted via the network 46 to the GGSN. *Id.* 16:1–5. Thus, Stubbs discloses the recited packet-switched data network coupled between the first radio sub-network and the group controller. Ex. 1002 ¶¶ 149–51.

Stubbs further discloses the packet data network 46 is connected with the GGSN of other PLMNs. Ex. 1006 10:14–17. Thus, Stubbs also teaches the claimed packet-switched data network coupled between the second radio sub-network and the group controller. Ex. 1002 ¶¶ 149–51.

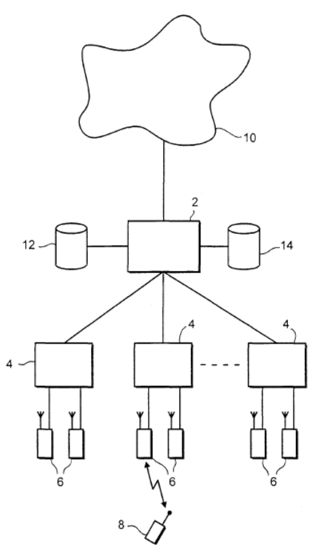
(f) a radio sub-network controller associated with each of said first and second radio sub-networks and a plurality of subscriber radios in communication with said radio sub-network controller

Stubbs discloses that data packets originating at the mobile stations are transmitted via the BSC to the SGSN. Ex. 1006 15:15–16. As explained above in Section IV.D.3(a), the SGSN is a part of a radio sub-network, while the BSC is responsible for encapsulating the data prior to it being transmitted outside a radio sub-network over the IP network. *Id.* 15:15–19. The BSC performs the functions of the radio sub-network controller as described in the '111 Patent. Because each PLMN disclosed in Stubbs has the same components, each of the first and second radio sub-networks has a radio sub-network controller. Ex. 1002 ¶¶ 152–53.

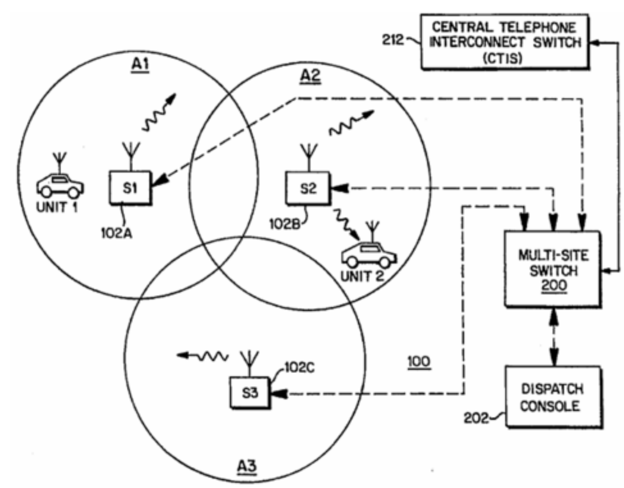
(g) each of said radio sub-network controllers is configured to resolve conflicts between substantially concurrent requests from said plurality of subscriber radios in communication with said radio sub-network controller to be origination points for a point-to-multipoint monolog and to provide subscriber traffic distribution to said plurality of subscriber radios in communication with said radio sub-network controller.

Stubbs teaches conflict resolution and prioritization using the packet handler 48 and further explains that the packet handler functions can be integrated into the GGSN. Ex. 1006 28:11–12. To accomplish this, the packet handler 48 sets up and manages the connectivity between the GPRS users in the PLMN. *Id.* 12:5–7. The packet handler also provides a call seize function and transmits confirmation messages informing a mobile user that its data can be transmitted. *Id.* 20:8–12.

Moreover, Kent teaches a radio sub-network controller that resolves conflicts between substantially concurrent requests, is an origination point for point-to-multipoint communications, and provides subscriber traffic distribution. The "call contentions" are resolved at a multi-site switch. Ex. 1007 11:6–19. In Kent, multiple networks can be connected together to form a system. *Id.* 6:18–21. Seen side-by-side, it is clear how the sub-networks of Stubbs and Kent align:



Ex. 1006 Fig. 1



Ex. 1007 Fig. 1

The MSC of Stubbs (shown in Fig. 1 and included in Fig. 3, see Ex. 1006 9:8) is shown as Multi-Site Switch 200 in Kent. In other words, Kent discloses a point-to-multipoint radio sub-network with the same radio system structure as the one disclosed in Stubbs.

Kent, however, provides explicit detail on the functionality of its multi-site switch (i.e., its "radio sub-network controller"). Kent teaches that its Multi-Site Switch 200 includes an arbitration scheme "to detect call contention situations." Ex. 1007 11:31. These "call contention situations" include receiving a group communication from outside the network when a group communication is already taking place, and originating a group communication from the network when another group communication is already taking place elsewhere. *Id.* 11:64–12:21.

