IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

_____

BEFORE THE PATENT TRIAL AND APPEAL BOARD

_____

SAMSUNG ELECTRONICS AMERICA, INC.,

SAMSUNG ELECTRONICS CO., LTD.,

Petitioners,

v.

COBBLESTONE WIRELESS, LLC,

Patent Owner.

_____

Case No. IPR2024-00318

U.S. Patent No. 8,554,196

_____

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 8,554,196

TABLE OF CONTENTS

I. Introduction 1

II. Standing 3

III. Identification of Challenge And Relief Requested 3

IV. Level Of Ordinary Skill In The Art 3

V. The ’196 patent 4

A. Overview 4

B. Prosecution History of the ’196 patent 5

VI. Overview Of The Prior Art 5

A. Chitrapu (Ex. 1005) 5

B. Wong (Ex. 1006) 7

C. Dinan (Ex. 1007) 9

VII. Claim Construction 10

VIII. Detailed Explanation of Invalidity Grounds 10

A. Ground 1: Claims 1-5, 7, 10, 12, 14, 17, 18, 20, and 21 are Rendered Obvious in View of Chitrapu 10

1. Claim 1 10

2. Claim 2: “The method of claim 1, wherein the providing the second coverage configuration comprises determining a direction of transmission for the second beam based at least in part on a location of the at least one continuous use device.” 20

3. Claim 3: “The method of claim 1, wherein the second beam of the first network is further configured to provide coverage to a second continuous use device of the group of devices.” 21

4. Claim 4: "The method of claim 1, wherein a subsequent iteration of providing the second coverage configuration includes transmitting the second beam of the first network configured to provide coverage to a second continuous use device, and wherein the at least one continuous use device has transitioned to being an interval use device." 21

5. Claim 5: "The method of claim 1, wherein the first network and the second network are different network types." 23

6. Claim 7: "The method of claim 1, wherein the first network and the second network are the same network types, and wherein the at least one continuous use device is allowed access to the second beam based on an admission control parameter." 23

7. Claim 10: "The method of claim 1, wherein the at least one continuous use device is engaged in at least one of a voice call, a download, or a content streaming." 25

8. Claim 12: "The method of claim 1, wherein the second beam is narrower than the first beam in at least one of a horizontal plane or a vertical plane." 25

9. Claim 14 27

10. Claims 17, 18, 20, 21 34

B. Ground 2: Claims 1-5, 7, 8, 12, 14, 17, 18, 20, and 21 Are Rendered Obvious by Chitrapu in View of Wong 35

1. Rationale to Combine Chitrapu with Wong 36

2. Limitations 1[a], 14[a], 17[a], and 20[a]: "cycling over time through a coverage sequence" 40

3. Claim 5 40

4. Claim 8: "The method of claim 1, wherein the first coverage configuration is provided for a first time duration and the second coverage configuration is

provided for a second time duration that is longer than the first time duration." 41

C. Ground 3: Claims 1-5, 8, 10, 12, 14, 17, and 20 Are Rendered Obvious by Dinan in View of Wong 42

1. Rationale to Combine Dinan with Wong 42

2. Claim 1 45

3. Claim 2: "The method of claim 1, wherein the providing the second coverage configuration comprises determining a direction of transmission for the second beam based at least in part on a location of the at least one continuous use device." 55

4. Claim 3: "The method of claim 1, wherein the second beam of the first network is further configured to provide coverage to a second continuous use device of the group of devices." 56

5. Claim 4: "The method of claim 1, wherein a subsequent iteration of providing the second coverage configuration includes transmitting the second beam of the first network configured to provide coverage to a second continuous use device, and wherein the at least one continuous use device has transitioned to being an interval use device." 56

6. Claim 5: "The method of claim 1, wherein the first network and the second network are different network types." 57

7. Claim 8: "The method of claim 1, wherein the first coverage configuration is provided for a first time duration and the second coverage configuration is provided for a second time duration that is longer than the first time duration." 57

8. Claims 10: "The method of claim 1, wherein the at least one continuous use device is engaged in at least one of a voice call, a download, or a content streaming." 57

9. Claims 12: "The method of claim 1, wherein the second beam is narrower than the first beam in at least one of a horizontal plane or a vertical plane." 58

10. Claim 14 58

11. Claims 17 and 20 64

IX. Discretionary Denial 66

A. *Fintiv* 66

B. *General Plastic* 67

C. 35 U.S.C. §325(d) 68

X. Ranking of Parallel Petitions 69

XI. Mandatory Notices And Fees 71

A. Real Party-In-Interest 71

B. Related Matters 71

C. Counsel and Service Information 72

D. Payment of Fees 73

XII. Conclusion 73

EXHIBIT LIST

Ex.	Description
1001	U.S. Patent No. 8,554,196 (“’196 patent”)
1002	File History for U.S. Patent No. 8,554,196
1003	Declaration of Dr. Kevin Almeroth
1004	*Curriculum Vitae* of Dr. Kevin Almeroth
1005	U.S. Patent Pub. No. 2005/0261028 (“Chitrapu”)
1006	U.S. Patent No. 8,548,525 (“Wong”)
1007	U.S. Patent No. 8,285,291 (“Dinan”)
1008	Patent Owner’s Infringement Contentions in *Cobblestone Wireless, LLC v. Samsung Electronics America, Inc., et al.*, No. 2:23-cv-00285 (E.D. Tex.) filed June 16, 2023
1009	*Cobblestone Wireless, LLC v. Samsung Electronics Co., Ltd.*, No. 2:22-cv-00285-JRG-RSP, Dkt. 29-1, Docket Control Order

LIST OF CHALLENGED CLAIMS

Claim	Limitation
1[pre]	A method for providing network coverage for a group of devices in an area comprising:
1[a]	cycling over time through a coverage sequence that includes providing a first coverage configuration and providing a second coverage configuration, wherein:
1[b]	providing the first coverage configuration includes transmitting a first beam of a first network that is configured to provide coverage for the group of devices; and
1[c]	providing the second coverage configuration includes transmitting a second beam of the first network that is narrower than the first beam and configured to provide coverage to at least one continuous use device of the group of devices, the at least one continuous use device being actively involved in a substantially continuous service with the network,
1[d]	and providing coverage by a second network to a plurality of interval use devices of the group of devices.
2	The method of claim 1, wherein the providing the second coverage configuration comprises determining a direction of transmission for the second beam based at least in part on a location of the at least one continuous use device.
3	The method of claim 1, wherein the second beam of the first network is further configured to provide coverage to a second continuous use device of the group of devices.
4	The method of claim 1, wherein a subsequent iteration of providing the second coverage configuration includes

Claim	Limitation
	transmitting the second beam of the first network configured to provide coverage to a second continuous use device, and wherein the at least one continuous use device has transitioned to being an interval use device.
5	The method of claim 1, wherein the first network and the second network are different network types.
7	The method of claim 1, wherein the first network and the second network are the same network types, and wherein the at least one continuous use device is allowed access to the second beam based on an admission control parameter.
8	The method of claim 1, wherein the first coverage configuration is provided for a first time duration and the second coverage configuration is provided for a second time duration that is longer than the first time duration.
10	The method of claim 1, wherein the at least one continuous use device is engaged in at least one of a voice call, a download, or a content streaming.
12	The method of claim 1, wherein the second beam is narrower than the first beam in at least one of a horizontal plane or a vertical plane.
14[pre]	A method for providing network coverage for a group of devices in an area comprising:

Claim	Limitation
14[a]	cycling over time through a coverage sequence that includes providing a first coverage configuration, providing a second coverage configuration, and providing a third coverage configuration, wherein:
14[b]	providing the first coverage configuration includes transmitting a first beam of a first network that is configured to provide coverage for a first set of the group of devices, and providing coverage by a second network to at least a second set of the group of devices;
14[c]	providing the second coverage configuration includes transmitting a second beam of the first network that is configured to provide coverage for the second set of the group of devices, and providing coverage by the second network to at least the first set of the group of devices; and
14[d]	providing the third coverage configuration includes transmitting a third beam of the first network that is narrower than the first beam and is configured to provide coverage to at least one continuous use device of the group of devices, the at least one continuous use device being actively involved in a substantially continuous service with the network,
14[e]	and providing coverage by the second network to at least a plurality of interval use devices of the group.
17[pre]	A machine readable non-transitory medium having stored therein instructions that, when executed, cause a device to provide a network coverage by:
17[a]	cycling over time through a coverage sequence that includes providing a first coverage configuration and providing a second coverage configuration, wherein:

Claim	Limitation
17[b]	providing the first coverage configuration includes transmitting a first beam of a first network that is configured to provide coverage for the group of devices; and
17[c]	providing the second coverage configuration includes transmitting a second beam of the first network that is narrower than the first beam and configured to provide coverage to at least one continuous use device of the group of devices, the at least one continuous use device being actively involved in a substantially continuous service with the network,
17[d]	and providing coverage by a second network to a plurality of interval use devices of the group of devices.
18	The machine readable non-transitory medium of claim 17, wherein the first network and the second network are the same network types, and wherein the at least one active device is allowed access to the second beam based on an admission control parameter.
20[pre]	A device comprising: a machine readable medium having stored therein instructions that, when executed, cause the device to provide network coverage by:
20[a]	cycling over time through a coverage sequence that includes providing a first coverage configuration and providing a second coverage configuration, wherein:
20[b]	providing the first coverage configuration includes transmitting a first beam of a first network that is configured to provide coverage for the group of devices; and
20[c]	providing the second coverage configuration includes transmitting a second beam of the first network that is narrower than the first beam and configured to provide coverage to at least

Claim	Limitation
	one continuous use device of the group of devices, the at least one continuous use device being actively involved in a substantially continuous service with the network,
20[d]	and providing coverage by a second network to a plurality of interval use devices of the group of devices;
20[e]	a processor coupled to the machine readable medium to execute the instructions; and
20[f]	an adaptive antenna configured to transmit the first beam and the second beam.
21	The device of claim 20, wherein the first network and the second network are the same network types, the at least one active device is allowed access to the second beam based on an admission control parameter, and the adaptive antenna is further configured to transmit a third beam of the second network.

I. INTRODUCTION

Samsung Electronics America, Inc. and Samsung Electronics Co., Ltd. ("Petitioners") respectfully requests *inter partes review* of claims 1-5, 7, 8, 10, 12, 14, 17, 18, 20, and 21 (the "Challenged Claims") of U.S. Patent No. 8,554,196 (the "'196 patent") pursuant to 35 U.S.C. §311 and 37 C.F.R. §42.100.

The '196 patent is directed to conventional beamforming techniques in a wireless system that were well-known by the patent's earliest priority date, August 2011. The claims of the '196 patent describe providing coverage to mobile devices using a wide beam for intermittent data usage and a narrow beam better suited for continuous use (such as streaming or downloading). Such techniques had long been used in wireless systems.

For example, Chitrapu discloses a wireless system that uses three beams: (1) an omni-directional beam for initial handshaking, (2) a narrow cover beam for broadcasting or paging messages, and (3) a very narrow center beam for providing high throughput transmission of data. Chitrapu discloses cycling through these different beams to provide the level of service needed by the mobile device. Chitrapu also discloses that the omni-directional beam or cover beam can locate the device so that the center beam can be directed toward the device.

Another example is Dinan, which describes an algorithm for providing simultaneous 3G and 4G coverage, where a device is assigned 3G or 4G service

depending on its data and QoS needs. Dinan discloses that applications with high QoS needs, such as video streaming or VoIP, are given the highest priority to 4G service, whereas applications with intermittent data usage, such as Email, is given the lowest priority and often assigned 3G service. In an environment that allows for beamforming, a POSITA would have looked to a variety of references to describe how to specifically implement beamforming. One such example is Wong. It would have been obvious to combine it with Wong, which expressly discloses using antenna patterns in a WiMAX (a 4G service) system and a scheduler that cycles through these patterns. These antenna patterns use beams of various widths depending on the particular needs of the coverage area. For example, Wong discloses that the scheduler can initially use 90 degree beam patterns around a coverage area, and then schedule narrower antenna patterns if it detects high traffic, or wider antenna patterns if it detects low amounts of traffic.

Along with this Petition, Petitioners have concurrently filed another Petition (IPR2024-00317) against different claims of the ’196 Patent using different prior art. That Petition is a copycat of the Petition filed in *T-Mobile USA, Inc. et al. v. Cobblestone Wireless, LLC*, IPR2024-00135. The claims, prior art, and arguments in the Copycat Petition are materially different from those in this Petition.

II. STANDING

Petitioners certify that the ’196 patent is available for IPR and that Petitioners are not barred or estopped from presenting the grounds identified in this Petition.

III. IDENTIFICATION OF CHALLENGE AND RELIEF REQUESTED

Petitioners request cancellation of claims 1-5, 7, 8, 10, 12, 14, 17, 18, 20, 21 (“Challenged Claims”) on the following grounds:

Ground	Reference(s)	Basis	Claims
1	Chitrapu	§103	1-5, 7, 10, 12, 14, 17, 18, 20, 21
2	Chitrapu, Wong	§103	1-5, 7, 8, 10, 12, 14, 17, 18, 20, 21
3	Dinan, Wong	§103	1-5, 8, 10, 12, 14, 17, 20

IV. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art (“POSITA”) as of August 24, 2011 would have had at least a bachelor’s degree in electrical engineering, computer engineering, computer science, physics, or the equivalent, and at least two years of experience working in the field. Ex. 1003, ¶¶50-51. Less work experience may be compensated by a higher level of education or vice versa. *Id*. Relevant working experience would include experience with cellular telecommunications and networking, radio-access networking architectures, protocols and signal propagation in wireless networks. *Id.* Petitioners’ expert, Dr. Kevin Almeroth, exceeds this definition. *Id.*, ¶51.

V. THE '196 PATENT

A. Overview

U.S. Pat. No. 8,554,196 (the "'196 patent") is directed to "Technologies and implementations for providing network coverage by cycling through beam shape coverage configurations." Ex. 1001, Abstract; Ex. 1003, ¶¶52-53. The claims are directed to cycling through two or more coverage configurations. For example, "a first coverage configuration may include a beam that may be relatively wide such that it may provide coverage for all the devices in an area or sector." Ex. 1001, 3:38-41. And a "second coverage configuration may include a beam that may be relatively narrow such that it may provide coverage by the first network type for one or more continuous use devices in the area." *Id.*, 3:42-45.

The '196 patent describes "continuous use devices" as "a device that may be actively involved in a substantially continuous service with the network," such as "a voice call, a download, a content streaming, or the like." *Id.*, 3:47-51. The '196 patent further describes "interval use devices" that "may have applications that require intermittent updating such as, for example, social networking applications, email, Really Simple Syndication (RSS) feeds, map updates, game update, sports score update, or the like." *Id.*, 4:10-13. Because of the intermittent use of such applications, "during the second coverage configuration, the interval use devices may be on a less capable network." *Id.*, 4:14-15.

B. Prosecution History of the '196 patent

The '196 Patent originated with the filing of U.S. Patent Application No. 13/321,792 ("the '792 App.") on November 21, 2011. Ex. 1001, Cover. The '196 Patent claims ultimate priority to PCT Application No. PCT/US2011/049003, which was filed on August 24, 2011. *Id*. The Patentee also petitioned to join the Patent Prosecution Highway program based on the PCT application, which was granted on March 7, 2012. Ex. 1002, 244; Ex. 1003, ¶¶54-55.

After joining the Patent Prosecution Highway program, the '196 Patent had a brief prosecution history consisting only of a single rejection. In that non-final rejection, the examiner rejected all claims under 35 U.S.C. § 103(a) as unpatentable over Vendryes (U.S. Patent No. 6,546,259) in view of Gale et al. (U.S. Patent App. Pub. No. 2011/0223925). Ex. 1002, 70. In response, the applicant amended the claims to specify that the continuous use device is "actively involved in a substantially continuous service with the network." Ex. 1002, 42-60. The applicant also argued that Gale does not disclose continuous service with the network. *Id.*

Following those amendments, the examiner allowed the claims. *Id.*, 33.

VI. OVERVIEW OF THE PRIOR ART

A. Chitrapu (Ex. 1005)

U.S. Patent Pub. No. 2005/0261028 ("Chitrapu") was published on November 24, 2005 and is therefore prior art under pre-AIA §102(b).

Chitrapu discloses a base station that provides network coverage using three types of beams: (1) omni-directional beams for initial handshaking, (2) cover beams for intermittent usage such as broadcasting and paging, and (3) center beams for high-throughput, high quality-of-service transmissions. Ex. 1003, ¶¶58-59. Chitrapu discloses "a base station" that provides network coverage to "a plurality of WTRUs," *i.e.*, "wireless transmit/receive units" that include "any ... type of device capable of operating in a wireless environment." Ex. 1005, ¶18, 11; Fig. 3A. For example, in Figure 3A, omni-directional beam 206 and cover beam 204 both provide network coverage to devices 216 and 218 (and additional devices not shown). Ex. 1003, ¶58.

