

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MINKA LIGHTING, LLC
Petitioner,

v.

WANGS ALLIANCE CORPORATION
Patent Owner

U.S. Patent No. 11,028,854

Case IPR2024-01027

**PETITION FOR *INTER PARTES* REVIEW
UNDER 35 U.S.C §312 AND 37 C.F.R. §42.104**

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EXHIBIT LIST

No.	Short Name	Reference
1001	'854 Patent	Certified copy of U.S. Patent No. 11,028,854 to Stefankiewicz et al.
1002	'854 File Hist.	Certified File Prosecution History of the '854 Patent
1003	Min Decl.	Expert Declaration of Paul Min, Ph.D.
1004	Min CV	Curriculum Vitae of Paul Min
1005	Markman Order	Inv. No. ITC-337-TA-1374 – Order Construing Terms of the Asserted Claims
1006	<u>Qirong</u>	Certified translation of Chinese Utility Model Patent No. 206738206
1007	<u>Yun</u>	Certified translation of Chinese Utility Model Patent No. 204783774
1008	<u>McPherson</u>	U.S. Patent Publication No. 2015/0325112
1009	Hunter Fan	Hunter Fan Co., M3602-01 Installation Guide (2016)
1010	Suro	U.S. Patent Publication No. 2013/0073431
1011	Fanimation	Fanimation, 2017 Showroom Collection
1012	Ahmed	Ahmed et al., Design and Construction of a Remote Controlled Fan Regulator, Leonardo Electronic Journal of Practices and Technologies Issue 9 pp. 55-62 (July 2006)
1013	Lach	Lach et al., Smart Home System Operating Remotely Via 802.11b/g Wireless Technology (January, 2007)
1014	Mehta	U.S. Patent No. 5,689,261 to Mehta et al.
1015	Hart	U.S. Patent No. 5,041,825 to Hart et al.
1016	McDonough	U.S. Patent No. 6,120,262 to McDonough et al.
1017	Mangla	Mangla et al., A Comprehensive Review: Internet of Things (IOT), IOSR Journal of Computer Engineering, Vol. 19, Issue 4, pp 62-72 (July, 2017)

1018	Sailaja	Sailaja et al., Literature Survey on Real World Applications using Internet of Things, 2018 IADS International Conference on Computing, Communications & Data Engineering (April, 2018)
1019	Matsuoka	U.S. Patent Publication No. 2014/0101082
1020	Li	Li et al., Research and application on the smart home based on component technologies and Internet of Things, pp 2087-92 (2011)
1021	Haiku Guide	Big Ass Fans, Haiku 60 Installation Guide (2014)
1022	Haiku Case Study	Big Ass Fans, Kinetis MCUs – The Brain Behind a Remarkably Smart Fan (2016)
1023	Bauer	U.S. Patent Publication No. 2015/0137941
1024	Festus	Festus et al., Development of a Rechargeable Fan, pp 43-46 (September, 2017)
1025	Weidong	Certified translation of Chinese Utility Model Patent No. 204716567
1026	Stay Order	<i>Minka Lighting, LLC v. Wangs Alliance Corp.</i> , Case No. 5-23-cv-02493-AB-SHK, (C.D. Cal.) – Order Granting Plaintiff’s Unopposed Motion to Stay Pending Resolution of Related ITC Proceeding
1027	Computer Dictionary	Microsoft Computer Dictionary, Fifth Edition, Microsoft Press (2002)
1028	Oxford Computer Dictionary	Oxford Dictionary of Computer Science, Seventh Edition, Oxford University Press (2016)
1029	Oxford English Dictionary	Oxford English Dictionary, <i>synchronize</i> (2016), https://www.oed.com/dictionary/synchronize_v?tl=true
1030	Haiku Technical Specifications	Big Ass Fans, Haiku 60 Technical Specifications (2015)

1031	'274 Provisional Application	U.S. Provisional Patent Application No. 62/617274
1032	'152 Provisional Application	U.S. Provisional Patent Application No. 62/617152
1033	ARM Spec.	Specification for ARM Cortex-M4 processor
1034	Mason	U.S. Patent 78,674
1035	Fan History	LA Times, “Whirlwind History of Ceiling Fans” (1997).
1036	WAC Claim Construction	Inv. No. ITC-337-TA-1374 – WAC Opening Claim Construction Brief
1037	Minka Claim Construction	Inv. No. ITC-337-TA-1374 – Minka Opening Claim Construction Brief

LISTING OF CHALLENGED CLAIMS

Reference	
Claim 1	
1 [pre]	A system comprising:
1 [a]	a fan motor;
1 [b]	a fan motor control circuit;
1 [c]	a processor in electrical communication with the fan motor control circuit;
1 [d]	a radio frequency interface configured to receive, at a first frequency, a signal;
1 [e]	a WiFi interface configured to communicate at a second frequency that is different from the first frequency; wherein:
1 [f]	the fan motor control circuit is configured to cause the fan motor to perform an operation in response to the signal; and;
1 [g]	the processor is configured to transmit, via the WiFi interface, to a server, an indication corresponding to the operation.
Claim 2	
2 [a]	The system of claim 1 further comprising, when the IO signal is a first signal, the operation is a first operation, and the indication is a first indication:
2 [b]	a light; and
2 [c]	a light control circuit configured to cause the light to 15 perform a second operation in response to a second signal received by the radio frequency interface;
2 [d]	wherein the processor is further configured to transmit to the server, via the WiFi interface, a second indication corresponding to the second operation.
Claim 3	

3 [a]	The system of claim 2 wherein: the first indication corresponds to an operation selected from the group consisting of: fan on, fan off, fan power state change, fan speed-up, fan speed-down, and fan direction-change; and
3 [b]	the second indication corresponds to an operation selected from the group consisting of: light on, light off, light power state change, light increase, and light decrease.
Claim 4	
4	The system of claim 1 further comprising a housing; wherein the fan motor, the fan motor control circuit the 30 processor, the radio frequency interface, and the WiFi interface are disposed in the housing.
Claim 8	
8 [a]	The system of claim 1 further comprising, when the processor is a first processor, the server; wherein the server includes a second processor configured to cause the server to:
8 [b]	receive a command directed to the first processor; and
8 [c]	communicate the command via the Internet and a WiFi router to the first processor.
Claim 9	
9	The system of claim 8 wherein the second processor is further configured to cause the server to update information about a state of a device that is in a wireless local network based on the command.
Claim 10	
10	The system of claim 9 wherein the second processor is further configured to cause the server to update the information in response to transmitting the command from the server.