Kent's arbitration scheme is nearly identical to the one disclosed in the '111 Patent. Both use flags at the controller (an "active" flag in the '111 Patent and a "busy flag" in Kent) to track whether a group call is taking place. Ex. 1007 11:44–63; Ex. 1001 6:66–7:24. Ex. 1002 ¶ 154–63. Both disclosures also provide for preemption based on different call priorities. Ex. 1007 12:11–13; Ex. 1001 10:15–7:17; Ex. 1002 ¶¶ 154–63.

Kent also teaches that its Multi-Site Switch 200 is an origination point for a point-to-multipoint communication (i.e., monolog). The Multi-Site Switch 200 includes a "network interface module" or NIM 253 for connecting to other multi-switches of other sub-networks to "provide an even greater coverage area." Ex. 1007 6:20. Whenever a group communication is transmitted form the Multi-Site Switch 200 to another multi-site switch in another sub-network, Multi-Site Switch

200 is an origination point for that communication. Ex. 1002 ¶¶ 154–63.

Finally, Kent teaches that the Multi-Site Switch 200 distributes communications to subscribers in its network via Master Interface Modules, or MIMs 203 that interface with site controllers to distribute communications to subscriber radios via RF links. Ex. 1007 3:16–17, 7:35–56.

Thus, to the extent Stubbs does not explicitly teach the functionalities of its terrestrial controllers through its reference to iDEN, a person of ordinary skill in the art would be motivated to use the decentralized conflict resolution approach of Kent to arbitrate conflicts between subscribers in a talk group to "avoid the potential performance bottleneck and 'single point of failure' mode that would arise from a conventional central arbitration scheme." *Id.* 11:12–14; Ex. 1002 ¶¶ 154–63. One could easily substitute the Multi-Site Switch 200 of Kent for the terrestrial controller 16 of Stubbs, as the networks have nearly identical structures. Ex. 1002 ¶¶ 154–63. Similarly, one of ordinary skill in the art would know to add conflict resolution at the radio sub-network because the management of determining if call data can be transmitted can add the packet handler functions to the GGSN. *Id.* The resulting combination would yield nothing more than predictable results. *Id.*

4. Claim 6

As explained in Section IV.B.4, dependent claim 6 requires that each sub-network have a converter to communicate with the packet-switched network. Stubbs discloses that the GGSN interfaces the PLMN with an external packet data network. Ex. 1006, 9:11–12. Both the GGSN and SGSN in a PLMN provides functionality to permit mobile users to transmit and receive packet mode data. *Id.* 10:14–17. To perform these functions, the GGSN and SGSN must convert data. Ex. 1002 ¶ 164. The data is converted by encapsulating data to be sent outward from the mobile users at the SSGN. Then the encapsulated data is sent to the GGSN, which can be a part of the same node as the SGSN. Ex. 1006 15:15–19, 10:12–13. The data at the GGSN is de-capsulated (another conversion) and sent onward to the external packet data network. Ex. 1006 15:19–22; Ex. 1002 ¶ 164.

Claim 6 also adds the following limitation to the system of claim 1: "said second radio sub-network comprises a second converter configured to translate between said first radio sub-network and said packet switched data communication network." Because Stubbs discloses multiple PLMN, each having the same components, Stubbs discloses a second converter in a second radio sub-network that is configured to translate between a first radio sub-network and a packet-switched data network. Ex. 1006 9:4–8; Ex. 1002 ¶ 165.

5. Claim 7

As explained in Section IV.B.5, dependent claim 7 recites that each sub-network has a protocol for communication between its respective controller and subscriber radios. Stubbs discloses first and second PLMNs each having a BSC, a GGSN and SGSN, and at least one mobile station. Ex. 1006 Fig. 3. Stubbs discloses that the data packets from mobile station 8 are transmitted to the SGSN via the BSC. *Id.* 15:15–16. This means that both the mobile station and the GGSN/SGSN are in communication with the BSC. Ex. 1002 ¶¶ 166–68. Thus Stubbs discloses that a first radio sub-network and first converter are each configured to communication with at first radio sub-network controller. *Id.*

Further, the components are configured to communicate with a protocol established for the first radio sub-network. Stubbs discloses two types of encapsulation, GSN-GSN encapsulation and SGSN-MS encapsulation. Ex. 1006 14:21–15:3. Here, the SGSN-MS encapsulation is used for the connection between the SGSN and mobile station within the same PLMN. Ex. 1006 15:1–3. Thus, a communication protocol as recited n claim 7 is disclosed. Ex. 1002 ¶¶ 166–68.