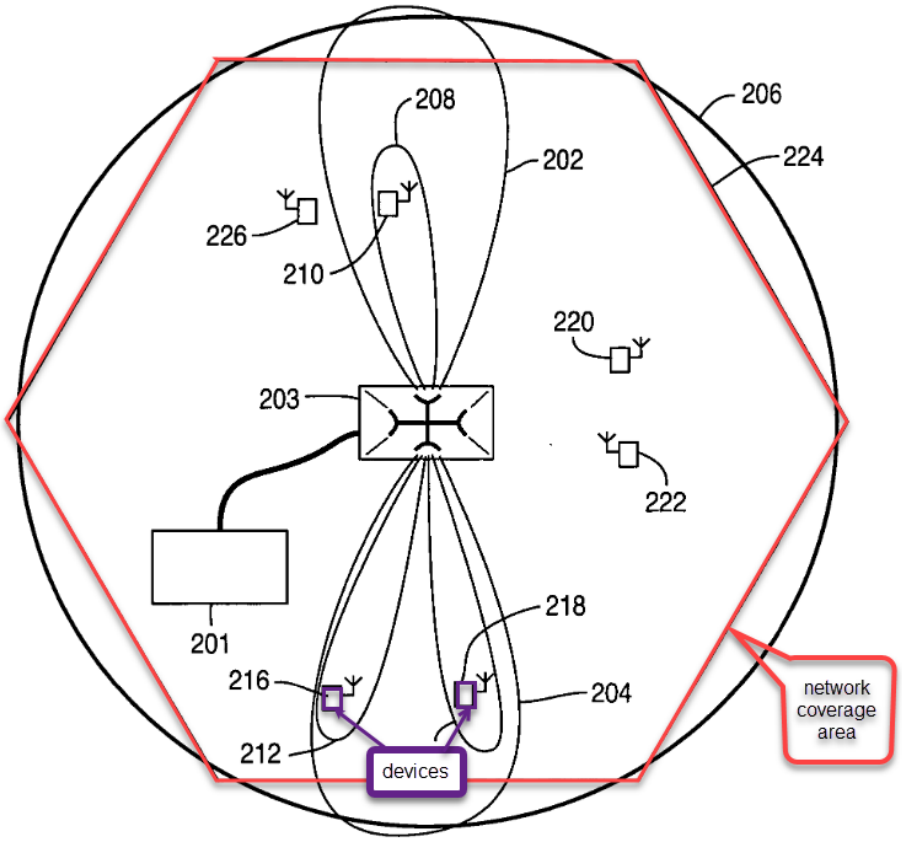


FIG. 3A

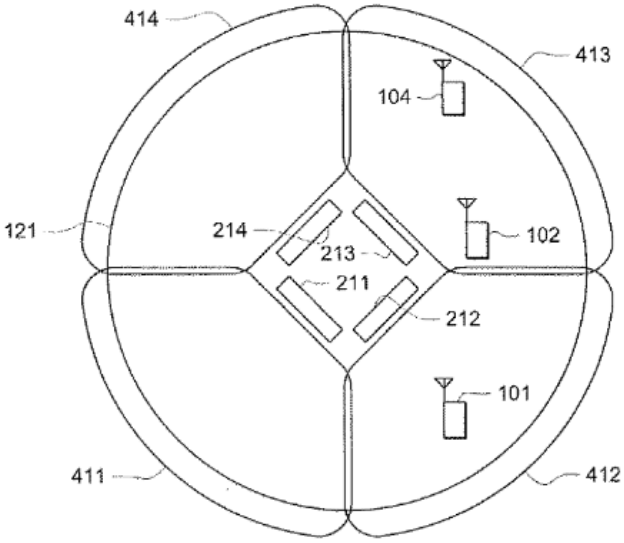
Chitrapu further discloses that when "new cover beams need to be deployed to bring additional WTRUs [*i.e.*, ***devices***] within the coverage areas of a cover beam," the system "may adjust [a pre-existing] cover beam ... and deploy an additional center beam ... focused" on the device. Ex. 1005, ¶24. For example, in Figure 3A, device 226 is not currently being covered by a cover or center beam. Ex. 1003, ¶59.

B. Wong (Ex. 1006)

U.S. Patent No. 8,548,525 ("Wong") was published on January 1, 2009. It is therefore prior art under pre-AIA §102(b).

Wong teaches a system where "various narrow and/or wide antenna patterns may be selected ... for directing to particular portions of [a] service area ... and the initial scheduling plan invoked by scheduler 242 may be adapted." Ex. 1006, 8:51-54. In a "highly simplified representation," Figure 4 of Wong depicts "4 substantially 90° antenna patterns [411-414]", which together "provide illumination of service area 121." *Id.*, 8:56-67; Ex. 1003, ¶60.

FIG. 4



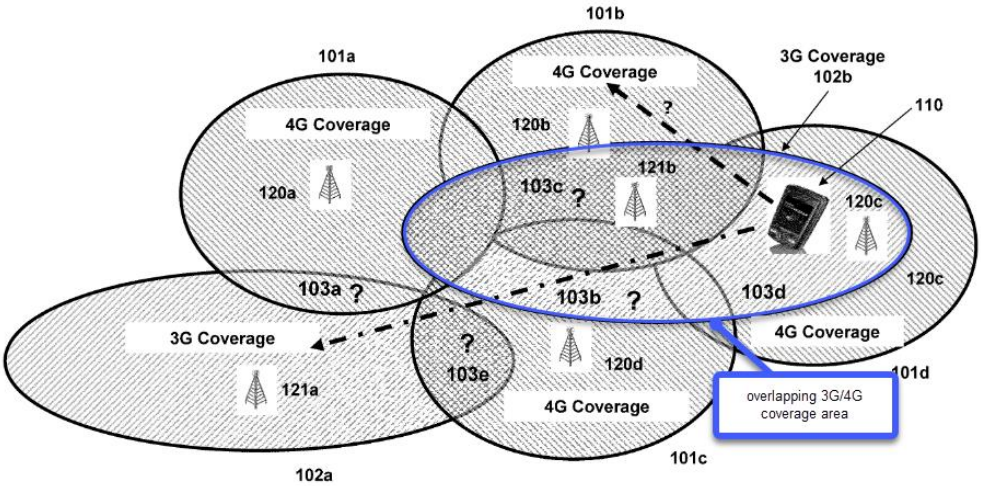
Wong teaches that the scheduler could cycle to another coverage configuration which uses narrow beams by selecting antenna patterns depicted in Figure 5, where "antenna pattern 413 has been replaced with antenna patterns 513 and 514," both of which are narrower than the beam in antenna pattern 413. Ex. 1006, 12:58-59; Ex. 1003, ¶61. In particular, "[a]ntenna pattern 514 provides a more

narrow beam antenna pattern consistent with the higher utilization of the corresponding portion of service area 121." *Id.*, 12:64-67.

C. Dinan (Ex. 1007)

U.S. Patent No. 8,285,291 ("Dinan") was filed on February 2, 2010 and published on August 4, 2011. It is therefore prior art under pre-AIA §102(a) and (e).

Dinan teaches a "operating a dual-mode 3G/4G communications device capable of operating in either a 3G or 4G network when in an area with overlapping 3G and 4G coverage." Ex. 1007, 7:19-22. Thus, as depicted in Figure 1, "dual-mode device 110 is in a coverage overlap area with acceptable 3G and 4G network access." *Id.*, 12:45-46; Ex. 1003, ¶62.



Dinan further describes an algorithm for determining whether a device is assigned 3G or 4G service. Ex. 1003, ¶63. In particular, Dinan uses "QoS categories" to "assign relatively higher or lower priority to various application

types." Ex. 1007, 11:48-49. For example, "streaming of high definition (HD) video, video conferencing, and voice (e.g., VoIP) may be assigned a highest QoS category, i.e., category 'C1', while applications of lesser relative importance or with less stringent data latency requirements may be assigned lower QoS categories 'C2' or 'C3'." *Id.*, 11:49-54. A higher QoS category will be given priority to 4G service, whereas a lower QoS category will often be assigned 3G service. *Id.*, 15:3-38; Ex. 1003, ¶63.

VII. CLAIM CONSTRUCTION

Petitioners have applied the ordinary and customary meaning of the claim terms as they would have been understood by a POSITA at the time of the alleged invention, in the context of the '196 patent and its prosecution history. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (*en banc*). Petitioners do not believe any term needs to be expressly construed beyond its plain and ordinary meaning. Ex. 1003, ¶¶56-57.

VIII. DETAILED EXPLANATION OF INVALIDITY GROUNDS

The following grounds establish a reasonable likelihood that the Petitioners will prevail with respect to the Challenged Claims. Ex. 1003, ¶¶64-231.

A. Ground 1: Claims 1-5, 7, 10, 12, 14, 17, 18, 20, and 21 are Rendered Obvious in View of Chitrapu

1. Claim 1

(a) 1[pre]: A method for providing network coverage for a group of devices in an area comprising:

To the extent the preamble is limiting, Chitrapu discloses this limitation. Ex. 1003, ¶64. Chitrapu discloses "a base station" that provides network coverage to "a plurality of WTRUs," *i.e.*, "wireless transmit/receive units" that include "any ... type of device capable of operating in a wireless environment." Ex. 1005, ¶18, 11; Fig. 3A. Figure 3A depicts the base station 203 providing coverage for those devices in an area around the base station using, for example, omni-directional beam 206, cover beams 202, 204, and center beams 212, 214, and 208. *Id.* For example, in Figure 3A, omni-directional beam 206 and cover beam 204 both provide network coverage to devices 216 and 218 (and additional devices not shown). Ex. 1003, ¶64.

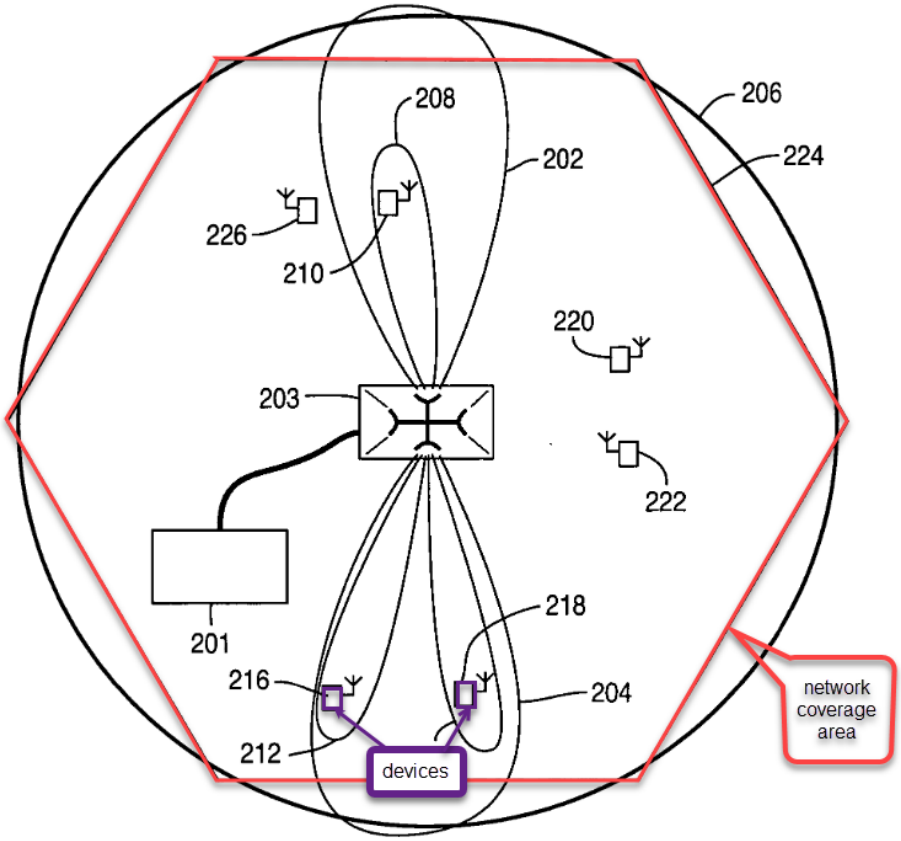


FIG. 3A

(b) 1[a]: cycling over time through a coverage sequence that includes providing a first coverage configuration and providing a second coverage configuration, wherein:

Chitrapu discloses this limitation. Ex. 1003, ¶¶65-67. As discussed below, Chitrapu discloses a ***first coverage configuration*** that provides coverage with a cover beam. Chitrapu also discloses a ***second coverage configuration*** that provides coverage with a center beam (as well as an omni-directional beam). *Id.*, ¶65.

Chitrapu discloses ***cycling over time through a coverage sequence*** that includes providing these two coverage configurations. Ex. 1003, ¶66. For example, Chitrapu discloses that when "new cover beams need to be deployed to bring additional WTRUs [*i.e.*, ***devices***] within the coverage areas of a cover beam," the system "may adjust [a pre-existing] cover beam ... and deploy an additional center beam ... focused" on the device. Ex. 1005, ¶24. For example, in Figure 3A, device 226 is not currently being covered by a cover or center beam. The system may adjust cover beam 204 to cover device 226, thereby cycling through the ***first coverage configuration*** of the ***coverage sequence***, as shown in Figure 3B annotated below. Ex. 1003, ¶66.

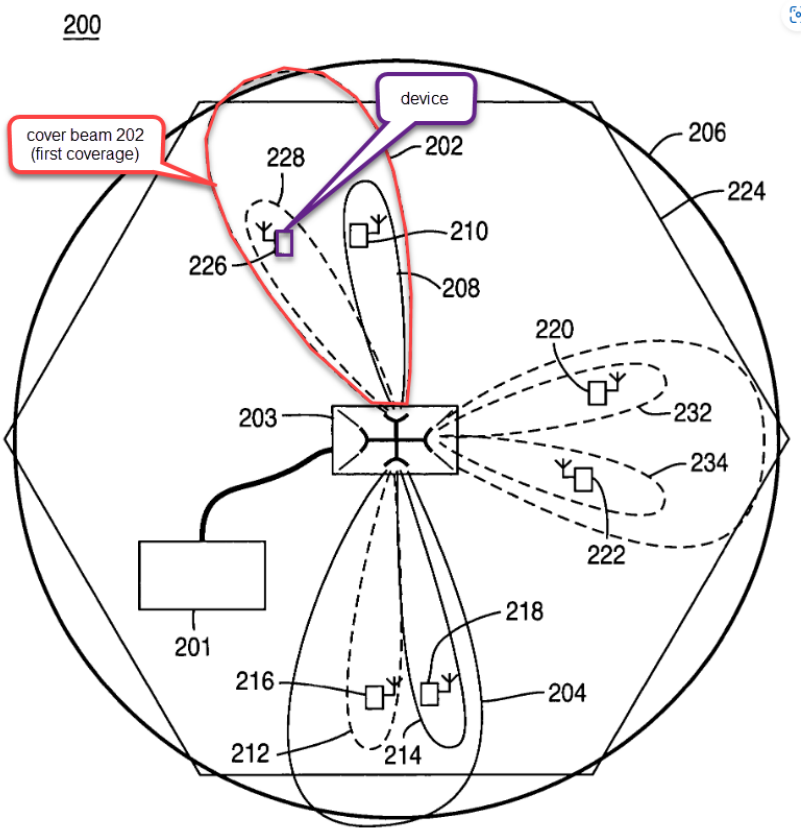


FIG. 3B

The system then deploys a new center beam focused on device 226, thereby cycling through the ***second coverage configuration*** of the ***coverage sequence***, as shown below in annotated Figure 3B. Ex. 1003, ¶67. As devices enter the coverage area, the system will cycle over time through the ***coverage sequence*** that provides these two coverage configurations by first adjusting (or creating new) cover beams to cover the device and then deploying a center beam on the device. *Id*.

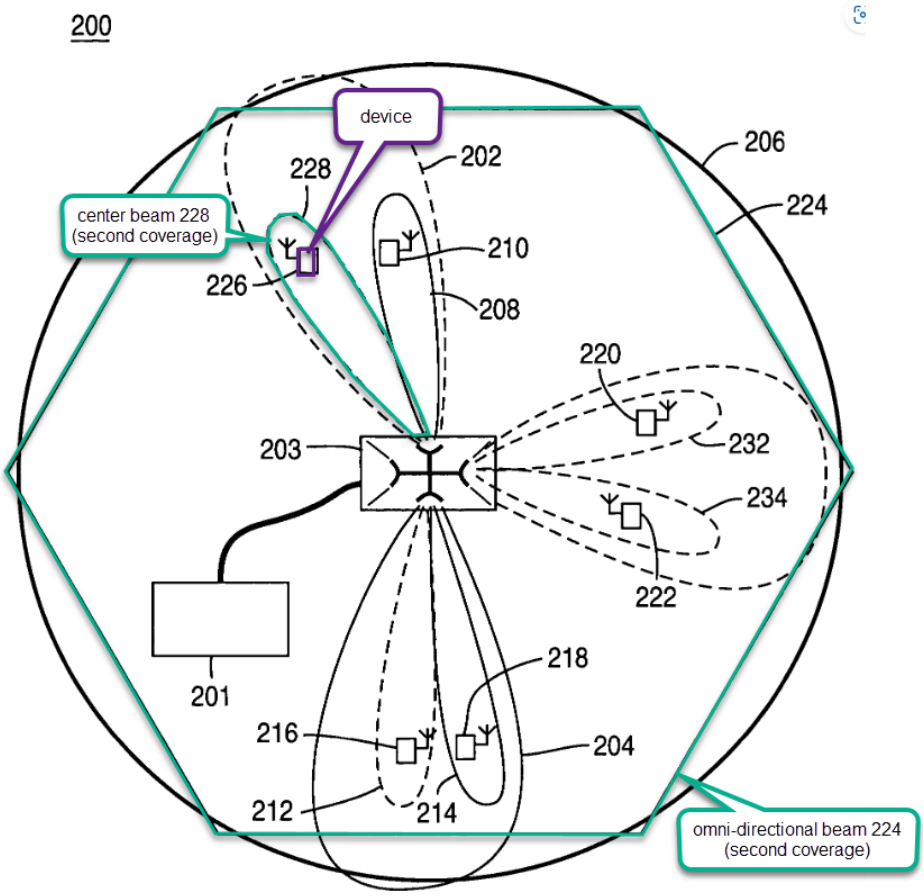


FIG. 3B

(c) 1[b]: providing the first coverage configuration includes transmitting a first beam of a first network that is configured to provide coverage for the group of devices; and

Chitrapu discloses this limitation. Ex. 1003, ¶68. Chitrapu discloses ***providing a first coverage configuration*** that includes transmitting a "cover beam" (*i.e.*, ***a first beam of a first network***) which is configured to provide coverage for a group of devices. *Id.* For example, in Figure 3B, cover beam 202 provides coverage for the group of devices 226 and 210, as well as other devices in the area. Ex. 1005,

¶18 ("It is noted that each WTRU [*i.e.*, ***device***] shown herein may represent a single WTRU or a group of WTRUs wherein the group may include any number of WTRUs.").