I. INTRODUCTION

Petitioner Minka Lighting, LLC (“Petitioner”) petitions for *inter partes* review (“IPR”) of claims 1-4 and 8-10 (“Challenged Claims”) of U.S. Patent 11,028,854 (EX1001, ’854 Patent)¹ and requests cancellation of those claims as unpatentable.

The claims of the ’854 Patent relate to a system for wirelessly controlling fan devices via multiple communication interfaces. EX1001, 1:14-18. However, the claimed subject matter is neither novel nor non-obvious as of January 2018. The claims recite existing technology implemented in a conventional manner to perform the obvious idea of wirelessly controlling a fan.

II. IDENTIFICATION OF CHALLENGE

A. Grounds for Challenge (§42.104(b))

The Challenged Claim are unpatentable, based on the following grounds:

Ground		Claims	Prior Art
1	§103	1-4, 8-10	<u>Yun</u> and <u>McPherson</u>
2	§103	1-4, 8-10	<u>Qirong</u>
3	§103	1-4, 8-10	<u>Qirong</u> and <u>Yun</u>

¹ The ’854 Patent is asserted in a parallel ITC Investigation. *Infra* §VIII.C.

A. Prior Art

The earliest alleged priority date for the Challenged Claims is January 12, 2018. *Infra* §IV.B. Thus, each of the cited references qualifies as prior art under at least 35 U.S.C. §102(a)(AIA).²

Prior Art	
<u>Qirong</u> (EX1006)	Chinese Patent No. 206738206, published on December 12, 2017; prior art at least under 35 U.S.C. §102(a)(1)
<u>Yun</u> (EX1007)	Chinese Patent No. 204783774, published on November 18, 2015; prior art at least under 102(a)(1)
<u>McPherson</u> (EX1008)	U.S. Patent Publication No. 2015/0325112, published November 12, 2015; prior art at least under 102(a)(1)

III. OVERVIEW OF THE TECHNOLOGY

By the 1990s, radio frequency (“RF”) remote controlled fans were well-known and included conventional components such as RF receivers, fan motors, fan motor control circuits, and processors. EX1024, 2;³ EX1034; EX1035, 1-2; EX1008, [0028]; EX1014, Abstract, 2:24-39; EX1015, 3:20-25; EX1019, [0064]; EX1018, 2; EX1020, 1-2. RF remote controls controlled the operations of the fan and could signal various fan commands—*i.e.*, speed, fan on/off, lighting on/off, etc. EX1014, 1:33-39, EX1015, 3:26-27, Abstract; EX1016, 1:63-65. In the early 2000s,

² All references to 35 U.S.C. §§ 102 and 103 are to the AIA statutory framework.

³ All citations to page numbers herein refer to the pagination provided pursuant to 37 CFR §42.63.

the benefits of WiFi functionality in wireless home devices and smartphones resulted in the proliferation of home appliances with built-in WiFi capability that allowed users to control and monitor devices remotely. EX1013, 2; EX1017, 2; EX1022, 1-2; EX1023, [0003], EX1010, [0003]; EX1011, 146. Yet legacy remote controls remained prevalent, cheap, and reliable, meaning that many products used multiple interfaces to allow control over the internet and through legacy RF remote controls. EX1023, [0003]; EX1009, 17-18; EX1012, 1, 7; EX1006, [0030]; EX1007, [0003]. By 2014, smart fans designed to use both WiFi and RF remote controls, were commercially available. *Compare* EX1022, 1-2 with EX1021, 18-19; EX1030, 12; EX1003, ¶65. These devices featured multiple communication interfaces and adopted real-time status conveyance and update protocols over WiFi. EX1022, 1-2; EX1009, 17-18; EX1003, ¶¶49-67; EX1006, Title; EX1007, Title; EX1008, Title; EX1009, 18; EX1011, 146-152; EX1019, Title.

IV. THE '854 PATENT

A. Overview

The '854 Patent relates to a system for controlling a fan that includes both “an RF interface and a WiFi interface.” EX1001, 1:15-18, 2:1-5. The “RF and WiFi control” interfaces replace the “unsightly” pull-cords that are common on ceiling fans. *Id.*, 1:39-45, 2:3-5. The RF interface can receive “RF control signals which are sent by control unit[s]” (e.g., wall-controller) to control the fan. *Id.*, 2:3-5,

Abstract, 7:25-26, 2:19-21. Likewise, the WiFi interface receives “WiFi communications... from a WiFi capable device, e.g., a cell phone, to control the fan device and its various functions.” *Id.*, 26:52-54. Additionally, “the fan device reports its state and/or changes in state due to received commands to a server, e.g., located outside the customer premises.” *Id.*, 27:13-15; EX1003, ¶¶39-41.

B. Prosecution History

The '854 Patent issued from Application No. 15/871,044, filed on January 14, 2018, and claims priority to Provisional Application No. 62/617,152 (EX1032), filed on January 12, 2018, and Provisional Application No. 62/617,274 (EX1031), filed January 14, 2018. The references relied on in this Petition qualify as prior art as of the earliest priority date.

During prosecution, the claims as-filed were rejected as anticipated by U.S. Patent Application Publication 2013/0073431 (“Suro”) (EX1010) in the first non-final rejection. EX1002, 126-132. Applicants argued that Suro failed to disclose a “fan motor,” “radio frequency signal receiver,” “WiFi interface.” or a fan device comprising “both a radio frequency (RF) signal receiver and a WiFi interface.” *Id.*, 153-54. The Examiner found the arguments unpersuasive and maintained the rejection. *Id.*, 289-297. Applicants filed a Notice of Appeal and later a Request for Continued Examination (RCE). *Id.*, 314, 327. In the RCE, Applicants cancelled then-pending claims 1-9 and amended the remaining claims to recite “a fan motor

control circuit,” and [1] a first and second “frequency,” [2] “signal,” [3] “operation,” [4] “indication,” and [5] “processor.” *Id.*, 334-38. Following the amendments, the Examiner issued a notice of allowance. *Id.*, 347.

The references relied on in this petition—Yun, Qirong, and McPherson—were not before the Examiner during prosecution. EX1002, 162-163; EX1001, Cover, pg. 3; EX1003, ¶¶42-47.

C. Level of Ordinary Skill in the Art (“POSA”)

In the related ITC Investigation, Patent Owner asserted that a person of ordinary skill in the art (POSA) at the time of the purported inventions of the ’854 Patent would have had a bachelor’s degree in electrical or computer engineering, or a related field, and two to three years of experience with the design or implementation of wireless communication systems, control circuits, or power electronics, and that a higher level of education or skill can make up for less experience, and vice versa. EX1005, 7. Petitioner has applied this level of skill. EX1003, ¶¶68-70.