6. Claims 11 and 15

As explained in Section VI.B.6, claims 11 and 15 add that the radio sub-networks have overlapping radio coverage areas and incompatible protocols. Stubbs discloses its mobile terminal can be a car telephone, which is clearly mobile, because the purpose of a car is to provide mobility from one location to another. Ex. 1006 29:16–20; Ex. 1002 ¶¶ 169–70. A person of ordinary skill in the art would have known that a car telephone would be mobile if it is located in the car, and thus can cross over from one network region to another, while remaining engaged in the same PLMN. Ex. 1002 ¶ 169–70. Thus, Stubbs discloses an overlapping network exists because the mobile phone can remain connected to one PLMN while physically being located in another PLMN's region.

Moreover, as explained in Section IV.A, having networks with two different protocols does not provide any novel or unexpected result. The claims already require a converter, which would be pointless if there was only a single protocol across the entire network, because no conversion would be necessary. Ex. 1002 ¶¶ 171–72. Accordingly, having different protocols among the sub-networks is an obvious design choice and renders claims 11 and 15 obvious in light of Stubbs and Kent. *Id.*

7. Claims 12 and 16

Dependent claims 12 and 16 require that the radio sub-networks have non-overlapping radio coverage area. *See* Section IV.B.7. As explained in Section IV.A, having wireless coverage areas overlap or not does not provide any novel or unexpected result. Indeed, the fact that there are dependent claims directed to both scenarios proves that the state of overlap has no bearing on the rest of the claim elements. The alleged invention functions the same way under both conditions, as one of ordinary skill in the art would readily expect. Ex. 1002 ¶ 173. Accordingly, having non-overlapping coverage areas is an obvious design choice and renders claims 11 and 15 obvious in light of Stubbs and Kent. *Id.*

8. Claim 13

(a) A method of implementing a common point-to-multipoint communication session involving first and second radio sub-networks

As explained above, Stubbs discloses a first and second PLMN that each have a GGSN which interfaces the PLMN with a packet-switched data network. Ex. 1006 9:12–16, 4:6–11. The GGSN provides components capable of point-to-multipoint communication to transmit data. *Id.* 9:12–16 4:6–11. A second PLMN has a GGSN and all other components of the first PLMN. *Id.* 9:4–8. Therefore, Stubbs discloses a method of implementing a common point-to-multipoint communication session involving a first and second radio sub-networks. Ex. 1002 ¶ 174.

(b) coupling said [first/second] radio sub-network to a packet switched communication network

Stubbs discloses first and second PLMNs (radio sub-networks), each having a GGSN to serve as an interface with a packet-switched data network. Ex. 1006 9:4–16. Ex. 1002 ¶¶ 149–51. Stubbs also discloses that packet data network is connected with the GGSN of other PLMNs. *Id.* 10:14–17. Further, Stubbs discloses a method where a data packet is transmitted via the packet data network to a GGSN. *Id.* 16:4–7.

> *(c)* *coupling a group controller to said data communication network*

As explained above related to claim 1, Stubbs discloses a management terminal, PUD, and HLR that serve as a group controller, particularly because the management terminal is a computer, as stated in the '111 Patent. Ex. 1006 12:9–18, 12:5–8. These elements are coupled to the IP network in Stubbs. *Id.* Fig. 3. Therefore, Stubbs discloses that a group controller is coupled to a packet-switched data network. Ex. 1002 ¶¶ 149–51.

> *(d)* *routing a point-to-multipoint monolog from said first radio sub-network through said group controller to said second radio sub-network*

Stubbs discloses sending communications as data through a point-to-multipoint network. Ex. 1006 4:6–11. The message is first in the form of data packets which originate at a mobile station. *Id.* 15:15–16. The data packets are transmitted via a BSC to the SGSN and thus the GGSN. *Id.* The GGSN contains functionality for the point-to-multipoint transmission of data. *Id.* 9:12–16, 4:6–11. The data is then transferred to all the cells in a defined region. *Id.* 4:7–8. The cells have mobile stations which may receive packet mode data, thereby disclosing this limitation. *Id.* 10:18–21; Ex. 1002 ¶¶ 144–48.

(e) converting said point-to-multipoint monolog into packets for distribution through said packet switched data communication network and said group controller

receiving said point-to-multipoint monolog at a first converter configured to communicate in said first radio sub-network using a communication protocol established for said first radio sub-network

transmitting said point-to-multipoint monolog as packets over said packet switched data communication network using a protocol established for said packet switched data communication network.