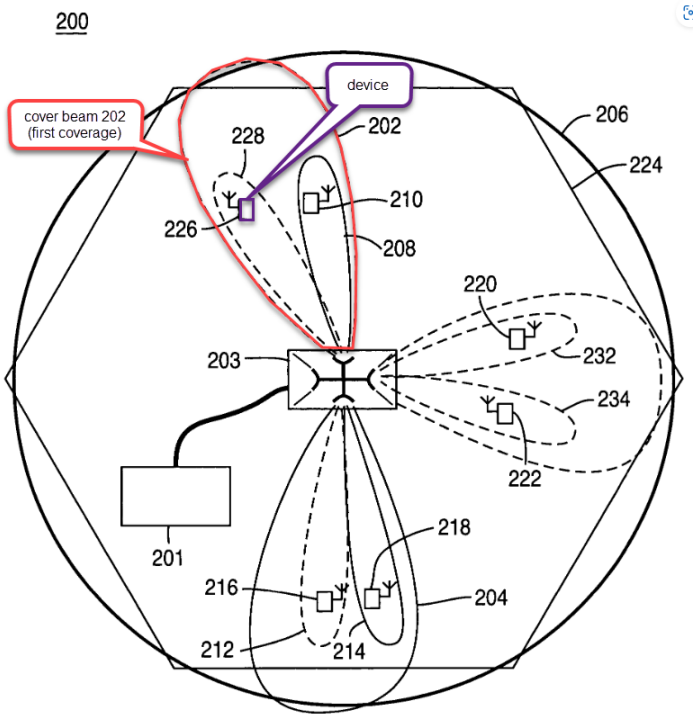


FIG. 3B

(d) 1[c]: providing the second coverage configuration includes transmitting a second beam of the first network that is narrower than the first beam and configured to provide coverage to at least one continuous use device of the group of devices, the at least one continuous use device being actively involved in a substantially continuous service with the network,

Chitrapu discloses or renders obvious this limitation. Ex. 1003, ¶¶69-72. Chitrapu discloses ***providing a second coverage configuration*** that includes

transmitting a "center beam" and an "omni-directional beam," as shown in the annotated Figure 3B below. Ex. 1003, ¶69.

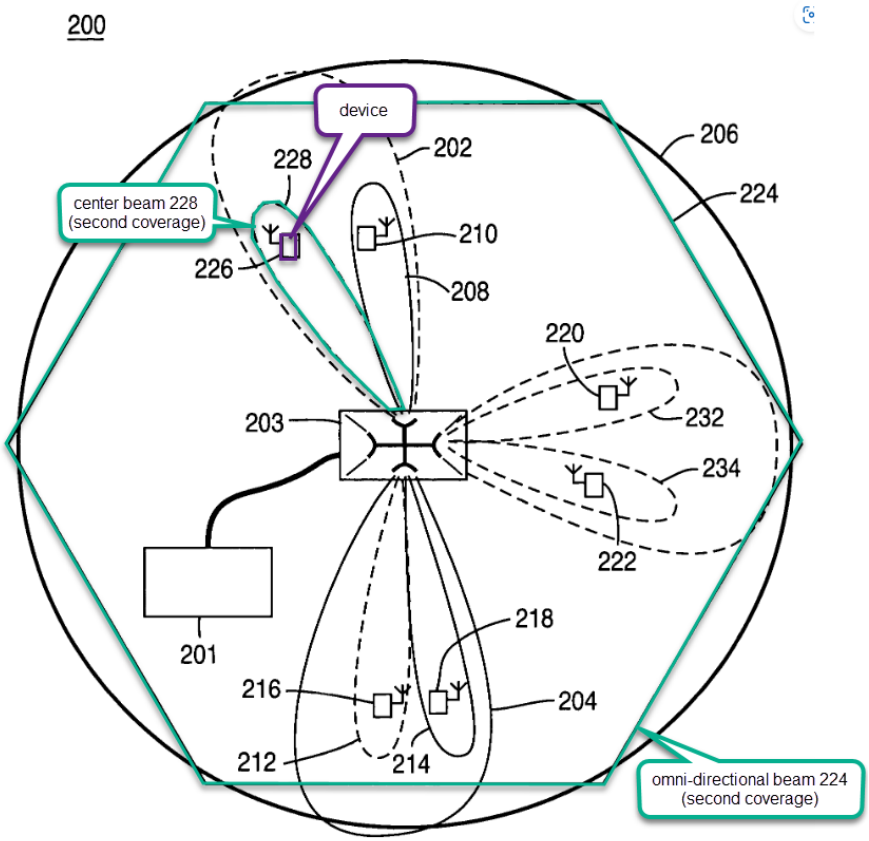


FIG. 3B

The center beam is a ***second beam of the first network***. Ex. 1003, ¶70. Chitrapu discloses and depicts that center beam 228 is ***narrower*** than cover beam 202 (*i.e.*, ***first beam of the first network***). *Id.*; Ex. 1005, ¶12 ("The cover beam 154 has a wider coverage area than the center beam 156."). Center beam 228 and cover beam 202 are of the same first network because they are part of the same nested beam. *Id.* ("The nested beam 152 includes a cover beam 154 and at least one center beam 156."); Ex. 1003, ¶70.

Chitrapu also discloses that a center beam is ***configured to provide coverage to a continuous use device***. Ex. 1003, ¶71. Chitrapu discloses that the center beam "is preferably used for transmission/reception of user data." Ex. 1005, ¶15. A center beam, being a narrow beam, is "particularly efficient" when one "want[s] to maximize throughput." *Id.*, ¶4. A center beam can "maintain data transmission/reception at an acceptable level of QOS." *Id.*, ¶22. A POSITA would understand that transmission/reception of user data where maximum throughput is desired with an acceptable level of QOS refers to a ***continuous use device*** being ***actively involved in a substantially continuous service***, such as the streaming of data (*e.g.*, video or audio) or downloading of data. Ex. 1003, ¶71.

To the extent Patent Owner argues that these disclosures in Chitrapu do not constitute disclosures of a continuous use device, it would have been obvious to a POSITA that the coverage provided by Chitrapu's center beam is for a ***continuous use device actively involved in substantially continuous service***. Ex. 1003, ¶72. Chitrapu discloses that the center beam provides transmission/reception of data that has "maximize[d]" throughput and "an acceptable level of QOS." Ex. 1005, ¶¶4, 22. A POSITA would have been motivated to use Chitrapu's center beam to provide substantially continuous service such as streaming or downloading of data because the provision of high throughput, high QOS transmission of data is readily suited for substantially continuous services like streaming and downloading data. Ex. 1003,

¶72. A POSITA would be so motivated because users would find it desirable that use Chitrapu's center beam for such services, as that would provide the highest service level (as opposed to using a less capable coverage for providing such services). *Id.*

(e) 1[d]: and providing coverage by a second network to a plurality of interval use devices of the group of devices.

Chitrapu discloses this limitation. Ex. 1003, ¶¶73-75. As shown in the annotated Figure 3B below, the ***second coverage configuration*** also includes transmitting an omni-directional beam 224 which provides coverage to interval use devices, such as the plurality of devices 210. *See* Ex. 1005, ¶18 ("It is noted that each WTRU [*i.e.*, ***device***] shown herein may represent a single WTRU or a group of WTRUs wherein the group may include any number of WTRUs."); Ex. 1003, ¶73. The omni-directional beam coverage is provided, for example, when devices no longer need center beam coverage. *Id.*, ¶20; Figure 3A (depicting several devices with omni-directional beam coverage but without center beam coverage). This is especially the case because when a device needs center beam coverage, the omni-directional beam can locate the device so that the system can direct a center beam towards the device. *Id.*; Ex. 1003, ¶73.

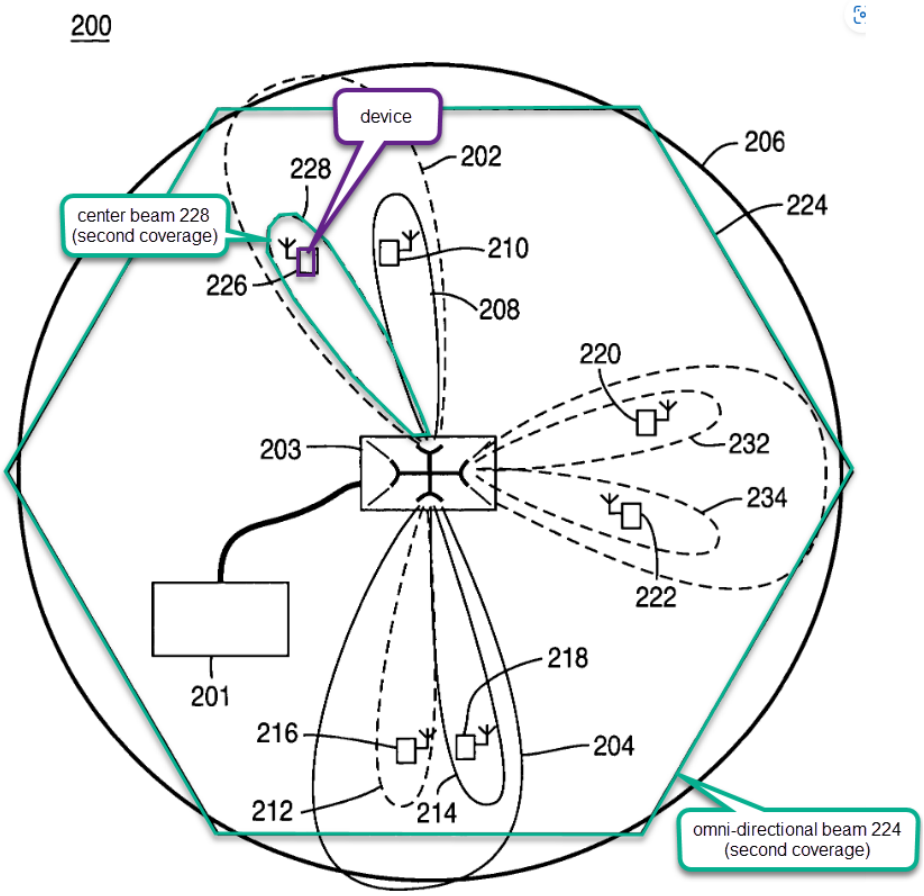


FIG. 3B

Chitrapu describes that the omni-directional beam "is preferably used for initial handshaking procedures when WTRUs ... begin operating within the coverage area," and may also "be used for paging, [or] broadcasting," thereby providing coverage to ***interval use devices of the group of devices***. As the '196 patent explains, an interval use device "may have applications that require intermittent updates." Ex. 1001, 4:63-66. A POSITA would understand that ***initial*** handshaking procedures only require intermittent use of data because they only occur initially when the device "begin[s] operating within the coverage area." *Id.*; Ex. 1003, ¶74. A POSITA

would further understand that broadcasting and paging are also intermittent. *Id.* Patent Owner's infringement contentions also assert that "5G devices transition from transmitting data active mode to inactive or idle modes," where the idle mode supports "UE paging." Ex. 1008, 22-23.

The ***omni-directional beam*** is on a different, ***second network*** than the cover and center beams of the first network because it is not part of the nested beam that comprises the cover and center beams. Ex. 1003, ¶75. Moreover, whereas the cover and center beams may adjust its position to provide coverage to devices, the omni-directional beam aways provides coverage within the coverage area 224, thereby generally constituting coverage of a different set of network devices than the cover and center beams. Ex. 1004, ¶25 ("[C]over beams ... cover only a portion of the coverage 224 ..."). Moreover, the '196 patent often describes the networks in terms of capability, such as one network being "less capable" than another network—as discussed above, Chitrapu discloses that the omni-directional beam provides less capable network coverage (*e.g.,* initial handshaking) compared to the cover and center beams. Ex. 1003, ¶75.

2. Claim 2: "The method of claim 1, wherein the providing the second coverage configuration comprises determining a direction of transmission for the second beam based at least in part on a location of the at least one continuous use device."

Chitrapu discloses this limitation. Ex. 1003, ¶76. Chitrapu discloses that, when transmitting the center beam of the ***second coverage configuration*** to provide

coverage to ***continuous use devices***, the system will "perform[] an analysis to determine the ***direction of arrival*** of at least one signal received from [the] WTRU" and "[a]ccording to the determined direction of arrival, the center beam ... is steered to the ***location of the WTRU***." Ex. 1005, ¶20. In other words, when a device "changes position, ... the center beam ... may be adjusted to remain focused on the" device, *i.e.* its ***direction of transmission*** will be based on the location of the device. *Id.* A POSITA would understand that adjusting/steering the center beam to focus on the device's location means adjusting/steering the beam in the direction of the device. Ex. 1003, ¶76.

3. Claim 3: "The method of claim 1, wherein the second beam of the first network is further configured to provide coverage to a second continuous use device of the group of devices."

Chitrapu discloses this limitation. Ex. 1003, ¶77. As discussed above, Chitrapu discloses that a narrow beam (*i.e.* ***second beam***) provides coverage to a WTRU. *Id.* Chitrapu discloses that a WTRU "may represent a single WTRU or a group of WTRUs wherein the group may include any number of WTRUs," *i.e.* at least a ***second continuous use device of the group of devices***. Ex. 1005, ¶15.

4. Claim 4: "The method of claim 1, wherein a subsequent iteration of providing the second coverage configuration includes transmitting the second beam of the first network configured to provide coverage to a second continuous use

device, and wherein the at least one continuous use device has transitioned to being an interval use device."

Chitrapu discloses this limitation. Ex. 1003, ¶¶78-79. Chitrapu discloses that a pre-existing center beam "is steered to the location of the WTRU ..., ***as needed***, for transmission/reception of data." Ex. 1005, ¶20. A POSITA would understand that when a device needs high throughput transmission of data, a center beam can be steered to that device—and similarly, when a device does not need high throughput transmission of data, a center beam can be steered away from that device and to another. Ex. 1003, ¶78. Thus, Chitrapu discloses that in a first iteration of the second coverage configuration (which provides a center beam), a center beam is focused on a first device, and in a subsequent iteration, when another device needs transmission of data (*i.e.* ***second continuous use device***) but the first device does not, the center beam (*i.e.* ***second beam of the first network***) can be steered to provide coverage to the second device. *Id.* Since the first device still has coverage from the omni-directional beam (or, alternatively, a cover beam) that provides broadcasting and paging support, it has ***transitioned to being an interval use device***. *Id.*

Alternatively, Patent Owner has asserted that this claim is met "by the second beam ... provid[ing] coverage to a second device" and a device on a second network (*i.e.*, 5G network) "transition[ing] ... to inactive or idle modes." Ex. 1008, 22. Chitrapu discloses that the center beam can provide coverage to "a group of WTRUs," where one of them would be the ***second continuous use device***. Ex. 1005, ¶18.

Chitrapu further discloses that "WTRUs are constantly moving" and that a center beam provides coverage "as needed," which a POSITA would understand to mean that a WTRU can transition to an idle mode where only broadcasting or paging services from the omni-directional beam or cover beam are needed, *i.e.* ***transitioned to being an interval use device***. *Id.*, ¶20; Ex. 1003, ¶79.

5. Claim 5: "The method of claim 1, wherein the first network and the second network are different network types."

Chitrapu discloses this limitation. Ex. 1003, ¶80. Chitrapu discloses that "the present invention may be implemented in ***any*** type of wireless communication system," including "UMTS-TDD, UMTS-FDD, CDMA2000, TDSCDMA, GSM, WLAN, WPAN, WMAN or any other type of wireless communication system." Ex. 1005, ¶27. A POSITA would understand that it was common for a network to support several types of these listed communication networks. Ex. 1003, ¶80. For example, it was well-known that UMTS is the third-generation network based on GSM and uses the same network protocols as GSM, thereby allowing base stations and devices to support both network modes. *Id.* Thus, a POSITA would understand that Chitrapu's disclosure of implementation using "any type of wireless communication system" would include well-known systems that supported both second generation GSM and, for example, third generation UMTS-FDD. *Id.*

6. Claim 7: "The method of claim 1, wherein the first network and the second network are the same network types, and wherein the at least one continuous use device is allowed

access to the second beam based on an admission control parameter."