D. Claim Construction

Four terms were construed in the ITC Investigation (EX1005):

Claim Term	Construction
<i>“a radio frequency interface configured to receive”</i> ⁴	“a radio frequency interface that is configured to receive”

⁴ Italics signify claim language.

“a WiFi interface configured to communicate”	“a WiFi interface that is configured to communicate”
“first frequency”	“first frequency”
“second frequency”	“second frequency different from said first frequency,”

The Petition and supporting Declaration have applied these constructions. EX1003, ¶¶72-73. No other terms of the Challenged Claims require construction in this IPR.

V. DETAILED EXPLANATION OF GROUNDS FOR INVALIDITY

A. Ground 1: Claims 1-4 and 8-10 are obvious over Yun/McPherson

Ground 1 is based on the combination of Yun and McPherson (Yun/McPherson), where McPherson discloses the “*radio frequency interface configured to receive, at a first frequency, a signal,*” not expressly disclosed by Yun. The remote-control functionality of McPherson is implemented within the smart fan system of Yun. In particular, receiver 115 of McPherson (including its associated data messages) is combined with input module 16 of Yun such that user commands received by receiver 115 are used to command the fan in a similar way as input module 16. When the prior art discloses analogous functionality, such as a fan motor or control signals, a POSA would prioritize efficiency and common sense in implementing the individual, nonredundant features into the combined system to obtain the benefits of both. EX1003, ¶75.

1. Yun

Yun (EX1007) discloses a fan system using “WiFi smart control combined with local control.” *Id.*, [0027]. In particular, the fan system includes a control system where a smart terminal (e.g., smartphone) application enables the remote operation (i.e., off/on, adjust wind speed, and adjust rotation) of the WiFi fan by sending control signals to the fan. *Id.*, [0025]. A user may also manually control the operation and configuration of the fan by local input buttons. *Id.*, [0030], [0040]. After implementing the requested operation (received from either input module 16 or the smart terminal), the current state of the WiFi fan is sent to the cloud server, which processes, stores, and sends the fan information to a user terminal. *Id.*, [0024]; [0040]; EX1003, ¶¶76-80.

2. McPherson

McPherson (EX1008) discloses a “Ceiling Fan Control System,” that includes a “receiving unit” 115 which receives “data messages via wireless signals such as radio frequency signals 106.” EX1008, [0029]. The “data messages describe the commands and responses to control the ceiling fans 130.” EX1008. [0033]. For example, a “data message” could control “turning the cooling and lighting functions of the ceiling fans 130 on and off, changing the fan speeds and lighting output.” EX1008, [0033]; EX1003, ¶¶81-83.

3. Motivation to Combine

The combination of Yun and McPherson would have been obvious for several reasons. EX1003, ¶84.

Yun, McPherson, and the '854 Patent are analogous art. Each is directed to the same field of endeavor, remote control of smart fans. EX1007, [0004]; EX1008, [0010]; EX1001, 1:14-17; EX1003, ¶85. Yun and McPherson are also reasonably pertinent to the problem addressed by the '854 Patent—an “improved method of controlling a fan.” *Id.*; EX1001, 1:59-60.

It would have been obvious to combine Yun and McPherson because to do so would have been [1] an arrangement of conventional elements (i.e., RF remote-control functionality of McPherson, WiFi fan system of Yun) [2] with each performing the same function it had been known to perform (i.e., remote control communication with a smart fan) and [3] yielding a predictable system (i.e., a fan system capable of both internet and RF remote control). EX1003, ¶86; EX1025, [0025]-[0026].

A POSA would have been motivated to use the remote-control functionality of McPherson in the system of Yun, because a remote control is a convenient and efficient way to facilitate user control of the fan and would have improved the user experience. EX1003, ¶87; EX1008, [0003]-[0009]. For instance, McPherson explains that “consumers often get confused and frustrated when manipulating the

pull chains.” EX1008, [0005]. RF remote controls (like the one in McPherson) overcame known drawbacks associated with pull chains and other forms of local control (such a control switches). EX1008, [0003]-[0009]. Likewise, a POSA would have been motivated to include the remote-control functionality of McPherson in the system of Yun, to allow the user to control the smart fan during WiFi network outages, or when local control would be more convenient. EX1003, ¶88; EX1007, [0040].

A POSA would have been also motivated to include the RF remote-control functionality of McPherson in Yun because RF remote controls have “the advantages of arbitrary directionality, [are] not obstructed by objects, [are] less susceptible to interference, and [have] greater stability,” as compared to infrared remote controls (such as TV remotes). EX1007, [0002]; EX1006, [0030]; EX1003, ¶89.

Yun also explains the benefits associated with Internet of Things functionality, such as “smart timing, remote restart and shutdown, smart shifting, intelligent display, and smart display.” EX1007, [0014]; EX1003, ¶90. McPherson similarly teaches how users may configure fan functionality via an application on an “Internet Protocol-enabled device”. EX1008, [0024], [0040-42]. For instance, a user can remotely enable “timer features” (i.e., smart scheduling), remote viewing on a display screen, or load monitoring to mitigate power consumption. *Id.*

Therefore, a POSA would have been motivated to include the benefits of McPherson and Yun in their design. EX1003, ¶91.

Additionally using the RF remote-control functionality of McPherson is one of only a finite number of commercially viable ways to control a ceiling fan and so would have been predictable. EX1013, 2 (“Most of the smart home products in industry mainly use wireless technology [] such as radio frequency (RF), microwave communication, infrared (IR), IrDA and Bluetooth.”); EX1008, [0003]-[0009]; EX1003, ¶¶ 92, 94.

Moreover, Yun expressly discloses all elements of the challenged claims but for element 1[d], reciting “*a radio frequency interface configured to receive, at a first frequency, a signal.*” However, Yun discloses a module 16 comprising input buttons for controlling wind speed 161, rotation 162, power 163. EX1007, [0030]. A POSA would have known that a wireless connection with the fan based on an RF frequency would enable users to locally control the fan without having to access buttons on the fan or on a wall plate. EX1003, ¶93; EX1007, [0002]; EX1008, [0003]-[0009]. McPherson explicitly teaches using a radio frequency interface this way. Thus, A POSA would have been motivated to combine Yun and McPherson because using the radio-control functionality of McPherson with the system of Yun would be no more than a simple substitution. EX1003, ¶94; EX1007, [0030], Figure 3; EX1008, [0025].