The last three limitations of claim 13 all involve conversion of communication data between a sub-network and the packet-switched network. The BSC encapsulates the data prior to it being transmitted outside a radio sub-network over the IP network. Ex. 1006 15:15–19. Thus, the BSC performs the functions of the radio sub-network controller as described in the '111 Patent. Further, the data is encapsulated at the SSGN, then sent to the GGSN, where it is de-capsulated (another conversion) and sent to the external packet data network. *Id.* 15:15–22, 10:12–13. When de-capsulated, the data is in the form of packets. *Id.* 15:19–22. The packets are then forwarded to the packet handler for transmission to mobile stations via a BSC, BTS, and GPRS radio interface, in the form of packets. *Id.* 16:8–11. Thus, Stubbs discloses converting the monolog into packets and distributing them through a packet-switched data network and group controller. Ex. 1002 ¶¶ 175–77.

Stubbs also discloses SGSN-MS encapsulation occurring at the SGSN for communication between the SGSN and a mobile station within the same PLMN. Ex. 1006 15:1–3. The SGSN and GGSN act as a converter because of the encapsulation and de-capsulation which takes place. Ex. 1002 ¶¶ 175–77. The de-capsulation is part of the process that converts the data into a protocol readable by the radio sub-network. Ex. 1006 15:19–22, 16:4–11. Thus, Stubbs discloses a converter configured to communicate in a first radio sub-network with a protocol established for such first radio sub-network. Ex. 1002 ¶¶ 175–77.

VII. MANDATORY NOTICES

A. Real Party in Interest

The real parties-in-interest are Hytera Communications Corp. Ltd., Hytera America, Inc., and Hytera Communications America (West), Inc.

B. Related Matters

The '111 Patent has been asserted in the following pending matters: *Certain Two-Way Radio Equipment and Systems, Related Software and Components Thereof,* 337-TA-1053 (ITC) (April 28, 2017); and *Motorola Solutions, Inc. v. Hytera Communications Corporation Ltd. et al*, 1:17-cv-01972 (N.D. Ill. 2017).

C. Lead and Back-Up Counsel

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D. Service Information

Hytera consents to e-mail service at the above e-mail addresses and ipupdate@calfee.com.

VIII. Grounds for Standing

Petitioner certifies that the '111 Patent is available for *inter partes* review and that Petitioner is not barred or estopped from requesting *inter partes* review challenging the patent claims on the grounds identified in this petition.

IX. Conclusion

For the reasons set forth above, the challenged claims 1, 6–7, 11–13, and 15–16 of the '111 Patent are unpatentable, so trial should be instituted and the claims should be cancelled. Please charge any required fees to Deposit Account

No. 03-0172.

Respectfully submitted,

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ATTORNEYS FOR PETITIONER

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(b)(1), the undersigned hereby certifies that the foregoing Petition contains 13,984 words, excluding a table of contents, a table of authorities, mandatory notices under 37 C.F.R. § 42.8, a certificate of service or word count, or appendix of exhibits or claim listing, as measured by the word-processing system used to prepare this paper.

Dated: November 9, 2017

By: /Todd R. Tucker/
Todd R. Tucker
Registration No. 40,850
Attorney for Petitioner

PETITION FOR INTER PARTES REVIEW
OF U.S. PATENT No. 6,591,111

Attachment A:
Proof of Service of the Petition

CERTIFICATE OF SERVICE

The undersigned certifies that the foregoing Petition for Inter Partes Review, the associated Power of Attorney, and Exhibits 1001 through 1010 were served on November 9, 2017, by Priority Express Mail at the following address of record for the subject patent.

MOTOROLA SOLUTIONS, INC.
IP Law Docketing
500 W. Monroe
43rd Floor
Chicago IL 60661

Dated: November 9, 2017

By: /Todd R. Tucker/
Todd R. Tucker
Registration No. 40,850
Attorney for Petitioner

PETITION FOR INTER PARTES REVIEW
OF U.S. PATENT NO. 6,591,111

Attachment B:

List of Evidence and Exhibits Relied Upon in Petition

ATTACHMENT B

List of Exhibits

Exhibit #	Reference Name
Exhibit 1001	U.S. Patent No. 6,591,111
Exhibit 1002	Declaration of Michael Davies
Exhibit 1003	U.S. Patent No. 6,301,263 ("Maggenti")
Exhibit 1004	U.S. Patent No. 5,398,248 ("Shepherd")
Exhibit 1005	U.S. Patent No. 5,987,331 ("Grube")
Exhibit 1006	PCT Publication No. WO 99/63773 ("Stubbs")
Exhibit 1007	U.S. Patent No. 5,659,881 ("Kent")
Exhibit 1008	iDEN™ Technical Overview, Motorola, Version 68P81095E55-A (Aug. 16, 1996), filed as prior art during prosecution of U.S. Patent No. 7,606,594, Apr. 21, 2003
Exhibit 1009	Prosecution file history of U.S. Patent No. 6,591,111 ("'111 Patent Prosecution History")
Exhibit 1010	Declaration of Todd R. Tucker