Chitrapu discloses this limitation. Ex. 1003, ¶¶81-82. Chitrapu discloses that "the present invention may be implemented in ***any*** type of wireless communication system," including "UMTS-TDD, UMTS-FDD, CDMA2000, TDSCDMA, GSM, WLAN, WPAN, WMAN or any other type of wireless communication system." Ex. 1005, ¶27. A POSITA would understand this teaching would include systems using a single type of network. Ex. 1003, ¶81. Moreover, Chitrapu discloses that the omni-directional beam (*i.e.*, ***coverage by a second network***) provides "initial handshaking procedures" for the cover beam and center beam (*i.e.*, ***coverage by a first network***), indicating that can be of the same network type. Ex. 1005, ¶19.

Chitrapu further discloses that a continuous use device's access to the center beam (*i.e.*, ***second beam***) is allowed based on ***admission control parameters***, such as "target signal-to-interference ratios" and "an acceptable level of QOS." Ex. 1005, ¶21; Ex. 1003, ¶82. Chitrapu discloses that, "when WTRUs change location," "physical measurements" are determined, including "signal to noise ratio" and "channel quality factor." *Id.* These measurements are used to "obtain advance information about wireless conditions" prior to deploying the center beam. *Id.*, ¶22. A POSITA would understand that if target SNR or QOS is not obtainable given the conditions, then a center beam will not be deployed. Ex. 1003, ¶82.

7. Claim 10: "The method of claim 1, wherein the at least one continuous use device is engaged in at least one of a voice call, a download, or a content streaming."

Chitrapu discloses this limitation. Ex. 1003, ¶83. Chitrapu discloses that the "center beam," *i.e.,* ***beam that provides coverage to a continuous use device***, "is preferably used for transmission/reception of user data," including data that requires "maximize[d] throughput." Ex. 1005, ¶¶15, 4. A POSITA would understand that a ***download*** is the transmission of user data from the base station to the device, usually at a high throughput. Ex. 1003, ¶83.

8. Claim 12: "The method of claim 1, wherein the second beam is narrower than the first beam in at least one of a horizontal plane or a vertical plane."

Chitrapu discloses this limitation. Ex. 1003, ¶¶84-86. Chitrapu discloses that the "cover beam [*i.e.,* ***first beam***] has a wider coverage area than the center beam [*i.e.,* ***second beam***]," and that both the cover and center beam "may be adjusted in the azimuth and/or elevation directions," *i.e.,* ***horizontal or vertical plane***, respectively. Ex. 1005, ¶12. A POSITA would understand that the center beam is therefore narrower in both the horizontal and vertical plane. Ex. 1003, ¶84.

Moreover, Chitrapu's various figures depict that the center beam 156 is narrower than the cover beam 154 in both the horizontal and vertical plane, including Figure 2. Ex. 1003, ¶85.

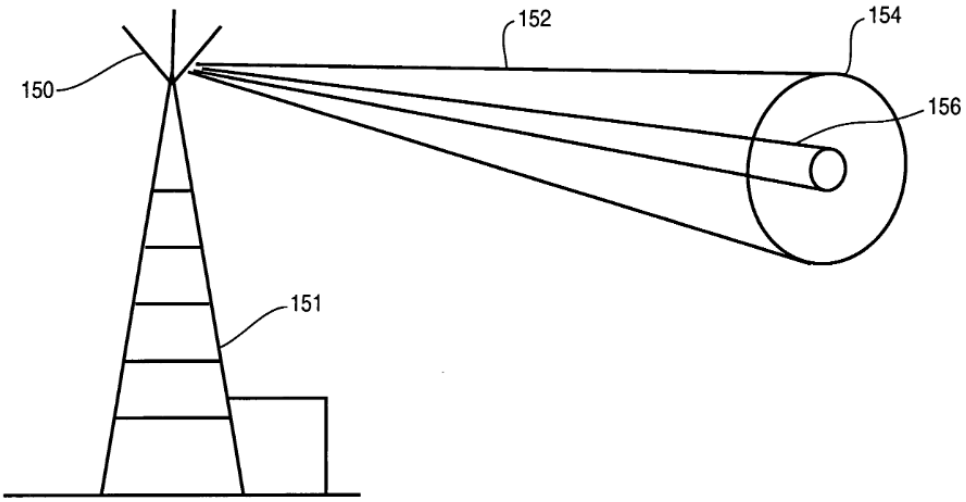


FIG. 2

Figures 3A and 3B depict that the center beams are narrower than the cover beams in at least the horizontal plane. Ex. 1003, ¶86.

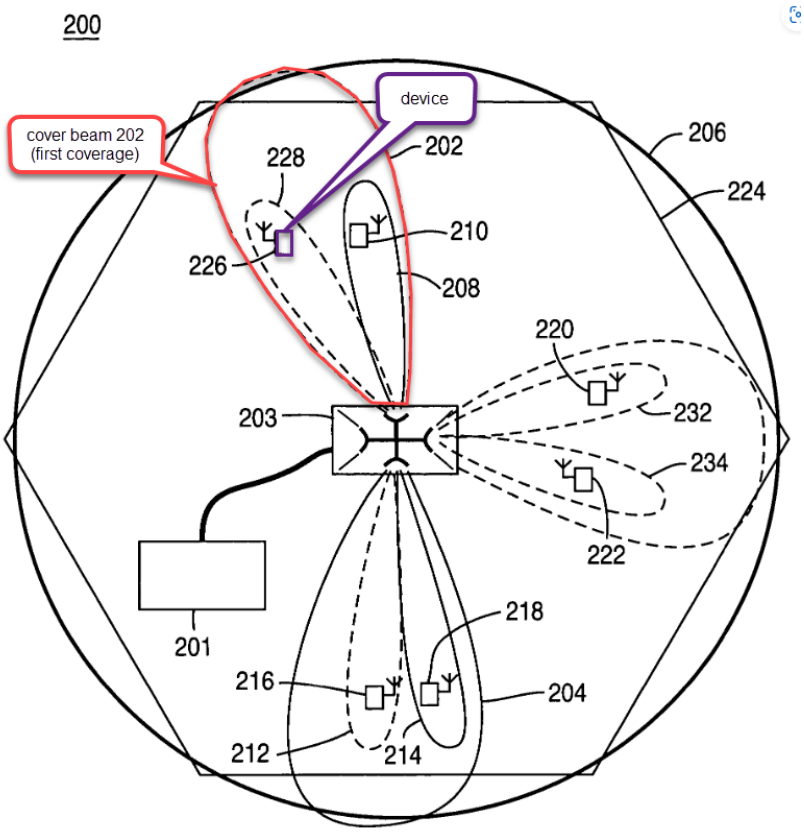


FIG. 3B

9. Claim 14

(a) 14[pre]: A method for providing network coverage for a group of devices in an area comprising:

See limitation 1[pre], *supra*. Ex. 1003, ¶¶87-88.

(b) 14[a]: cycling over time through a coverage sequence that includes providing a first coverage configuration, providing a second coverage configuration, and providing a third coverage configuration, wherein:

Chitrapu discloses this limitation. Ex. 1003, ¶¶89-94. As discussed below, Chitrapu discloses providing a ***first coverage configuration*** that includes a cover beam providing coverage to multiple devices when they enter the coverage area, a

second coverage configuration that includes a center beam providing coverage to a device, and a ***third coverage configuration*** that includes a different center beam providing coverage to a device. Ex. 1003, ¶91. All three coverage configurations also include an omni-directional beam that provides coverage to the devices. *Id.*, ¶91.

Chitrapu discloses ***cycling over time through a coverage sequence*** that includes these three coverage configurations. *Id.*, ¶92. As discussed above in limitation 1[a], Chitrapu discloses cycling from a cover beam coverage to a center beam coverage for a first device, such as device 218 in Figure 3B. *Id.* This would include cycling from the ***first coverage configuration*** to the ***second coverage configuration***. *Id.*

Chitrapu further discloses that a device within the coverage of a cover beam will receive coverage of a center beam "as needed." Ex. 1005, ¶20. Thus, when a second device that is covered by a cover beam needs transmission/reception of high throughput data, the system will steer or create a new center beam for that device, thus cycling to the ***third coverage configuration***. Ex. 1003, ¶93.

As multiple devices enter the coverage area and need center beam coverage, the system will ***cycle over time*** through these three coverage configurations. *Id.*, ¶94. For example, if two nearby devices enter the coverage area at the same time, Chitrapu discloses that it will provide a cover beam for both devices (first coverage

configuration), then deploy a center beam for one device (second coverage configuration), and another center beam for the other device (third coverage configuration). *Id.* Chitrapu's system will cycle through these three coverages over time as devices enter the coverage area. *Id.*

(c) 14[b]: providing the first coverage configuration includes transmitting a first beam of a first network that is configured to provide coverage for a first set of the group of devices, and providing coverage by a second network to at least a second set of the group of devices;

Chitrapu discloses this limitation. Ex. 1003, ¶¶95-96. Chitrapu discloses providing a ***first coverage configuration*** that includes transmitting a "cover beam" (*i.e.*, ***a first beam of a first network***) which is configured to provide coverage to ***a first set of the group of devices***. *Id.*, ¶95. For example, in Figure 3A, cover beam 204 provides coverage for the devices 216 and 218 and any other devices within cover beam 204, which are the ***first set of devices***. *Id.* Moreover, in this coverage configuration, omni-directional beam 224 ***provides coverage by a second network*** to device 218, which is a ***second set of the group of devices***, being a different set than the first set. *Id.* As discussed above in limitation 1[d], the omni-directional beam is a different network than the center beam.

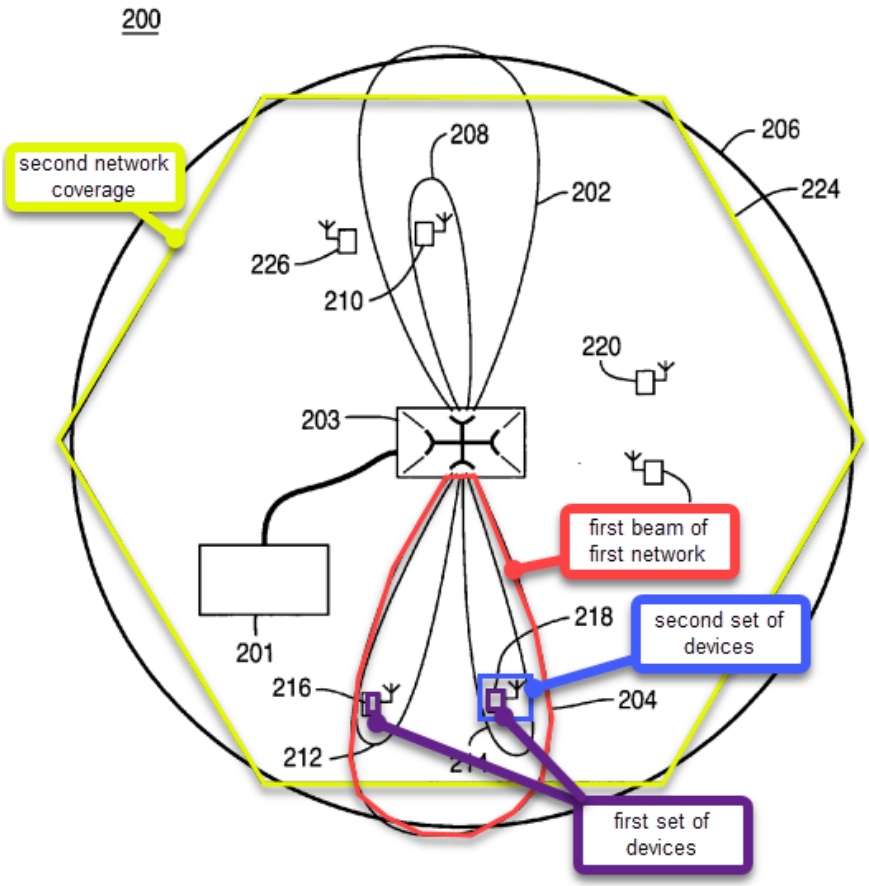


FIG. 3A

(d) 14[c]: providing the second coverage configuration includes transmitting a second beam of the first network that is configured to provide coverage for the second set of the group of devices, and providing coverage by the second network to at least the first set of the group of devices; and

Chitrapu discloses this limitation. Ex. 1003, ¶¶97-98. Chitrapu discloses providing a ***second coverage configuration*** that includes transmitting a "center beam" (*i.e.*, ***a second beam of a first network***) which is configured to provide coverage to ***the second set of the group of devices***. *Id.*, ¶97. As discussed above in limitation 1[c], a cover and center beam are part of the same first network. For

example, in Figure 3B, center beam 214 provides coverage for the device 218 (which could include more than one device), which as discussed in limitation 14[b] is the ***second set of devices***. *Id.* Moreover, in this coverage configuration, omni-directional beam 224 provides ***second network coverage*** to devices 216 and 218 and any other devices within cover beam 204, which as discussed in limitation 14[b] is the ***first set of devices***. *Id.*

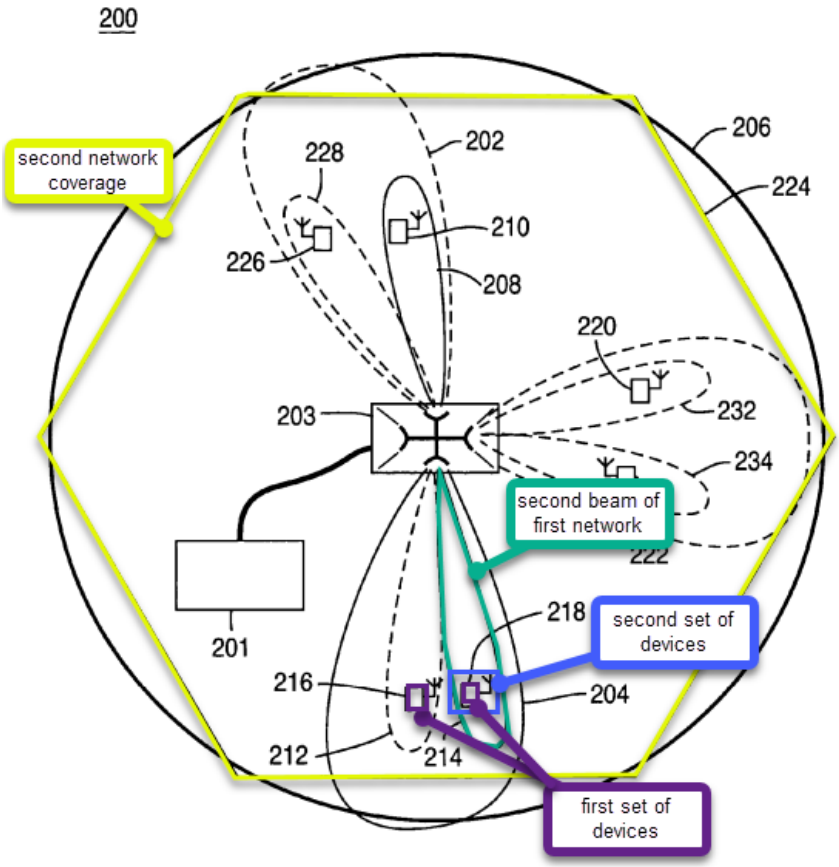


FIG. 3B

(e) 14[d]: providing the third coverage configuration includes transmitting a third beam of the first network that is narrower than the first beam and is configured to provide coverage to at least one

continuous use device of the group of devices, the at least one continuous use device being actively involved in a substantially continuous service with the network,

Chitrapu discloses this limitation. Ex. 1003, ¶¶99-100. Chitrapu discloses providing a ***third coverage configuration*** that includes transmitting a "center beam" (*i.e.*, ***a third beam of the first network***) which is configured to provide coverage to a ***continuous use device***. *Id.*, ¶99. As discussed above in limitation 1[c], a center beam is narrower than a cover beam. For example, in Figure 3B, center beam 212 (which is narrower than cover beam 204) provides coverage for the device 216, which is among the ***group of devices***. *Id.* As discussed above for limitation 1[c], Chitrapu discloses that device 216 is a ***continuous use device*** that is ***actively involved in a substantially continuous service with the network*** when provided center beam coverage. *Id.*

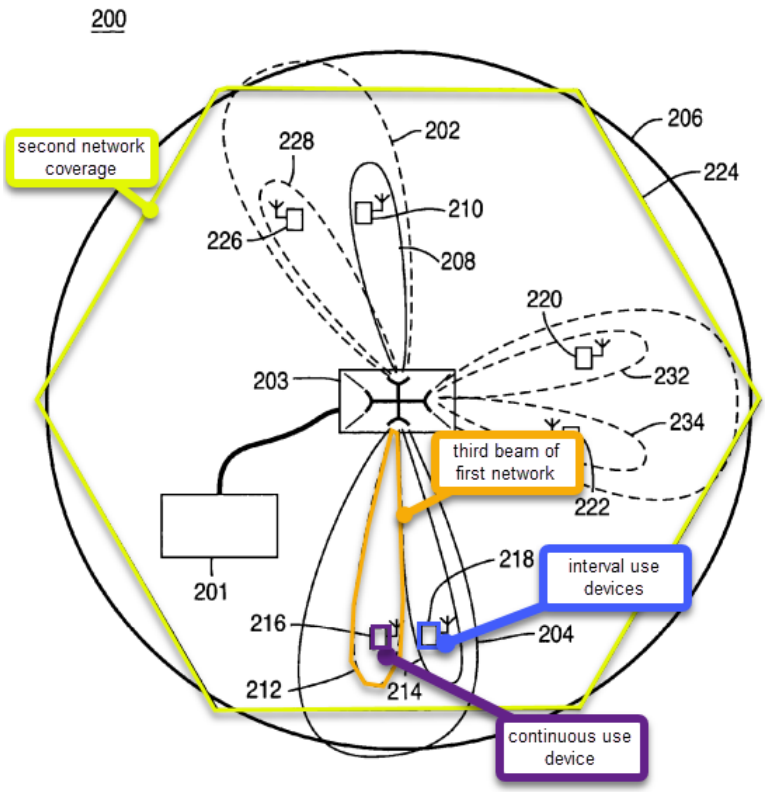


FIG. 3B

(f) 14[e]: and providing coverage by the second network to at least a plurality of interval use devices of the group.