As explained above, using both WiFi and RF remote-control in a ceiling fan was known in the prior art. *Supra*, §III. Moreover, both Yun and McPherson explain that their disclosures are not limited to any one physical configuration. EX1007, [0020]; EX1008, [0063]. Therefore, a POSA would have had a reasonable expectation of success in using the remote-control functionality of McPherson within the Yun system because doing so involves applying the straightforward solution of RF remote control with no undue level of unpredictability. EX1003, ¶¶94-95.

4. Claim 1

a. Element 1[pre]

To the extent the preamble is considered limiting, Yun teaches or renders obvious the claimed “*system*” as a “smart fan system.” EX1007, [0024], [0004]; EX1003, ¶¶96-98.

b. Element 1[a]

Yun teaches or renders obvious the claimed “*fan motor*.” EX1003, ¶¶99-101. Yun discloses a “smart fan system” that includes a “WiFi fan.” EX1007, [0024], [0003], [0004]. The WiFi fan in Yun is an improvement over a “traditional fan” or “existing fan” but also includes “a remote-control function.” *Id.* A POSA would have understood that “traditional fan[s]” or “existing fans” includes a “*fan motor*.” EX1003, ¶100; EX1008, [0004], [0006]; EX1024, 2-3; EX1025, Abstract. Yun

teaches that the WiFi fan includes “a power supply module 11 for powering, [and] a drive circuit 12 for driving the operation of the WiFi fan 1” (i.e., the speed, direction, and on/off state). EX1007, [0027], [0031]. For example, “when the wind speed adjustment button 161 is pressed, the fan starts to work” and each subsequent time the wind speed adjustment button is pressed the fan “will speed up.” EX1007, [0030]. Therefore, a POSA would have understood that drive circuit 12 controls a “*fan motor*” because it is controlling the speed, direction, and on/off state of a fan—and making the fan blades move. EX1003, ¶100.

If Patent Owner argues Yun does not expressly disclose this limitation, McPherson expressly teaches the claimed “*fan motor*.” McPherson describes the structure of a conventional ceiling fan, which comprises “**the motor of the fan.**” EX1008, [0004], [0006]; EX1003, ¶101.⁵

c. Element 1[b]

Yun teaches or renders obvious the claimed “*fan motor control circuit*.” EX1003, ¶¶102-105. Yun discloses that “the WiFi fan includes...**a drive circuit** for driving the WiFi fan to operate.” EX1007, [Abstract], [0021]. As explained above (§V.A.4.b), drive circuit 12 controls the operations of the WiFi fan 1, such as the speed, direction, and on/off state. *Id.*, [0029], [0027]. Therefore, a POSA would

⁵ All emphasis is added unless noted otherwise.

have understood that drive circuit 12 is a “*fan motor control circuit*” because it controls the operations of the “*fan motor*.” EX1003, ¶¶103-105; EX1007, [0027], Fig. 3 (depicting sub-components “switching circuit 121 for turning off the WiFi fan 1, [] turning circuit 122 for turning the fan left and right, and [] adjustment circuit 123 for adjusting the wind speed.”) Moreover, a POSA would have understood that fan motor control circuits were widely used in prior art fans and therefore would have been obvious. EX1025, [0003]; EX1003, ¶105.

d. Element 1[c]

Yun teaches or renders obvious the claimed “*processor in electrical communication with the fan motor control circuit*.” EX1003, ¶¶106-109. Yun discloses a “control module 131,” which “adopt[s] the circuit structure of a microcontroller, **microprocessor**.” EX1007, [0029]. Therefore, a POSA would have understood that “control module 131” is “*a processor*.” Additionally, a POSA would have understood control module 131 is “*a processor*” because it performs the functions of a processor such as “**processing** control signals” and controls “the operation of the drive circuit 12.” EX1007, [0021], [0013], [0029], [0031]; EX1019, [0071]; EX1003, ¶108.

Yun further discloses that control module 131 is “*in electrical communication with the fan motor control circuit*.” In particular, control module 131 is “**connected** to the drive circuit 12” (i.e., the “*fan motor control circuit*”). EX1007, [0029]; Fig

3 (depicting control module 132 in direct electrical communication with the smart fan drive circuit 12). Yun explains that “connections” may be communication connections, **electrical connections**, or mechanical connections. *Id.*, [0020]. Moreover, the control module 131 controls “the operation of the drive circuit 12.” EX1007, [0021]. A POSA would have understood that being “connected to” and “controlling” the operations of drive circuit 12 means control module 131 is in “*electrical communication with the fan motor control circuit.*” EX1003, ¶109; EX1007, [0004], [0033].

e. Element 1[d]

Yun/McPherson renders obvious “*a radio frequency interface configured to receive, at a first frequency, a signal.*” EX1003, ¶¶110-115. Yun explains that WiFi fan 1 includes an input module 16, that includes buttons for controlling wind speed 161, rotation 162, power 163. EX1007, [0030]. While Yun does not expressly disclose the input module 16 having a radio frequency interface, Yun explains that the “WiFi fan 1 can be operated and configured locally through the input module 16, whose principle is known to those skilled in the art and is not described here.” *Id.* Based on the general knowledge of a POSA in 2018, it was well known that ceiling fans are “usually operated by... pull chains and/or by a remote control.” EX1008, [0003]; EX1003, ¶111. Using a remote control (and having an interface to communicate with that remote control) would have been obvious to a POSA, since

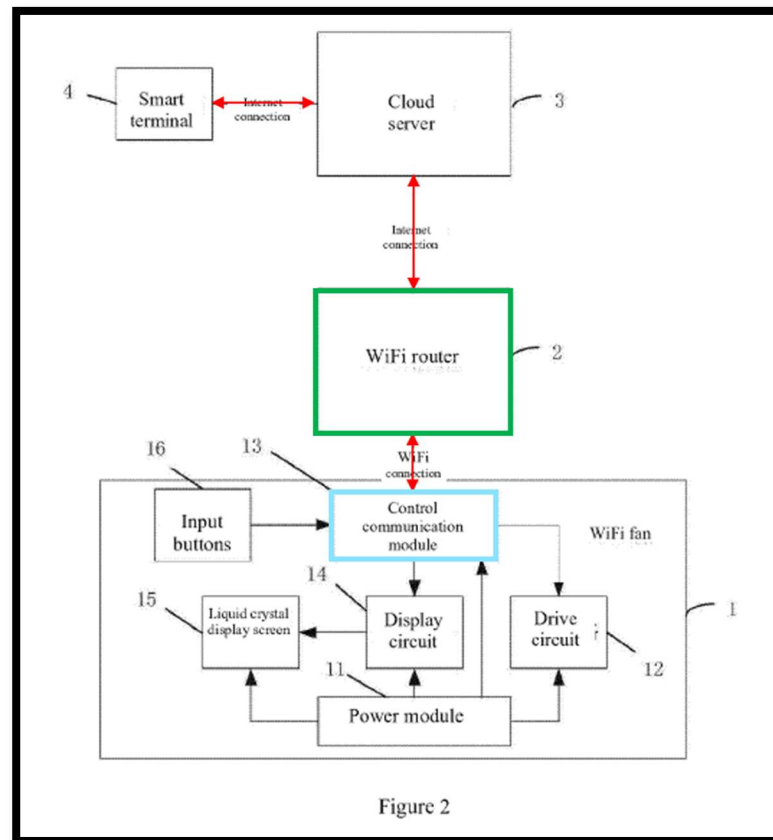
remote controls are one of a finite number of commercially viable solutions for controlling a ceiling fan and are how a fan is “usually operated.” *Id.*, ¶112.