Chitrapu discloses this limitation. Ex. 1003, ¶¶101-102. The ***third coverage configuration*** includes transmitting an omni-directional beam 224 which provides ***second network coverage*** to interval use devices of the group of devices, including any devices within cover beam 204, whether or not they are covered by a center beam. *Id.*, ¶102. As discussed above for limitation 1[d], Chitrapu discloses that devices are ***interval use devices*** when covered by an omni-directional beam. *Id.*

10. Claims 17, 18, 20, 21

With a few exceptions as set forth below, claims 17, 18, 20, and 21 mirror claims 1 and 7, as set forth in the following chart. Chitrapu renders these claims obvious for the same reasons as set forth above for claims 1 and 7. Ex. 1003, ¶¶103-133.

Claim Limitation	Corresponding Claim Limitation(s)
17[pre]	1[pre]
17[a]	1[a]
17[b]	1[b]
17[c]	1[c]
17[d]	1[d]
18	7
20[pre]	1[pre]
20[a]	1[a]
20[b]	1[b]
20[c]	1[c]
20[d]	1[d]
21	7

(a) Limitations 17[pre], 20[pre], and 20[e]

Limitations 17[pre], 20[pre], and 20[e] recite a device comprising a machine readable medium storing instructions, and a processor to execute those instructions. Chitrapu discloses these limitations. Ex. 1003, ¶¶103-105. Chitrapu discloses that

"a base station includes but is not limited to a Node-B, a site controller, an access point or any other type of interfacing device in a wireless environment," which are ***devices***. Ex. 1005, ¶11. A POSITA would understand that a Node-B base station comprises a processor and a machine-readable medium for storing instructions executed by that processor, as such components were well-known and readily available and, indeed, necessary for a base station to perform any functions. *See, e.g.*, Ex. 1007, 15:63-66, 10:30-33; Ex. 1003, ¶105.

(b) Limitation 20[f] and claim 21

Limitation 20[f] and claim 21 recite an "adaptive antenna configured to transmit the first beam and the second beam" as well as "a third beam of the second network." Chitrapu discloses this limitation. Ex. 1003, ¶¶130, 132. Chitrapu discloses that an "adaptive antenna[]" will radiate a nested beam that includes a "cover beam" and a "center beam," *i.e.*, ***the first and second beams***. Ex. 1005, ¶¶11-12. Chitrapu also discloses that the adaptive antenna will radiate an "omni-directional beam," *i.e.*, ***a third beam of the second network***. Ex. 1005, ¶18.

B. Ground 2: Claims 1-5, 7, 8, 12, 14, 17, 18, 20, and 21 Are Rendered Obvious by Chitrapu in View of Wong

As discussed in Ground 1, Chitrapu renders obvious claims 1-5, 7, 12, 14, 17, 18, 20, and 21. The combination of Chitrapu in further view of Wong is an additional obviousness theory for those claims, as well as claim 8. Ex. 1003, ¶¶134-150. In particular, Wong describes an "[a]ntenna pattern scheduler" for cycling between

coverage configurations, and a POSITA would have found it obvious to combine Chitrapu with Wong. *Id.*, ¶134. And with respect to claim 5, Wong also describes that its beam patterns can be different types of networks. *Id*.

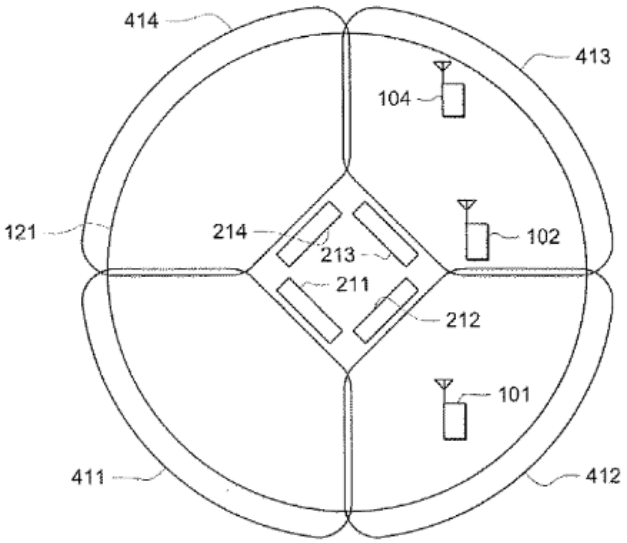
1. Rationale to Combine Chitrapu with Wong

A POSITA would have found it obvious to modify Chitrapu's system for omni-directional, cover, and center beam coverage configurations by incorporating Wong's teachings of an antenna pattern scheduler to cycle between coverage configurations. Ex. 1003, ¶¶136-144.

A POSITA would have been motivated to incorporate Chitrapu and Wong in this manner because of the well-known benefits of Wong's scheduler. *Id.*, ¶137. For example, Wong explains that, through use of the scheduler, it allows for "illumination time of one or more portions of a service area associated with higher/lower traffic [to be] greater/less than the illumination times of other portions of the service area." Ex. 1006, 9:53-56. This allows for better quality of service for the devices. *Id.*, 10:21-22. Wong further explains that the scheduler would allow the activation of "a particular subscriber station's best antenna pattern when data packets directed to that subscriber station are being transmitted." *Id.*, 9:36-38. Thus, Wong allows for more flexibility in the distribution of its beams to provide better quality of service. Ex. 1003, ¶137.

The specific teachings of Wong that a POSITA would be motivated to incorporate into Chitrapu are as follows. Ex. 1003, ¶138. Wong teaches a system where "various narrow and/or wide antenna patterns may be selected ... for directing to particular portions of [a] service area ... and the initial scheduling plan invoked by scheduler 242 may be adapted." Ex. 1006, 8:51-54. In a "highly simplified representation," Figure 4 of Wong depicts "4 substantially 90° antenna patterns [411-414]", which together "provide illumination of service area 121." *Id.*, 8:56-67.

FIG. 4



A POSITA would have been motivated to include Wong's teachings of a "[s]cheduler" that "implements antenna pattern scanning and traffic timing by controlling the succession, of antenna patterns, active times of antenna patterns, periodicity or repetition of particular antenna patterns, etcetera." Ex. 1006, 9:18-22. This would further include "controlling ... beam former 220 to active an appropriate

antenna pattern at the appropriate time." *Id.*, 9:29-31. The scheduler may also take into account "high/low QoS [that] is desired" by devices when scheduling the antenna patterns. *Id.*, 9:51; Ex. 1003, ¶139.

A POSITA would have also been motivated to incorporate Wong's teachings into Chitrapu by using Wong's scheduler to control the formation and positioning of cover beams and center beams. Ex. 1003, ¶140. For example, Wong's scheduler could be used to schedule one of Chitrapu's cover beams at a particular area and particular time, with subsequent center beams being formed for any devices that the cover beam detects. *Id.*, ¶140.

While Chitrapu discloses that cover beams can be deployed by locating devices within an omni-directional beam, Wong's scheduler would still provide improvements. *Id.*, ¶141. Chitrapu teaches locating a device using "direction of arrival," which requires time and processing, and may not be accurate. *Id.*; Ex. 1005, ¶20. The use of Wong's scheduler could forego reliance on locating the devices if it is known in advance which areas tend to have higher or lower traffic, so that the scheduler can schedule antenna patterns to accommodate for such typical traffic uses. Ex. 1003, ¶141. A scheduler may provide better quality of service over locating devices—or at least give the base station the option to choose which method performs better. *Id.*

A POSITA would further be motivated because Chitrapu already discloses a cruder form of scheduling where "if no omni-directional beam 206 is provided, the cover beams 202, 204 may be swept through the coverage area 224 to pick up new users so that existing cover beams may be adjusted or additional cover beams may be deployed." Ex. 1005, ¶25; Ex. 1003, ¶142. Thus, Chitrapu discloses that the formation of beams is compatible with scheduling. Ex. 1003, ¶142.

A POSITA would have reasonably expected the proposed Chitrapu and Wong combination to succeed. Ex. 1003, ¶143. Wong provides implementation details for its scheduler, specifically that it is part of the base station and coupled to a database containing antenna patterns. Ex. 1006, 9:18-67; Fig. 3. Incorporating Wong's teachings into Chitrapu would be a straightforward change to Chitrapu's base station and well within the capabilities of a POSITA. Ex. 1003, ¶143. A POSITA would know that a scheduler and database could be implemented in software without any special hardware. *Id.*

References cannot be combined as obvious unless they are analogous art to the challenged patent. Chitrapu, Wong, and the '196 patent are analogous art, as they are all directed to wireless systems that use beams for coverage. *See* Ex. 1001, Abstract ("[P]roviding network coverage by cycling through beam shape coverage configurations"); Ex. 1005, ¶2 ("The present invention is related to wireless communication systems [and] smart antennas for generating nested beams."); Ex.

1006, Abstract ("Systems and methods which utilize antenna pattern or antenna beam scanning techniques to provide communication of payload traffic"); Ex. 1003, ¶144.

2. Limitations 1[a], 14[a], 17[a], and 20[a]: "cycling over time through a coverage sequence"

Wong discloses a "[s]cheduler" that "implements antenna pattern scanning and traffic timing by ***controlling the succession***, of antenna patterns, active times of antenna patterns, ***periodicity or repetition*** of particular antenna patterns, etcetera." Ex. 1006, 9:18-22. In other words, Wong discloses that its scheduler can ***cycle over time through a coverage sequence*** of various antenna patterns, including successive patterns that are repeated over time. Ex. 1003, ¶¶145-47.

As discussed above in Ground 1, Chitrapu discloses coverage sequences that include various ***coverage configurations*** that use cover and center beams. In the Chitrapu-Wong combination, Wong's scheduler is used to schedule the location and times of Chitrapu's cover and center beams. Thus, the Chitrapu-Wong combination renders obvious ***cycling over time through a coverage sequence*** of cover and center beams constituting coverage configurations. Ex. 1003, ¶147.

3. Claim 5

Along with the disclosures in Chitrapu that the networks can be different network types, Wong also provides similar disclosures. Ex. 1003, ¶148. For example, Wong describes that its transceiver "provides communication according to

one or more standardized protocols," such as providing "simultaneous ... communications ... using a plurality of antenna patterns and a multiple access protocol (e.g., WiFi, WiMAX, WiBro, etcetera)." Ex. 1006, 6:34-53. Thus, in the Chitrapu-Wong combination, a POSITA would have found it obvious that Chitrapu's beam coverage could use different types of networks. Ex. 1003, ¶148.

4. Claim 8: "The method of claim 1, wherein the first coverage configuration is provided for a first time duration and the second coverage configuration is provided for a second time duration that is longer than the first time duration."

Chitrapu and Wong render obvious this limitation. Ex. 1003, ¶149. For example, Wong teaches that its scheduler "implements antenna pattern scanning and traffic timing by controlling the ... ***active times of antenna patterns***." Ex. 1006, 9:18-21. Specifically, the scheduler may allow "one or more antenna patterns [be] implemented ... for a longer/shorter illumination time period," including that "quality of service (QoS) provided with respect to various subscriber stations may be controlled by scheduler 242 through more/less frequent scheduling of an antenna pattern determined to be best with respect to the station for which a high/low QoS is desired." *Id.*, 9:48-51. In Chitrapu, the center beam provides higher QoS, and thus in the Chitrapu-Wong combination, the scheduler can assign Chitrapu's center beam with a higher time period than the cover beam. Ex. 1003, ¶149.

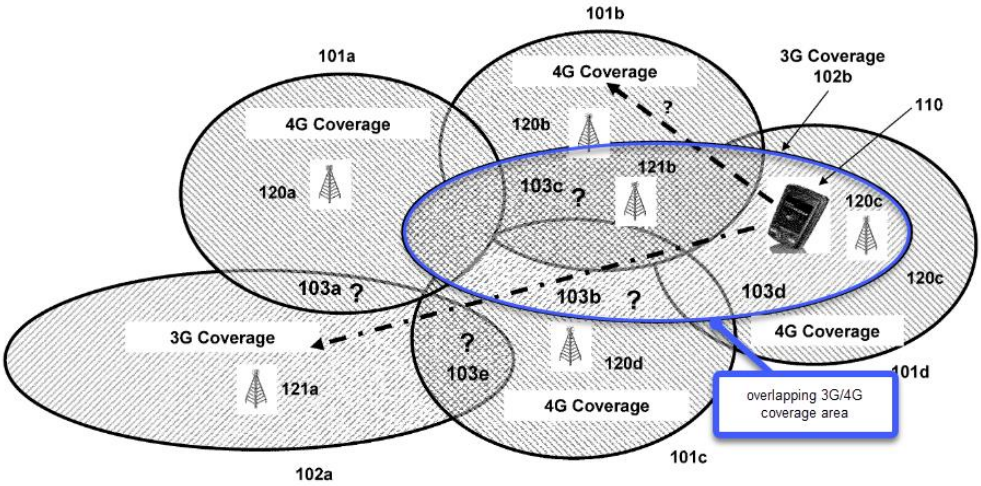
C. Ground 3: Claims 1-5, 8, 10, 12, 14, 17, and 20 Are Rendered Obvious by Dinan in View of Wong

Dinan in view of Wong render obvious claims 1-5, 8, 10, 12, 14, 17, and 20. Ex. 1003, ¶¶151-231. In particular, Dinan teaches providing simultaneous 3G and 4G coverage, whereas Wong teaches cycling of coverage using narrow and wide beams within a network. *Id.*, ¶151.

1. Rationale to Combine Dinan with Wong

A POSITA would have found it obvious to modify Dinan's system for providing simultaneous 3G/4G coverage by incorporating Wong's teachings of providing coverage using an antenna pattern scheduler to cycle between coverage configurations. Ex. 1003, ¶¶153-59.

The Dinan and Wong combination is described as follows. Ex. 1003, ¶154. Dinan teaches a "operating a dual-mode 3G/4G communications device capable of operating in either a 3G or 4G network when in an area with overlapping 3G and 4G coverage." Ex. 1007, 7:19-22. Thus, as depicted in Figure 1, "dual-mode device 110 is in a coverage overlap area with acceptable 3G and 4G network access." *Id.*, 12:45-46.



Dinan further describes an algorithm for determining whether a device is assigned 3G or 4G service. Ex. 1003, ¶155. In particular, Dinan uses "QoS categories" to "assign relatively higher or lower priority to various application types." Ex. 1007, 11:48-49. For example, "streaming of high definition (HD) video, video conferencing, and voice (e.g., VoIP) may be assigned a highest QoS category, i.e., category 'C1', while applications of lesser relative importance or with less stringent data latency requirements may be assigned lower QoS categories 'C2' or 'C3'." *Id.*, 11:49-54. A higher QoS category will be given priority to 4G service, whereas a lower QoS category will often be assigned 3G service. *Id.*, 15:3-38.

A POSITA would have been motivated to modify Dinan's provision of 4G service to incorporate Wong's teachings of using antenna patterns for providing wireless services. Ex. 1003, ¶156. As an initial matter, a POSITA would understand that Dinan's system is compatible with Wong's system. *Id.* In particular, Dinan's

provision of 4G service uses "4G Base Transceiver Stations" that provide "WiMAX ... coverage areas." Ex. 1007, 10:16-19. And Wong teaches that its system is implemented using a base station "operable to provide communications according to the IEEE ... 802.16 (commonly referred to as WiMAX ...) standard[]." Ex. 1006, 6:37-40. Thus, a POSITA would understand that Wong's teachings are fully applicable and compatible with the 4G provision in Dinan's system. Ex. 1003, ¶156.