In the combination, McPherson discloses a “radio frequency receiving unit” 115 (i.e., “*a radio frequency interface*”) that receives “data messages” (i.e., “*a signal*”) sent to the fan. EX1008, [0011], [0025], [0029]. The “data messages” received by the “receiving unit” include the “commands and responses [] to control the ceiling fans 130,” such as “turning the cooling and lighting functions of the ceiling fans 130 on and off, changing the fan speeds and lighting output.” *Id.*, [0033]. A POSA would have recognized that McPherson is using the radio frequency receiving unit 115 to receive the same types of commands as Yun’s input module 16. EX1003, ¶113. Therefore, using the remote-control functionality of McPherson with the system of Yun would be simple substitution, and yield a predictable result. *Id.*, ¶113, ¶115; *supra* §V.A.3.

The receiving unit of McPherson is also “*configured to receive, at a first frequency, a signal.*” McPherson explains that the receiving unit can be configured to “communicate in the ISM band at a frequency between 433.050 MHz and 434.790 MHz.” EX1008, [0032]. A POSA would have understood that 433.050 - 434.790 MHz is within “*radio frequency.*” EX1027, 446; EX1001, 11:32-34; EX1003, ¶114.

f. Element 1[e]

Yun teaches or renders obvious a “WiFi interface configured to communicate at a second frequency that is different from the first frequency.” EX1003, ¶¶116-120. If the processor and WiFi interface can be part of the same structure, Yun discloses it. As shown below, Yun discloses that the control communication module 13 (blue) includes a WiFi communication module (i.e., main communication module 132) for communicating (red) with a WiFi router (green). EX1007, [0029].



(EX1007, Fig. 2) (annotated).

In particular, the “main communication module 132 [is] for communicating with the WiFi router” and can “enable **communication** with the smart terminal 4 through the WiFi router 2 and cloud server 3.” *Id.*, [0002]. Therefore, a POSA would have understood that the main communication module 132 is a “*WiFi interface configured to communicate*.” EX1003, ¶¶117-118.

To the extent the claim requires the WiFi communication module and processor to be in separate sub-components, Yun renders that configuration obvious. In particular, Yun explains that “[v]arious changes, modifications, substitutions, and variations can be made to these examples without departing from the principles and objectives of” Yun. Therefore, a POSA would have understood that Yun allows for main communication module 132 and control module 131 to be separate components. Using separate components for the main communication module 132 and control module 131 was well-known and well understood and would have been a matter of simple substitution. EX1003, ¶119; *Infra* §V.B.2.f.

Additionally, the main communication module 132 communicates “*at a second frequency that is different from the first frequency*.” As explained above (§V.A.4.e), the RF receiving unit of McPherson operates at a frequency between 433.050 and 434.790 MHz (i.e., RF). EX1008, [0032]. However, the “main communication module 132” of Yun uses “WiFi,” not RF. EX1007, [0029], [0014]. A POSA would have known that the 433 MHz frequency is not used in any WiFi

standard (such as IEEE 802.11b). EX1003, ¶120. A POSA would have also understood that “WiFi” is a “wireless Ethernet link operating in the 2.4 GHz band and conforming to IEEE 802.11b.” EX1028, 4; EX1001, 11:34; EX1007, [0014]. Therefore, the 2.4 GHz WiFi signal (i.e., the “*second frequency*”) differs from the 433 MHz RF signal (i.e., “*the first frequency*”) received by receiver 115. EX1003, ¶120.

g. Element 1[f]

Yun teaches or renders obvious a “*fan motor control circuit [] configured to cause the fan motor to perform an operation in response to the signal.*” EX1003, ¶¶121-124. As explained above, a POSA would have understood that drive circuit 12 controls a “*fan motor*” and is a “*fan motor control circuit.*” See §V.A.4.c.

The drive circuit 12 is also “*configured to cause the fan motor to perform an operation in response to the signal.*” Yun explains that “drive circuit 12” is used to drive “the operation of the WiFi fan 1.” EX1007, [0021]. For example, “input buttons 16 are arranged corresponding to the drive circuit 12” where the “wind speed adjustment button 161” can adjust the speed of the fan. EX1007, [0030]. Yun explains that “[e]ach time the wind speed adjustment button 161 is pressed, **it will speed up.**” EX1007, [0040]. A POSA would have understood that a command to “speed up” the fan is an “*operation*” of the fan. EX1003, ¶123; see EX1001, 13:63-67 (“operations, e.g., [] increase fan speed of fan 1, decrease fan speed of fan 1,

change fan direction of fan 1.”) Therefore, a POSA would have understood that the drive circuit 12 is “*configured to cause the fan motor to perform an operation in response to*” input module 16.

In the combination of Yun and McPherson, the remote-control functionality of McPherson is combined with the system of Yun. McPherson describes how RF “data messages” received by receiving unit 115 include the “commands and responses [] to control the ceiling fans 130,” such as “turning the cooling and lighting functions of the ceiling fans 130 on and off, changing the fan speeds and lighting output.” EX1008, [0033]. In the combination, the “data messages” received by the receiving unit 115 of McPherson would be used with drive circuit 12 in Yun to signal the same types of commands as input module 16. The drive circuit 12 would cause the fan motor to perform an “*operation*” in response to a RF signal received by the receiving unit 115 of McPherson. Therefore, in the combination, drive circuit 12 is “*configured to cause the fan motor to perform an operation in response to [an RF] signal.*” EX1003, ¶124.

h. Element 1[g]