A POSITA would have been motivated to combine Dinan and Wong in this manner because of the well-known benefits of Wong's scheduler and antenna patterns. Ex. 1003, ¶157. For example, Wong explains that, through use of the scheduler, it allows for "illumination time of one or more portions of a service area associated with higher/lower traffic [to be] greater/less than the illumination times of other portions of the service area." Ex. 1006, 9:53-56. This allows for better quality of service for the devices. *Id.*, 10:21-22. Wong further explains that the scheduler would allow the activation of "a particular subscriber station's best antenna pattern when data packets directed to that subscriber station are being transmitted." *Id.*, 9:36-38. Thus, Wong allows for more flexibility in the distribution of its beams to provide better quality of service. Ex. 1003, ¶157. A system that provides a device's required level of QoS is particular important in Dinan's system, because Dinan's algorithm is more likely to assign devices that require high QoS to 4G service as they are "assigned a highest QoS category." Ex. 1007, 11:51.

A POSITA would have reasonably expected the proposed Dinan and Wong combination to succeed. Ex. 1003, ¶158. Wong provides implementation details for its scheduler and beamformer that forms antenna patterns, specifically that they are part of the base station and coupled to a database containing antenna patterns. Ex. 1006, 9:18-67; Fig. 3. Incorporating Wong's teachings (and particularly a scheduler, beamformer, and database) into Dinan would be a straightforward change to Dinan's base station and well within the capabilities of a POSITA. Ex. 1003, ¶158.

As discussed above, Wong and the '196 patent are analogous art, as they are both directed to wireless systems that provide wireless service coverage. Dinan is also directed to the same field of endeavor. Ex. 1007, Abstract ("Systems and methods of operating multimode 3G/4G communications devices in an overlapping 3G/4G coverage area"); Ex. 1003, ¶159.

2. Claim 1

(a) 1[pre]: A method for providing network coverage for a group of devices in an area comprising:

To the extent the preamble is limiting, Dinan and Wong render obvious this limitation. Ex. 1003, ¶160. Dinan discloses "Systems and methods of operating multimode 3G/4G communications devices in an overlapping 3G/4G coverage area." Ex. 1006, Abstract.

(b) 1[a]: cycling over time through a coverage sequence that includes providing a first coverage configuration and providing a second coverage configuration, wherein:

Dinan and Wong render obvious this limitation. Ex. 1003, ¶¶161-66. In the Dinan-Wong combination, the system provides overlapping 3G/4G coverage as taught by Dinan, where 4G coverage uses Wong's scheduling of antenna patterns. *Id.*, ¶161. Thus, as discussed below, the Dinan-Wong combination renders obvious a ***coverage sequence*** that includes a ***first coverage configuration*** that provides 4G coverage using a wide beam and a ***second coverage configuration*** that provides 4G coverage to a continuous use device using a narrow beam, as well as 3G coverage to interval use devices. *Id.*

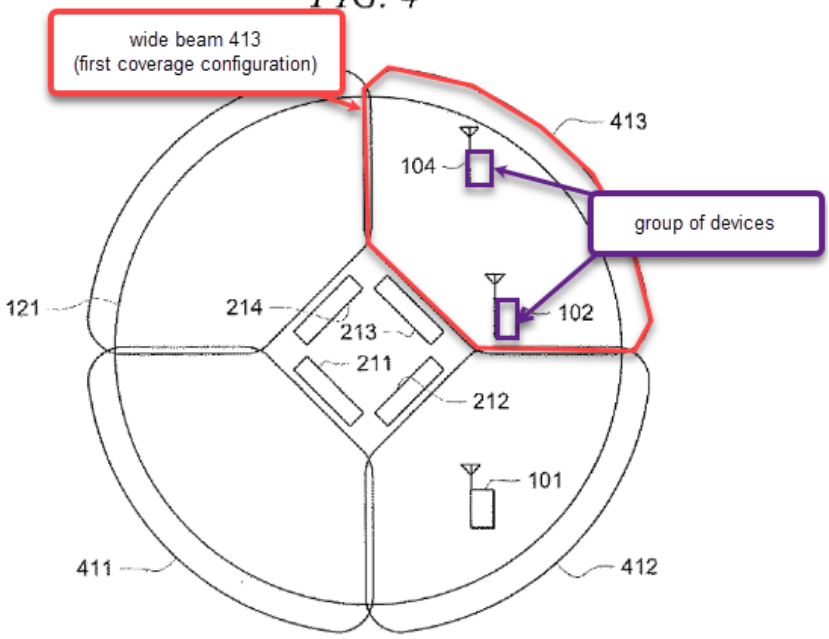
The Dinan-Wong combination renders obvious ***cycling over time*** through these two coverage configurations of the coverage sequence. Ex. 1003, ¶163. For example, Wong discloses a "[s]cheduler" that "implements antenna pattern scanning and traffic timing by ***controlling the succession***, of antenna patterns, active times of antenna patterns, ***periodicity or repetition*** of particular antenna patterns, etcetera." Ex. 1006, 9:18-22. Antenna patterns are formed by obtaining "phase shift and signal weighting information for signal paths of ***beam former 220*** suitable for forming particular antenna patterns." *Id.*, 8:61-63. In other words, Wong discloses that its scheduler, which a POSITA would find obvious to combine with Dinan, cycles

through the antenna patterns over time, including successive patterns that are repeated. Ex. 1003, ¶163.

Wong further discloses that the aforementioned antenna patterns include both wide beam and narrow beam patterns, such as those used in the ***first and second coverage configurations***. Ex. 1003, ¶164. Wong teaches that "antenna beams have various attributes (e.g., wide beams and narrow beams, beams having different azimuthal orientations, etcetera)." Ex. 1006, 11:15-17. Wong further teaches that "wide beam antenna patterns are utilized in combination with narrow beam antenna patterns." *Id.*, 11:25-26.

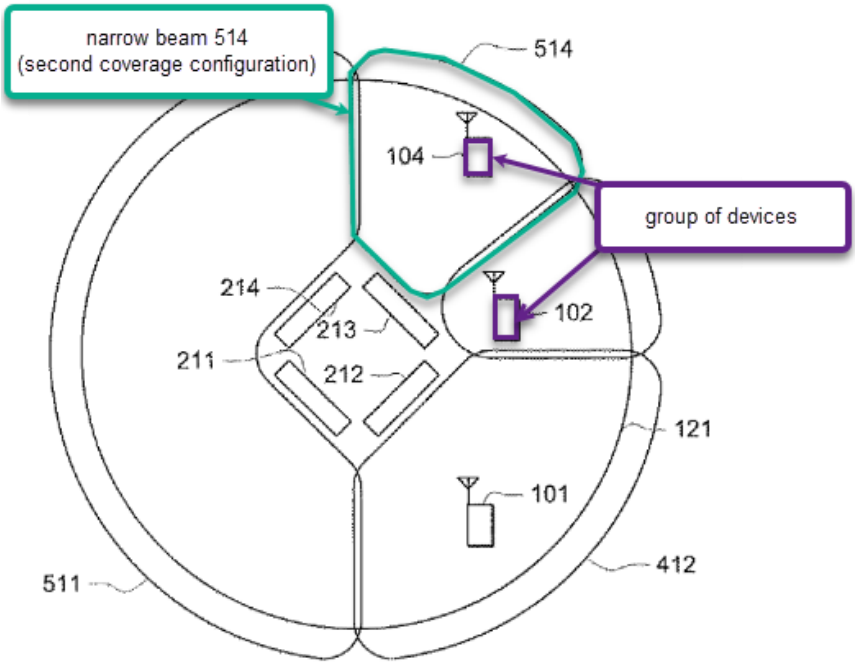
For example, Wong depicts in Figure 4 (annotated below) that "antenna pattern 413 ... has the greatest subscriber station activity," specifically that it includes devices 102 and 104. Ex. 1006, 12:46-47. This is the ***first coverage configuration***. Ex. 1003, ¶165.

FIG. 4



Wong teaches that the scheduler could cycle to another coverage configuration which uses narrow beams by selecting antenna patterns depicted in Figure 5 (annotated below), where "antenna pattern 413 has been ***replaced with*** antenna patterns 513 and 514," both of which are narrower than the beam in antenna pattern 413. Ex. 1006, 12:58-59; Ex. 1003, ¶166. In particular, "[a]ntenna pattern 514 provides a more ***narrow beam*** antenna pattern consistent with the higher utilization of the corresponding portion of service area 121." *Id.*, 12:64-67. Antenna pattern 514, along with 3G coverage described in Dinan, constitutes the ***second coverage configuration***. Ex. 1003, ¶166.

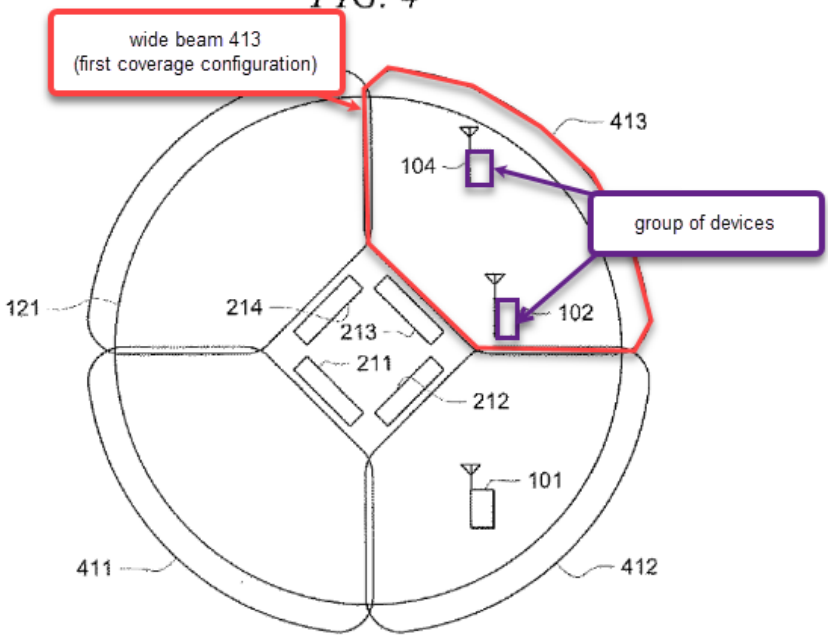
FIG. 5



(c) 1[b]: providing the first coverage configuration includes transmitting a first beam of a first network that is configured to provide coverage for the group of devices; and

Dinan and Wong render obvious this limitation. Ex. 1003, ¶¶167-68. Wong discloses providing a ***first coverage configuration*** that includes transmitting a beam antenna pattern (*i.e.*, ***first beam of a first network***) which provides coverage for a group of devices. *Id.*, ¶167. For example, in Figure 4 (annotated below), antenna pattern 413, which uses a 90 degree beam, provides coverage for devices 102 and 104 and other devices which may be in that area. *Id.* As discussed above, a POSITA would find it obvious to incorporate Wong's teachings of cycling through antenna patterns into Dinan. *Id.*

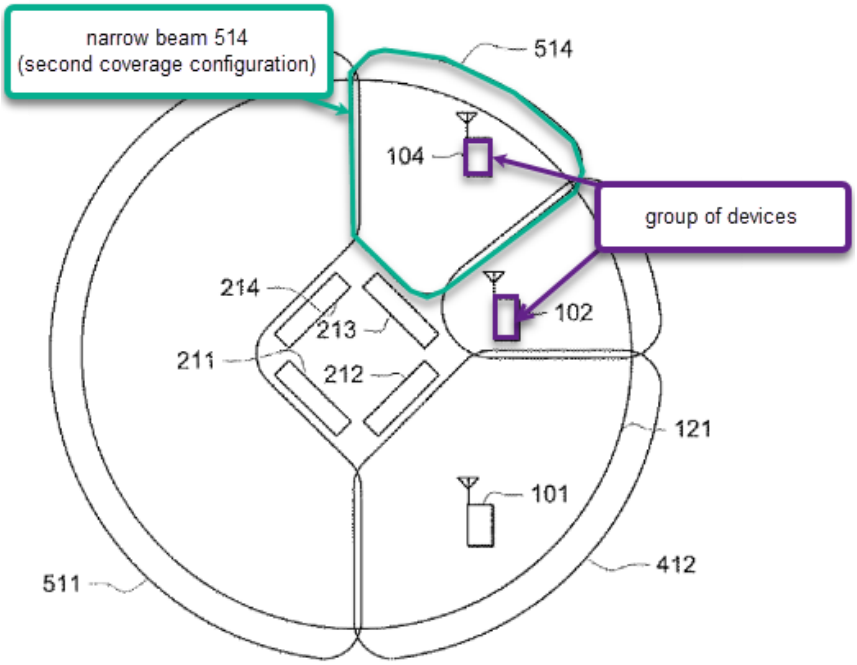
FIG. 4



(d) 1[c]: providing the second coverage configuration includes transmitting a second beam of the first network that is narrower than the first beam and configured to provide coverage to at least one continuous use device of the group of devices, the at least one continuous use device being actively involved in a substantially continuous service with the network,

Dinan and Wong render obvious this limitation. Ex. 1003, ¶¶169-72. Wong discloses providing a ***second coverage configuration*** that includes transmitting a ***narrow beam*** antenna pattern (*i.e.*, ***second beam of a first network***) which provides coverage for a ***continuous use device***. *Id.*, ¶170. For example, in Figure 5 (annotated below), antenna pattern 514 provides coverage for device 104. *Id.* As discussed above, a POSITA would find it obvious to incorporate Wong's teachings of cycling through antenna patterns into Dinan. *Id.*

FIG. 5



Wong discloses that antenna pattern 514 is a ***second beam of the first network*** because it "provides a ***more narrow beam*** antenna pattern" compared to antenna pattern 413 from Figure 4 (*i.e.*, ***the first beam of the first network***). Ex. 1006, 12:64-66; Ex. 1003, ¶171. Moreover, in the Dinan-Wong combination, Wong's antenna patterns are used to provide 4G (*e.g.*, WiMAX) coverage, and therefore both beams are of the same, first network. Ex. 1006, 6:36-40 ("Transceiver 230 [of the base station] may comprise a radio or radio chip set operable to provide communications according to the ... 802.16 (commonly referred to as WiMAX and WiBro) standards."); Ex. 1003, ¶171.

Both Dinan and Wong disclose that the 4G coverage using Wong's antenna patterns is ***configured to provide coverage to a continuous use device***. Ex. 1003,

¶172. Wong teaches that "narrow beam antenna patterns [can] be used in providing communications with subscriber stations having ... frequent communications," *i.e.*, a device ***actively involved in a substantially continuous service with the network***. Ex. 1006, 11:63-67. Wong also teaches that "narrow beam antenna pattern[s]" are used with devices "having a high quality of service requirement." *Id.*, 13:1-3. Dinan further teaches that devices needing "streaming of high definition (HD) video, video conferencing, and voice (e.g., VoIP) may be assigned a highest QoS category," where the system will prioritize such devices for 4G service. Ex. 1007, 11:49-51, 15:8-10 ("[H]igher application categories ... device ... is handed off to 4G"). Dinan also "summarizes the various WiMAX data service types" in Table 1 (reproduced below), including "Streaming audio & video" and "File transfers." Ex. 1007, col. 2. A POSITA would understand that devices that stream data, transfer files, and generally need high QoS are ***continuous use devices*** that are ***actively involved in a substantially continuous service***. Ex. 1003, ¶172.

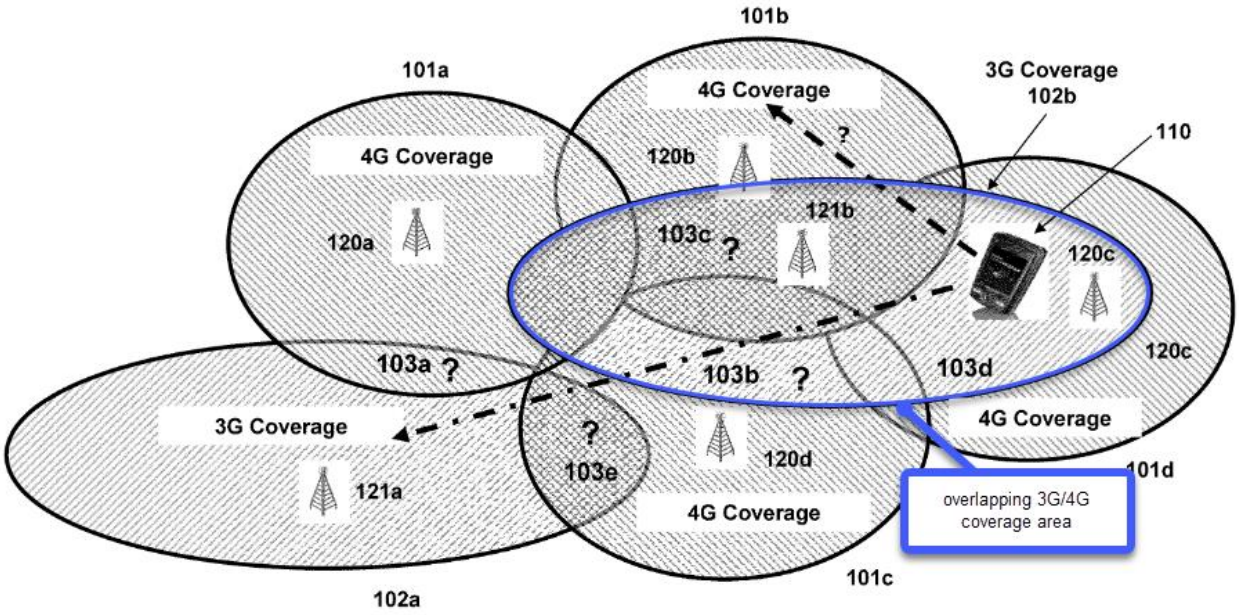
TABLE I

WiMAX Data Delivery Services		
DL data delivery service	UL scheduling service	Targeted traffic
Unsolicited grant service (UGS)	Unsolicited grant service (UGS)	Constant bit rate (CBR) services, TDM services
Extended real-time Variable Rate (ERT-VR)	Extended real-time polled service (ertPS)	VoIP with silence suppression/activity detection
Real-time Variable Rate (RT-VR)	Real-time polled service (rtPS)	Streaming audio & video
Non-real-time Variable Rate (NRT-VR)	Non-real-time polled service (nrtPS)	File transfers
Best Effort (BE)	Best Effort (BE)	Web browsing, e-mail, etc.