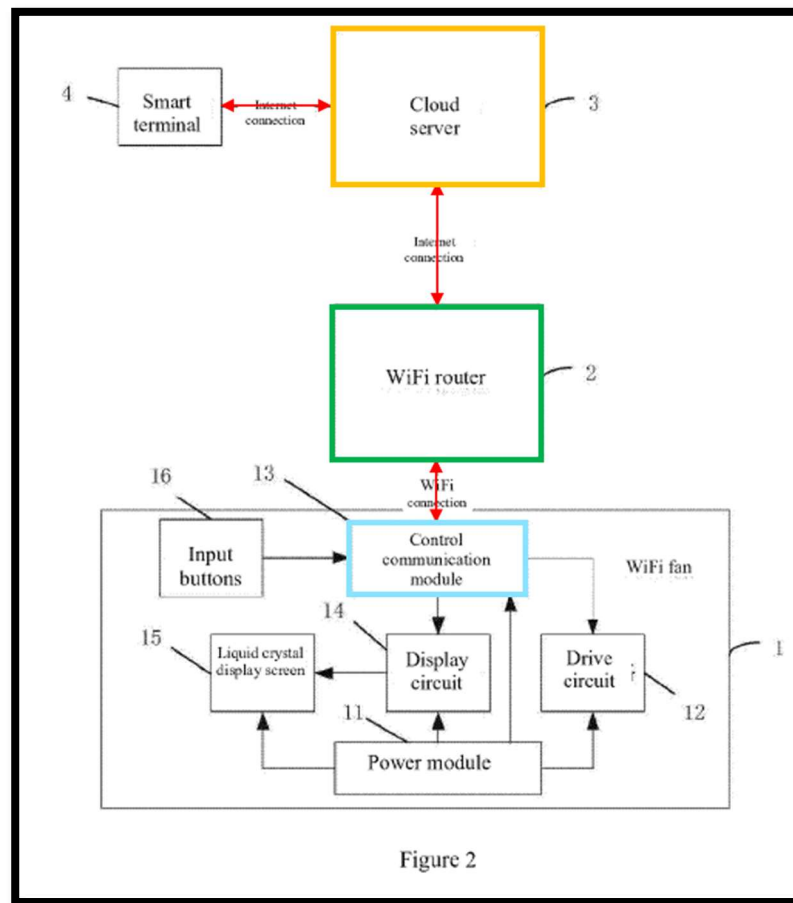
Yun teaches or renders obvious a “*processor [] configured to transmit, via the WiFi interface, to a server, and indication corresponding to the operation.*” EX1003, ¶¶125-131.

In the parallel ITC Investigation both parties proposed competing constructions for the term “*an indication corresponding to the operation*,” as shown below:

Patent Owner	Petitioner
“an indication that corresponds to the operation” (EX1036, 31.)	“a message indicating the operation has been performed” (EX1037, 27.)

However, the ALJ never construed this claim term. EX1005. Regardless, the prior art discloses this limitation under either construction, so the Board need not construe it in this IPR. *Spherix Inc. v. Matal*, 703 F. App'x 982, 985 (Fed. Cir. 2017); EX1003, ¶127.

As explained above (§V.A.4.f), the control communication module 13 includes a main communication module 132 for communicating with the WiFi router. EX1007, [0029]. The control communication module 13 also includes “control module 131” (i.e., the “*processor*”). *Id.*; §V.A.4.d. Yun explains that there is a “communication connection between the **cloud server 4** and the control communication module 13.” *Id.*, [0041]. Therefore, the processor (housed inside control communication module 13) and cloud server 3/4 (“*a server*”) can communicate over WiFi. EX1003, ¶128. Moreover, Figure 2 of Yun shows that the “communication connection” occurs “*via the WiFi interface*,” because “[t]he main communication module 132 is a WiFi communication module for realizing communication with the WiFi router 2.” *Supra* §V.A.4.f; EX1007, [0029], [0024].



(EX1007, Fig. 2) (annotated).

As explained above (§V.A.4.f), if the claim requires the WiFi communication module and processor to be in separate sub-components, Yun renders that configuration obvious. EX1003, ¶129. In any configuration, the “[t]he main communication module 132” would be used by the processor to communicate with the server because it “is a WiFi communication module for realizing communication with the WiFi router 2.” EX1007, [0029], [0024].

Yun also discloses that the “processor [is] configured to transmit... to a server, ***an indication corresponding to the operation.***” As explained in §V.A.4.g, drive circuit 12 causes the fan motor to perform an operation (i.e., on/off or change speed) in response to a RF signal received by the receiving unit 115 of McPherson. Yun explains that WiFi fan 1 includes an input module 16, that includes buttons for controlling wind speed 161, rotation 162, power 163. EX1007, [0030]; *supra* §V.A.4.e. As an example, “[e]ach time the wind speed adjustment button 161 is pressed, it will speed up.” EX1007, [0040]. Thus, when a user presses the input buttons the processor performs the requested “operation,” for example by causing the fan to “speed up.” EX1007, [0028], [0040]; EX1003, ¶130.

Yun explains that when “the user changes the operating state of the WiFi fan 1,” using input module 16, “the WiFi fan 1 sends the current state to the cloud server 3.” EX1007, [0040]. Therefore, the “operating state of the WiFi fan 1” is updated on the server in response to performing a fan “operation”—such as “speed up.” In the combination, when a command is received by receiving unit 115 of McPherson the processor of Yun would perform the command (as if it had been received by input module 16). EX1003, ¶130. Therefore, in the combined system “the operating state of the WiFi fan” would be uploaded to the cloud server 3 after receiving and processing a control signal received through receiving unit 115. *Id.*

A POSA would have also understood that “the operating state of the WiFi fan” and/or fan “status information” is “*an indication corresponding to the operation,*” because, as explained above, it is a message indicating that an operation has been performed by the fan. EX1007, [0028], [0040]; EX1003, ¶130-131; EX1001, 12:8-13:4, 3:42-47, 10:42-46, 10:58-60. In particular, when an operation such as “speed up” is executed by the processor, the status of the fan is changed and a message indicating the change is sent to the server. EX1007, [0028], [0040]. Moreover, “the operating state of the WiFi fan” and/or fan “status information” is an indication that corresponds to the operation because it changes when an operation is executed. *Id.* Thus, the operating state of the WiFi fan” and/or fan “status information” is “*an indication corresponding to the operation,*” under either parties’ construction.