(e) 1[d]: and providing coverage by a second network to a plurality of interval use devices of the group of devices.

Dinan and Wong render obvious this limitation. Ex. 1003, ¶¶173-77. As discussed above, the ***second coverage configuration*** includes transmitting Wong's 4G narrow beam antenna pattern and Dinan's 3G coverage. *Id.*, ¶174.

Dinan discloses "operating a dual-mode 3G/4G communications device capable of operating in either a 3G or 4G network when in an area with ***overlapping 3G and 4G coverage***." Ex. 1007, 7:19-22. Thus, as depicted in Figure 1, "dual-mode device 110 is in a ***coverage overlap area*** with acceptable 3G and 4G network access." *Id.*, 12:45-46.

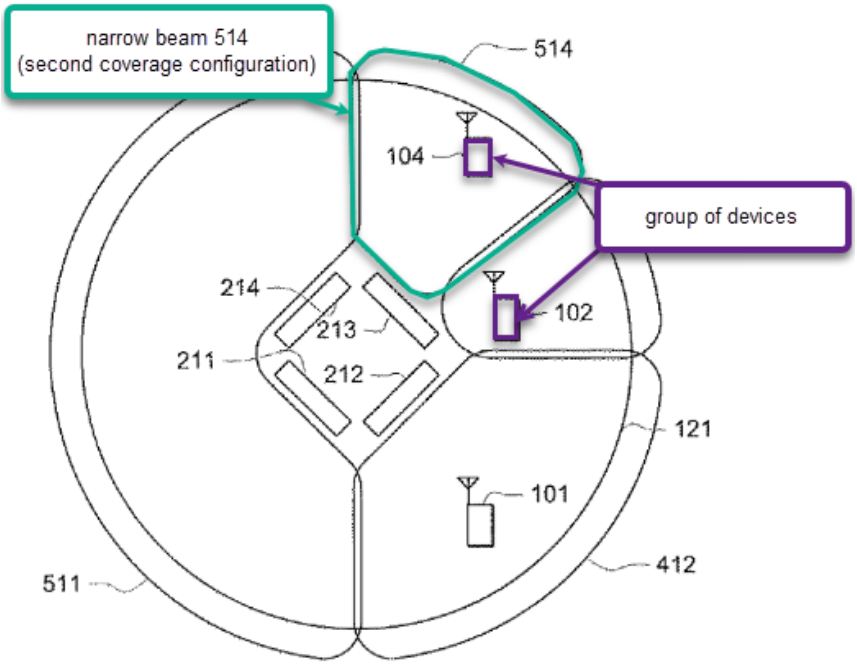


Thus, in the Dinan-Wong combination, when the system provides 4G coverage to a device in the coverage area using Wong's narrow beam antenna pattern

of the ***second coverage configuration***, it provides 3G coverage to other devices within the coverage area as taught by Dinan. Ex. 1003, ¶176. The 4G coverage and 3G coverage are different network types and therefore different networks, *i.e.*, ***a first and second network***, respectively. *Id.*

Dinan discloses that the 3G coverage provides coverage to ***interval use devices***. Dinan discloses that "applications of lesser relative importance or with less stringent data latency requirements may be assigned lower QoS categories 'C2' or 'C3'," with devices using application category C3 being assigned 3G service if 4G service is loaded. Ex. 1007, 11:49-54; 15:28-38. Figure 7 provides an "exemplary mapping of application type to an arbitrarily assignable QoS Category," including "Email" being assigned to C3. *Id.*, Fig. 7. The '196 patent describes that "email" is an example of an "interval service[]," which if used by a device makes the device an ***interval use device***. Ex. 1001, 4:9-12. Thus, Dinan discloses that 3G coverage is used to provide service to devices using email, *i.e.*, ***interval use devices***. Ex. 1003, ¶177. For example, in the ***second coverage configuration***, device 102 in Wong is not covered by narrow beam 514 (*i.e.*, ***second beam of the first network***) because it does not need high QoS services—thus, per Dinan, this device is provided 3G service (*i.e.* ***coverage by a second network***) for interval services such as email. *Id.*

FIG. 5



3. Claim 2: "The method of claim 1, wherein the providing the second coverage configuration comprises determining a direction of transmission for the second beam based at least in part on a location of the at least one continuous use device."

Dinan and Wong render obvious this limitation. Ex. 1003, ¶¶178-79. Wong discloses that "controller 240 of base station 111 may utilize information with respect to ... the direction of movement of the subscriber station [and] the location of the subscriber stations ... in identifying, a best antenna pattern for use with respect to any particular subscriber station." Ex. 1006, 11:53-59. Wong further discloses that "narrow ... antenna patterns may be selected ... for ***directing*** to particular portions of service area 121." *Id.*, 8:51-53. Thus, in the ***second coverage configuration***, when determining the direction of transmitting a narrow beam to a continuous use device per Wong, the base station uses the location and movement

of the device. Ex. 1003, ¶179. A POSITA would understand that directing the narrow beam on a device involves pointing the beam in the direction of the device's location. *Id.* For example, in Figure 5, beams 513 and 514 are pointed in the direction of devices 102 and 104, respectively. *Id.*

4. Claim 3: "The method of claim 1, wherein the second beam of the first network is further configured to provide coverage to a second continuous use device of the group of devices."

Dinan and Wong render obvious this limitation. Ex. 1003, ¶¶180-81. Wong discloses that antenna patterns in general may provide coverage for "one or more subscriber stations." *See, e.g.*, Ex. 1006, 10:32-34. Wong also discloses that "[a]ntenna pattern 514 provides a more narrow beam antenna pattern consistent with the ***higher utilization*** of the corresponding portion of service area 121." *Id.*, 12:64-67. This antenna pattern is used "where the number of subscriber stations is large." *Id.*, 12:25-26. Thus, a POSITA would understand that antenna pattern 514 provides coverage to multiple devices that together generate higher utilization for that portion of the service area. Ex. 1003, ¶181.

5. Claim 4: "The method of claim 1, wherein a subsequent iteration of providing the second coverage configuration includes transmitting the second beam of the first network configured to provide coverage to a second continuous use device, and wherein the at least one continuous use device has transitioned to being an interval use device."

Dinan and Wong render obvious this limitation. Ex. 1003, ¶¶182-83. Wong discloses that "a same antenna pattern may be shared as a 'best' antenna pattern for

a plurality of subscriber stations." *Id.*, 10:34-36. Thus, Wong contemplates that the narrow beam antenna pattern used in the ***second coverage configuration***, may in a ***subsequent iteration***, be used for a second continuous use device. Ex. 1003, ¶183. If the first continuous use device no longer requires the quality of service or throughput of the "best" antenna pattern, it can be transitioned to an interval use device using 3G service, per Dinan as discussed limitation 1[d]. *Id.*

6. Claim 5: "The method of claim 1, wherein the first network and the second network are different network types."

Dinan and Wong render obvious this limitation. Ex. 1003, ¶¶184-85. In the Dinan-Wong combination, the system provides overlapping 3G/4G coverage as taught in Dinan, where the 4G coverage uses scheduled antenna patterns per Wong. *Id.* As discussed above in claim 1, the ***first network*** is a 4G (*e.g.*, WiMAX) network and the ***second network*** is a 3G network, which are different network types. *Id.*

7. Claim 8: "The method of claim 1, wherein the first coverage configuration is provided for a first time duration and the second coverage configuration is provided for a second time duration that is longer than the first time duration."

Dinan and Wong render obvious this limitation. Ex. 1003, ¶186. Wong discloses this limitation as discussed above in Ground 2, *supra*.

8. Claims 10: "The method of claim 1, wherein the at least one continuous use device is engaged in at least one of a voice call, a download, or a content streaming."

Dinan and Wong render obvious this limitation. Ex. 1003, ¶¶187-88. As discussed above in limitation 1[c], in the Dinan-Wong combination, the ***continuous***

use device is assigned 4G service because it is engaged in "streaming of high definition (HD) video, video conferencing, and voice (e.g., VoIP)." Ex. 1007, 11:49-50.

9. Claims 12: "The method of claim 1, wherein the second beam is narrower than the first beam in at least one of a horizontal plane or a vertical plane."

Dinan and Wong render obvious this limitation. Ex. 1003, ¶¶189-90. Wong discloses that its narrow beam antenna patterns (*i.e.,* ***second beam***) is at least narrower on the horizontal plane than the wide beam antenna patterns (*i.e.,* ***first beam***). *Id.* For example, Figure 5 depicts antenna pattern 514 as horizontally narrower than Figure 4's antenna pattern 413. *Id.* Wong also discloses that narrow beams have a "more narrow beam width," *i.e.,* narrower on the horizontal plane. Ex. 1006, 11:33; Ex. 1003, ¶190.

10. Claim 14

(a) 14[pre]: A method for providing network coverage for a group of devices in an area comprising:

See limitation 1[pre], *supra*. Ex. 1003, ¶¶191-92.

(b) 14[a]: cycling over time through a coverage sequence that includes providing a first coverage configuration, providing a second coverage configuration, and providing a third coverage configuration, wherein:

Dinan and Wong render obvious this limitation. Ex. 1003, ¶¶193-96. As discussed below, the Dinan-Wong combination renders obvious ***coverage sequence*** that includes a ***first coverage configuration*** that provides 4G coverage using a wide

beam antenna pattern as taught by Wong, a ***second coverage configuration*** that provides 4G coverage using a narrow beam antenna pattern as taught by Wong, and a ***third coverage configuration*** that provides 4G coverage using a different narrow beam antenna pattern as taught by Wong. *Id.*, ¶195. All three coverage configurations also provide 3G coverage as taught by Dinan. *Id.*

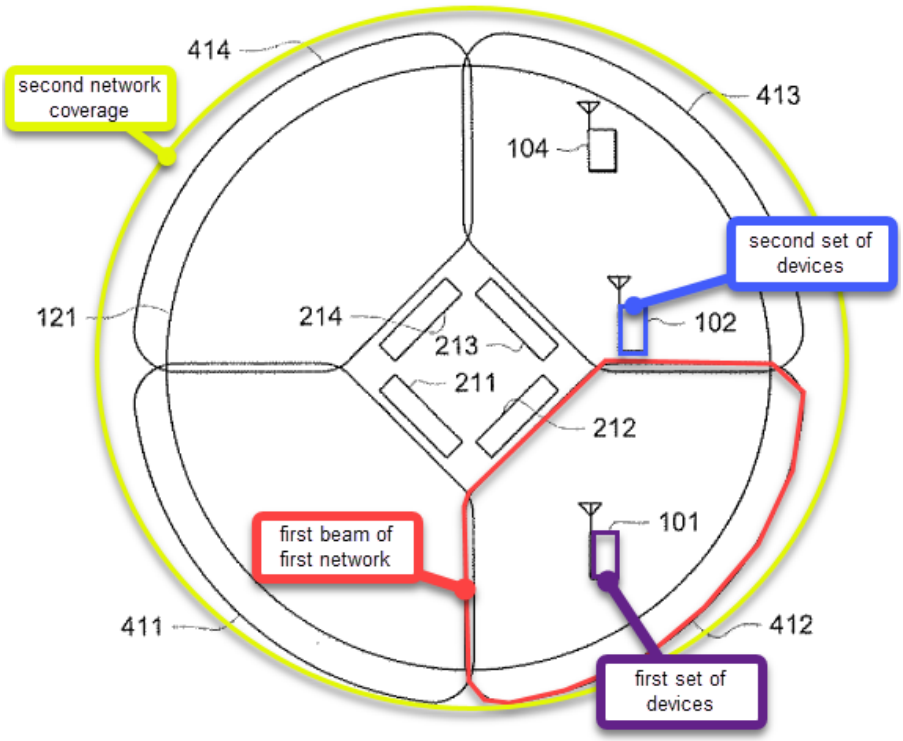
As discussed above in limitation 1[a], Wong discloses cycling through antenna patterns, including a cycle where wide beam "antenna pattern 413 has been replaced with [narrow beam] antenna patterns 513 and 514," as depicted in Figures 4 and 5. Ex. 1006, 12:58-59; Ex. 1003, ¶196.

(c) 14[b]: providing the first coverage configuration includes transmitting a first beam of a first network that is configured to provide coverage for a first set of the group of devices, and providing coverage by a second network to at least a second set of the group of devices;

Dinan and Wong render obvious this limitation. Ex. 1003, ¶¶197-98. Wong discloses providing a ***first coverage configuration*** that includes transmitting a wide beam "antenna pattern" (*i.e.*, ***first beam of a first network***) which is configured to provide coverage to a ***first set of the group of devices***. *Id.*, ¶198. For example, in Figure 4 of Wong, antenna pattern 412 provides coverage for device 101 and any other devices within that antenna pattern, which is the ***first set of devices***. *Id.* Moreover, in the Dinan-Wong combination, when the system provides 4G coverage using an antenna pattern, it simultaneously provides 3G coverage to other devices,

as taught by Dinan and as discussed above in limitation 1[d]. *Id.* For example, 3G coverage may be provided to device 102 and nearby devices in Figure 4 of Wong (*i.e.*, ***second set of devices***) if they are using "applications of lesser relative importance or with less stringent data latency requirements." Ex. 1007, 11:52-53; Ex. 1003, ¶198.

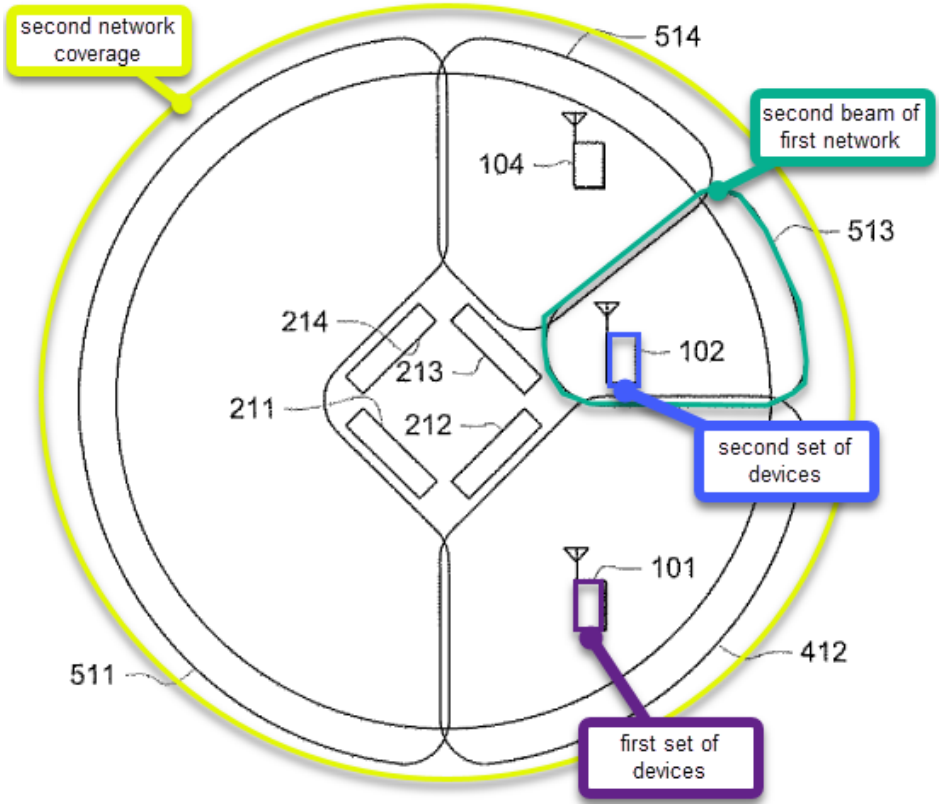
FIG. 4



(d) 14[c]: providing the second coverage configuration includes transmitting a second beam of the first network that is configured to provide coverage for the second set of the group of devices, and providing coverage by the second network to at least the first set of the group of devices; and

Dinan and Wong render obvious this limitation. Ex. 1003, ¶¶199-200. Wong discloses providing a ***second coverage configuration*** that includes transmitting a narrow beam "antenna pattern" (*i.e.*, ***second beam of a first network***) which is configured to provide coverage to the ***second set of the group of devices***. *Id.* For example in Figure 5, antenna pattern 513 provides coverage for 102 and any other devices within that antenna pattern, which is the ***second set of devices*** that had 3G coverage in the first coverage configuration. *Id.* And 3G coverage (*i.e.*, ***coverage by the second network***) is provided to device 101 (*i.e.*, ***first set of devices***) if they are using lower priority applications. *Id.*

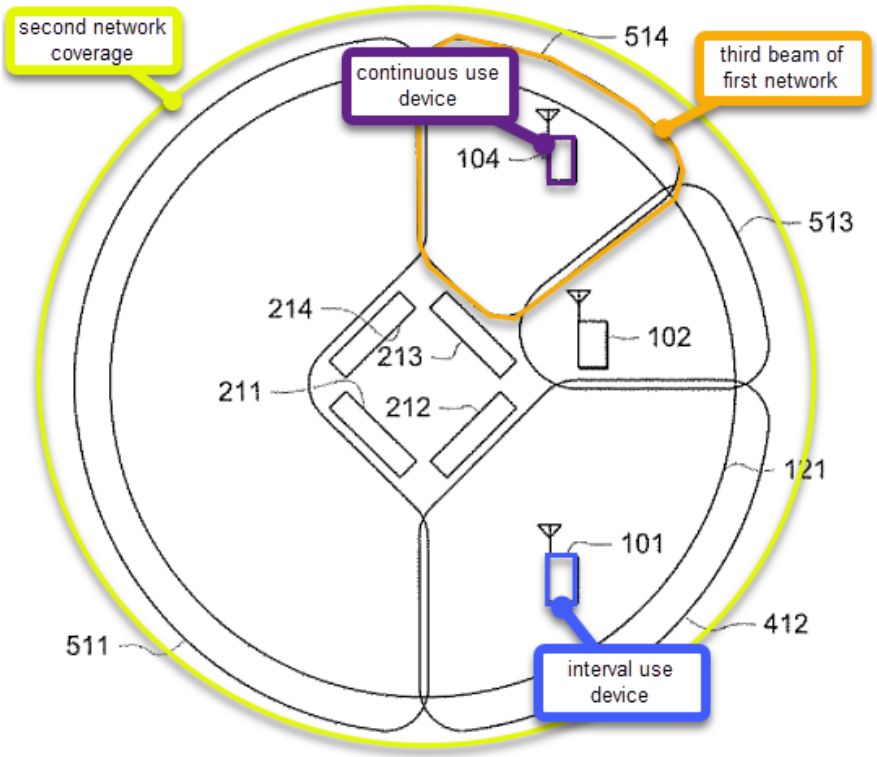
FIG. 5



(e) 14[d]: providing the third coverage configuration includes transmitting a third beam of the first network that is narrower than the first beam and is configured to provide coverage to at least one continuous use device of the group of devices, the at least one continuous use device being actively involved in a substantially continuous service with the network,

Dinan and Wong render obvious this limitation. Ex. 1003, ¶¶201-202. Wong discloses providing a ***third coverage configuration*** that includes transmitting another narrow beam "antenna pattern" (*i.e.,* ***a third beam of the first network***) which, as explained in limitation 1[c], is narrower than the first beam and provides coverage to a continuous use device. *Id.* For example, in Figure 5, narrow beam antenna pattern 514 provides coverage for continuous use device 104. *Id.*

FIG. 5



(f) 14[e]: and providing coverage by the second network to at least a plurality of interval use devices of the group.

Dinan and Wong render obvious this limitation. Ex. 1003, ¶¶203-204. The ***third coverage configuration*** includes 3G coverage as taught by Dinan. *Id.* As explained above in limitation 1[e], in the Dinan-Wong combination, devices that are not covered by narrow beam "antenna patterns," such as device 101 and other devices in that area as depicted in Figure 5, are ***interval use devices*** which are provided 3G coverage (*i.e.* ***coverage by a second network***) for interval services like email. *Id.*

11. Claims 17 and 20

With a few exceptions as set forth below, claims 17 and 20 mirror claim 1 as set forth in the following chart. Dinan and Wong render these claims obvious for the same reasons as set forth above for claim 1. Ex. 1003, ¶¶205-231.

Claim Limitation	Corresponding Claim Limitation(s)
17[pre]	1[pre]
17[a]	1[a]
17[b]	1[b]
17[c]	1[c]
17[d]	1[d]
20[pre]	1[pre]
20[a]	1[a]
20[b]	1[b]
20[c]	1[c]
20[d]	1[d]

(a) Limitations 17[pre], 20[pre], and 20[e]

Limitations 17[pre], 20[pre], and 20[e] recite a device comprising a machine readable medium storing instructions, and a processor to execute those instructions. Dinan and Wong render obvious these limitations. Ex. 1003, ¶¶207-208. For example, Dinan discloses that its disclosures may "be implemented as instructions stored on a machine-readable medium, which may be read and executed by one or more processors." Ex. 1007, 15:63-66. Dinan specifically discloses that its 3G and

4G base stations "contain various processors and memory devices ... which may be used to carry out ... the functionality described herein." *Id.*, 10:30-33.

Similarly, Wong describes that its beams are formed at a base station using a beam former, which could be "a processor-based system operable under control of an instruction set to provide processing of digital signals, to provide digital beam forming." Ex. 1006, 5:51-53. Wong's base station also has a controller which may also "comprise a processor-based system operating under control of an instruction set." *Id.*, 6:22-23. A POSITA would understand that in order for a processor to execute instructions, there would necessarily be a machine-readable medium for storing said instructions. Ex. 1003, ¶208.

(b) Limitation 20[f]

Limitation 20[f] recites an "adaptive antenna configured to transmit the first beam and the second beam." Dinan and Wong render obvious this limitation. Ex. 1003, ¶231. Wong discloses that its beam antenna patterns (*i.e.*, ***first and second beams***) are transmitted by an "antenna array 210 coupled to transceiver 230 through beam former 220." Ex. 1006, 5:11-12. Wong teaches that the purpose of its invention is to "facilitate ***adaptively forming*** ideal antenna patterns for communications" with devices. Ex. 1006, 12:9-11; *see also* 13:4-10 ("[A]ntenna patterns, adjusted over time according to embodiments of the present invention, are expected to provide a very good approximation of the use of antenna patterns

uniquely optimized for particular subscriber stations."). Thus, the antenna array in Wong which transmits the first and second beams is an ***adaptive antenna*** because it adapts to changing conditions to provide more optimal communications with devices. Ex. 1003, ¶231.

IX. DISCRETIONARY DENIAL

A. *Fintiv*

The six-factor *Fintiv* analysis weighs in favor of the Board declining to exercise discretionary denial. The district court has not indicated it will grant or deny a stay, and so that factor is neutral. Trial is not currently scheduled, although Jury Selection is scheduled for May 5, 2025, approximately a month before the Board's statutory deadline for a final written decision, which given the proximity weighs against denial or is at least neutral. Ex. 1009; *see SMIC Ams. V. Innovative Foundry Techs., LLC*, IPR2020-00786, Paper 10 at 20-21 (Oct. 5, 2020). Moreover, the litigation is at an early stage—Patent Owner only recently served infringement contentions and Petitioners have not yet served invalidity contentions, have produced a minimal amount of documents (indeed, a Protective Order was only entered a little over a month ago), have not deposed any witnesses, and have not begun claim construction briefing (which does not begin for another eight months). *Id.* Moreover, this Petition includes a challenge to Claim 8, which is not asserted in the District Court, giving unique issues for the Board to resolve. Petitioners were

also diligent in filing this Petition less than six months after it was served with the complaint. These factors weigh strongly in favor of not denying. Finally, the strong merits presented herein also weigh in favor of not exercising discretionary denial. Together, the factors weigh in favor of the Board declining to exercise its discretion to deny the petition.

B. *General Plastic*

The Board has discretion to deny under §314(a) in consideration of the factors enumerated in the Board's precedential decision *General Plastic Industrial Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 (Sept. 6, 2017). An IPR Petition against the '196 patent was recently filed by T-Mobile *et al.* (collectively, the "Carrier Petitioners") in IPR2024-00135.

Under the *General Plastic* factors, the Board should not exercise its discretion to deny despite the earlier IPR petition. Petitioners have not previously filed a petition directed to the same patent and, to the extent the Carrier Petitioners are considered the "same Petitioner" as Petitioners, the Petition in IPR2024-00135 challenges a completely different, non-overlapping set of claims.

Indeed, the claims being challenged in IPR2024-00135 (claims 23-27) are materially different than the claims challenged here. Claims 23-27 are directed to receiving or deferring data updates on a device depending on which network it is connected to, whereas the Challenged Claims in this Petition are directed to a base

station cycling through different coverage configurations that include wide and narrow beams to provide continuous or interval use services. As a result, it was necessary for Petitioners to use a completely different set of prior art references in this Petition. Thus, while Petitioners knew of the prior art references when the Carrier Petitioners filed their Petition, that should not weigh in favor of denial, since the prior art references in this Petition are not intended to replace or supplement the prior art in the Carriers' Petition. Moreover, given the material differences in the challenged claims and the prior art between the two IPR proceedings, there are few overlapping issues that would warrant conservation of Board resources.

Since the Petition in IPR2024-00135 was filed less than a month ago, Patent Owner has not filed a preliminary response nor has the Board issued any institution decision.

Finally, Petitioners note that the Challenged Claims in this Petition have not been asserted against the Petitioners in the Carriers' Petition.

C. 35 U.S.C. §325(d)

The Board should decline to deny institution under §325(d) because the PTO has not previously considered the same or substantially the same prior art and arguments Petitioners present here. The references relied upon in this Petition were neither cited nor considered during prosecution of the '196 patent, nor are they

duplicative of the references cited by the examiner. Thus, the Board should decline to deny institution under the discretionary authority of §325(d).

X. RANKING OF PARALLEL PETITIONS

Petitioners hereby note that, concurrently with this Petition (IPR2024-00318), Petitioners are filing a second Petition (IPR2024-00317) against the '196 Patent which is a "copycat" of the Petition filed in *T-Mobile USA, Inc. et al. v. Cobblestone Wireless, LLC*, IPR2024-00135 ("Copycat Petition"). The Copycat Petition challenges Claims 23-27 of the '196 Patent using a single ground based on U.S. Pat. No. 9,830,642 ("Chang"). Thus, compared to this Petition, the Copycat Petition challenges a different set of claims using different prior art.

Petitioners are filing the Copycat Petition with the intent to move for joinder if IPR2024-00135 is instituted. Although Patent Owner has not asserted Claims 23-27 in the parallel district court litigation against Petitioners, Patent Owner has alleged that Petitioners' products infringe those claims in the litigations against T-Mobile, AT&T and Verizon. Petitioners have therefore been identified as Real Parties-in-Interest in IPR2024-00135.

The Board's Consolidated Practice Guide requests that, for parallel petitions against the same patent, the Petitioner provides "(1) a ranking of the petitions in the order in which it wishes the Board to consider the merits, if the Board uses its discretion to institute any of the petitions, and (2) a succinct explanation of the

differences between the petitions, why the issues addressed by the differences are material, and why the Board should exercise its discretion to institute additional petitions if it identifies one petition that satisfies petitioner's burden under 35 U.S.C. § 314(a)." Consolidated Trial Practice Guide at 60.

Ranking. Petitioners provide the following ranking of the Petitions in the order it wishes the Board to consider the merits: (1) this Petition (IPR2024-00318), (2) the Copycat Petition (IPR2024-00317).

Explanation. The differences between the two Petitions are reflected in the below table.

Ground	Reference(s)	Basis	Claims
This Petition (IPR2024-00318)			
1	Chitrapu	§103	1-5, 7, 10, 12, 14, 17, 18, 20, 21
2	Chitrapu, Wong	§103	1-5, 7, 8, 10, 12, 14, 17, 18, 20, 21
3	Dinan, Wong	§103	1-5, 8, 10, 12, 14, 17, 20
Copycat Petition (IPR2024-00317)			
1	Chang	§103	23-27

The differences between the two Petitions are material. The Challenged Claims here are materially different than the Challenged Claims in the Copycat Petition. The Challenged Claims in this Petition are directed to a wireless base station cycling through wide and narrow beam coverage patterns to provide

continuous use service or interval use service to devices. By contrast, Claims 23-27 challenged in the Copycat Petition are directed to a user device deferring device updates until it is on a more capable network. As a result, the prior art is materially different, and the issues for the Board to consider are materially different between the two Petitions.

In addition, if the Board institutes IPR2024-00135, instituting the Copycat Petition and granting Petitioners' to-be-filed motion for joinder (or consolidating the proceedings) will not require the expenditure of any additional Board resources.

XI. MANDATORY NOTICES AND FEES

A. Real Party-In-Interest

The real parties-in-interest for Petitioners are Samsung Electronics America, Inc and Samsung Electronics Co., Ltd. Out of an abundance of caution and to avoid additional issues associated with real parties-in-interest, Petitioners likewise identify T-Mobile USA, Inc., AT&T Services Inc., AT&T Corp., AT&T Mobility LLC, and Cellco Partnership d/b/a Verizon Wireless because Petitioners' products are accused of infringement in their respective patent infringement actions.

B. Related Matters

Cobblestone Wireless, LLC v. T-Mobile USA, et al., No. 2:22-cv-00477 (E.D. Tex.) filed December 16, 2022

Cobblestone Wireless, LLC v. Verizon Communications Inc., et al., No. 2:22-cv-00478 (E.D. Tex.) filed December 16, 2022

Cobblestone Wireless, LLC v. AT&T Inc. et al., No. 2:22-cv-00474 (E.D. Tex.) filed December 15, 2022

Cobblestone Wireless, LLC v. Samsung Electronics Co., Ltd. et al., No. 2:23-cv-00285 (E.D. Texas) filed June 16, 2023

T-Mobile USA, Inc. et al. v. Cobblestone Wireless, LLC, IPR2024-00135 (PTAB)

Samsung Electronics America, Inc. v. Cobblestone Wireless LLC, IPR2024-00317 (PTAB)

C. Counsel and Service Information

Petitioners provide the following counsel and service information. Petitioners consent to electronic service the email addresses listed in the table below. Pursuant to 37 C.F.R. § 42.10(b), a Power of Attorney accompanies this Petition.

LEAD COUNSEL	BACK-UP COUNSEL
James M. Glass (Reg. No. 46729) jimglass@quinnemanuel.com QUINN EMANUEL URQUHART & SULLIVAN, LLP 51 Madison Avenue, 22nd Floor New York, NY 10010 Tel: (212) 849-7000 Fax: (212) 849-7100	Quincy Lu (Reg. No. 76,954) quincylu@quinnemanuel.com QUINN EMANUEL URQUHART & SULLIVAN, LLP 1109 First Avenue, Suite 210 Seattle, WA 98101 Tel: (206) 905-7000 Fax: (206) 905-7100 Jason Williams (*pro hac vice* forthcoming) jasonwiliams@quinnemanuel.com QUINN EMANUEL URQUHART & SULLIVAN, LLP 51 Madison Avenue, 22nd Floor New York, NY 10010 Tel: (212) 849-7000 Fax: (212) 849-7100

D. Payment of Fees

The undersigned authorizes the Office to charge the fee required for this Petition for *Inter Partes* Review to Deposit Account No. 50-5708. Any additional fees that might be due are also authorized.

XII. CONCLUSION

Petitioners request institution of an IPR and cancellation of the Challenged Claims.

Date: December 18, 2023

Respectfully submitted,

By: /s/ *James M. Glass*
James M. Glass

Counsel for Petitioners

CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITATION, TYPEFACE REQUIREMENTS, AND TYPE STYLE REQUIREMENTS

1. This Petition complies with the type-volume limitation of 14,000 words, comprising 12,492 words, as counted using the Microsoft Word software that was used to prepare this paper, excluding the parts exempted by 37 C.F.R. § 42.24(a).

2. This Petition complies with the general format requirements of 37 C.F.R. § 42.6(a) and has been prepared using Microsoft® Word 2016 in 14-point Times New Roman.

Date: December 18, 2023

By: */s/ James M. Glass*

James M. Glass
QUINN EMANUEL URQUHART
& SULLIVAN, LLP
51 Madison Avenue, 22nd Floor
New York, NY 10010
Tel: (212) 849-7000
Fax: (212) 849-7100

Counsel for Petitioners

CERTIFICATE OF SERVICE

The undersigned hereby certifies that on December 18, 2023, true and correct copies of the foregoing document and supporting materials were served in its entirety on the Patent Owner at the following address of record as listed on PAIR via Priority Mail Express® or Express Mail:

BRUNDIDGE & STANGER, P.C.
1925 BALLENGER AVENUE, STE. 560
ALEXANDRIA VA 22314
UNITED STATES
Official Correspondence Address

Courtesy copies were also sent via electronic mail to Patent Owner's counsel of record in the related district court proceeding

Reza Mirzaie, rmirzaie@raklaw.com
Marc A. Fenster, mfenster@raklaw.com
Neil A. Rubin, nrubin@raklaw.com
Christian W. Conkle, cconkle@raklaw.com
Jonathan Ma, jma@raklaw.com
Amy E. Hayden, ahayden@raklaw.com

Date: December 18, 2023

By: */s/ James M. Glass*
James Glass
QUINN EMANUEL URQUHART
& SULLIVAN, LLP
51 Madison Avenue, 22nd Floor
New York, NY 10010
Tel: (212) 849-7000
Fax: (212) 849-7100

Counsel for Petitioners