A POSA would have understood the “*processor...transmits*” the fan status because, as explained above (§V.A.4.g), (1) drive circuit 12 controls the operations of the “*fan motor,*” (2) the “*processor*” controls “the operation of the drive circuit 12,” and (3) as explained above, there is a “communication connection” between the “*processor*” and the “*server*”. *Supra* §V.A.4.g. Therefore, operations of the fan would be performed by drive circuit 12 under the control of the “*processor.*” And the processor would then transmit the updated fan status to the cloud server. EX1003, ¶131. Thus, the “*processor*” transmits “*an indication corresponding to the*

operation” to the server after receiving a signal via the “receiving unit” of McPherson. *Id.*

5. Claim 2

a. Element 2[a]

Yun teaches or renders obvious “*a first signal, the operation is a first operation, and the indication is a first indication.*” for the same reasons described in §V.A.4.e (“*a signal*”), §V.A.4.g (“*an operation*”), and §V.A.4.h (“*indication*”). EX1003, ¶¶132-134.

a. Element 2[b]

Yun/McPherson also teaches or renders obvious “*a light.*” EX1003, ¶135-137. While Yun does not expressly disclose the smart fan having “*a light*,” based on the general knowledge of a POSA in 2018, it was well known that “[c]eiling fans have been widely used to provide a cooling function as well as a lighting function.” EX1008, [0003]. For example, McPherson teaches that receiving unit 115 can be used to “turn on and off **the lights.**” EX1008, [0033]; [0038]. Therefore, McPherson discloses “*a light.*” EX1003, ¶¶136-37.

It would have been obvious to combine the light of McPherson with the fan system of Yun. Ceiling fan lights were common, “widely used,” and well understood. EX1008, [0003]. Moreover, a POSA would have understood that including a light would not change or alter the operation of Yun’s smart fan system.

EX1003, ¶136; EX1021, 19 (“The [] light accessory operates independently from the fan”). Rather, a light would increase the functionalities of the fan of Yun, making it more attractive to consumers. *Id.*; *see generally* EX1011.

a. Element 2[c]

Yun/McPherson teaches or renders obvious “*a light control circuit configured to cause the light to perform a second operation in response to a second signal received by the radio frequency interface.*” EX1003, ¶¶138-144.

First, “prior art” fans included a “ceiling fan light” with a “*light control circuit.*” EX1006, [0002], [0019]; EX1014, 6:54-55; *Infra* §V.B.3.c.; EX1003, ¶140, ¶142. Therefore, a POSA would have understood that the “ceiling fan” of McPherson includes “*a light control circuit*” given the fan’s ability to “manipulate several features of the lighting feature of the ceiling fan 130.” EX1008, [0007], [0038].

Second, as explained in §V.A.4.g, McPherson describes RF “data messages” received by receiving unit 115. The “data messages” received by receiving unit 115 include commands (i.e., “*a second operation*”) such as turning the light “on and off” or changing the “lighting output.” EX1008, [0033]; EX1001, 4:4-5. In particular, a POSA would have understood that “lighting feature of the fan typically includes the options: on/off/incremental dimming.” EX1008, [0003]. Thus, a POSA would have understood that McPherson discloses “*a second operation*” when describing

on/off/incremental dimming of the light. EX1003, ¶¶139-142; *Id.*, ¶¶142-143 (explaining that on/off/incremental dimming would be obvious given the “fine control features” and input buttons (in Fig. 10) of McPherson).

Third, a POSA would have understood that McPherson controls the lighting “*in response to a second signal*” because McPherson explains that “lighting functions, may also be controlled by remote control operation.” EX1008, [0007], [0038]; EX1003, ¶144.

Fourth, as described in §V.A.4.e, the “data messages” would be within “*a second signal*” for the same reason as above. *Id.*, ¶141. Moreover, the “data messages” are received by receiving unit 115 and are therefore “*received by the radio frequency interface.*” *Id.*

a. Element 2[d]

Yun/McPherson teaches or renders obvious “*the processor is further configured to transmit to the server, via the WiFi interface, a second indication corresponding to the second operation.*” EX1003, ¶¶145-147. As explained in §V.A.4.h, the “operating state of the WiFi fan 1” is updated on the server in response to performing a fan “*operation*”—such as “speed up” or “light on.” EX1007, [0040]. When the WiFi fan 1 receives a “user’s required state” it “will take the corresponding actions according to the received information.” *Id.*, [0039], [0029]. For example, the “user’s required state” may specify that the light should be on or off. EX1003,

¶147. After the WiFi fan takes the user requested actions, “the current state of the WiFi fan 1 will be sent to the cloud server 3 and the cloud server 3 will then forward it to the user’s smart terminal 4.” EX1007, [0039]. Therefore, for the same reasons described in §V.A.4.h, Yun/McPherson discloses this limitation. Moreover, to ensure the server has the most up to date “operating state of the WiFi fan 1,” a POSA would have understood that Yun transmits a “*a second indication corresponding to the second operation*” after each operation. EX1003, ¶147.

6. Claim 3

a. Element 3[a]

Yun/McPherson teaches or renders obvious Element 3[a]. EX1003, ¶¶148-152. Element 3[a] recites a “*group consisting of*” and is thus a closed Markush group. *Abbott Laboratories v. Baxter Pharmaceutical Products, Inc.*, 334 F.3d 1274, 1280–81 (Fed. Cir. 2003). Therefore, this claim is disclosed “by any prior art device that had any one of the listed units.” *Fresenius USA, Inc. v. Baxter Intern., Inc.*, 582 F.3d 1288, 1298 (Fed. Cir. 2009).

As explained in §V.A.4.h, Yun discloses an “*indication correspond[ing] to an operation.*”

Moreover, as explained in §V.A.4.e, Yun’s input module 16, includes buttons for controlling wind speed 161 (“*fan speed-up, fan speed-down*”), rotation 162 (“*fan direction-change*”), and power 163 (“*fan on, fan off, fan power state change*”).

EX1007, [0030]. As explained in §V.A.4.e, McPherson further describes how RF “data messages” include operational commands for “turning the cooling [functions]... on and off, [and] changing the fan speeds.” EX1008, [0033]. Therefore, a POSA would have understood that at least one of the claimed “*operation[s]*” is disclosed. EX1003, ¶¶151-152.

a. Element 3[b]

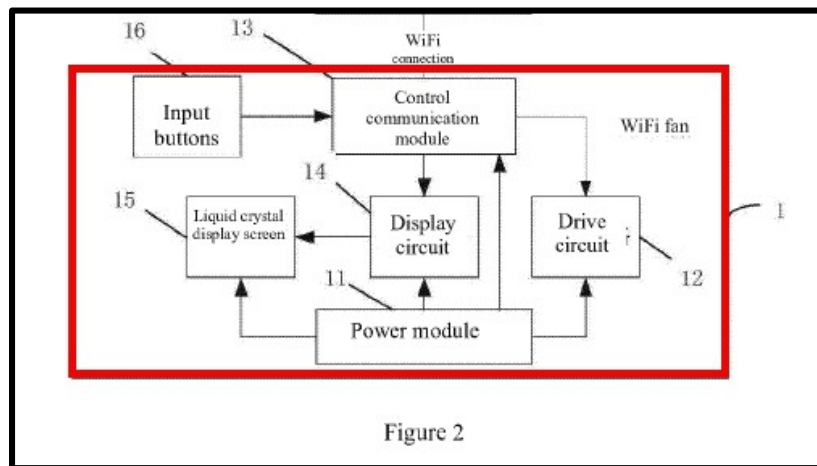
Yun/McPherson teaches or renders obvious Element 3[b]. EX1003, ¶153-155. Element 3[b] recites a “*group consisting of*” and is thus disclosed “by any prior art device that had any one of the listed units.” *Fresenius*, 582 F.3d at 1298.

As explained in §V.A.5.a, McPherson discloses how RF “data messages” include operational commands for “turning the ... lighting functions of the ceiling fans 130 on and off... and lighting output.” EX1008, [0033]; [0040] (“manipulate [] the brightness of the light.”) A POSA would have understood that “on and off” and changes to the “lighting output” and “brightness of the light” discloses “*light on, light off, light power state change, light increase, and light decrease.*” EX1003, ¶155; EX1001, 4:4-8.

7. Claim 4

Yun/McPherson teaches or renders obvious “*a housing; wherein the fan motor, the fan motor control circuit, the processor, the radio frequency interface, and the WiFi interface are disposed in the housing.*” EX1003, ¶¶156-160.

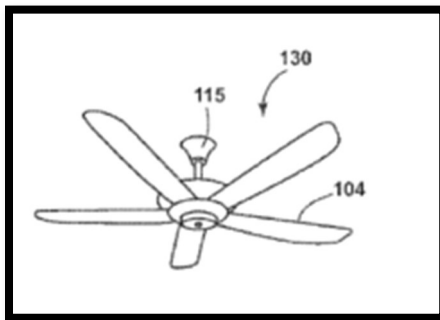
First, Yun renders obvious “*a housing.*” Yun explains that the smart fan is an improvement over a “traditional fan” or “existing fans” but also includes “a remote-control function.” EX1007, [0024], [0003], [0004]. A POSA would have understood that “traditional fan[s]” or “existing fans” included “*a housing*” comprising all the components of the fan. EX1003, ¶158; EX1024, 2 (explaining typical electric fans comprise a “**fabricated housing.**”). Moreover, as explained in §V.A.4, Yun/McPherson discloses “*the fan motor, the fan motor control circuit, the processor, the radio frequency interface, and the WiFi interface.*” *Supra*, §V.A.4; EX1007, Fig. 2 (showing the fan components in the bounds of the “WiFi fan”).



(EX1007, Fig. 2) (annotated).

Therefore, it would have been obvious to a POSA to include fan components of Yun/McPherson in a fan housing because using a fan housing was well-known and commonplace. EX1003, ¶158; EX1024, 2; EX1025, [0008]; EX1008, [0005].

McPherson discloses that receiving unit 115 is included within the fan of 130. EX1008, Fig. 1B; *Id.*, [0025] (“Those signals are received by a receiving unit **housed within the canopy** of the ceiling fan.”). A POSA would have understood that the canopy of the ceiling fan is “*a housing*,” that the receiving unit 115 is “*disposed in*.” EX1003, ¶159. In the combination, it would have been obvious to include the components of Yun’s system in the fan 130 of McPherson, because the housing would (1) protect the fan components, (2) protect the user, and (3) because such an implementation was well-known and commonplace arrangement of conventional elements (i.e., the housing of McPherson, and the fan components of Yun). *Id.*, ¶160.



(EX1008, Fig. 1B) (annotated).

8. Claim 8

a. Element 8[a]

Yun teaches or renders obvious that “*the server includes a second processor*.” EX1003, ¶¶161-163. As explained in §V.A.4.h, Yun includes a “cloud server 3” in communication with the WiFi fan. EX1007, [0004], [0024]. Yun also explains that

the cloud server 3 comprises a processing module 33 for receiving and processing user requests. *Id.*, [0006], [0024]. The processing module handles user requests and enables the cloud server to realize both WiFi communication with and control functions over the WiFi fan. *Id.* A POSA would have understood that processing module 33 is a “*second processor*.” EX1003, ¶¶162-163; EX1027, 484; EX1019 [0072].

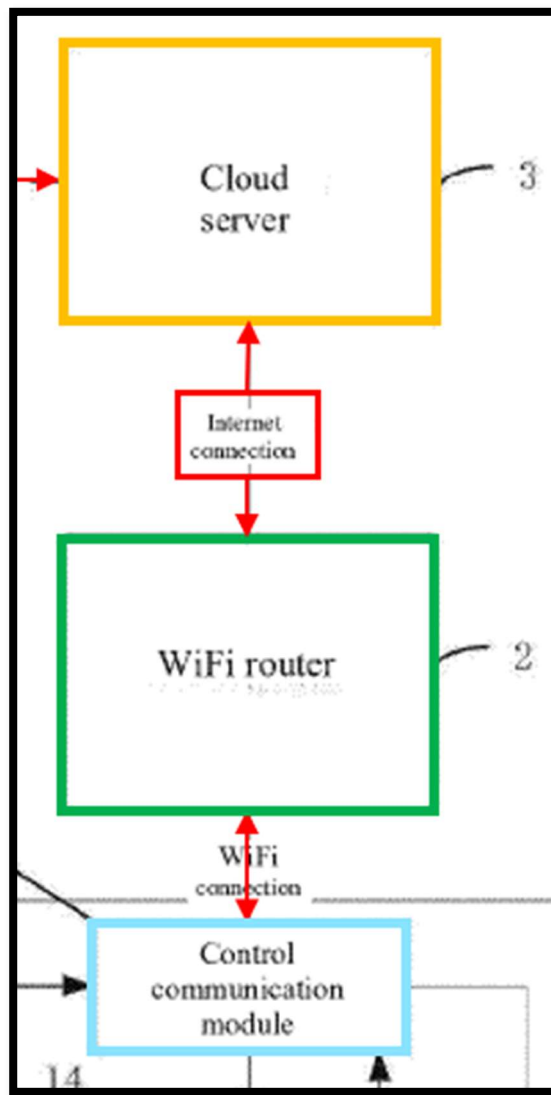
b. Element 8[b]

Yun teaches or renders obvious a second processor configured to cause the server to “*receive a command directed to the first processor*.” EX1003, ¶¶164-166. Yun discloses that cloud server 3 includes a communication module 31 and processing module 33 for “receiving and processing user requests.” EX1007, [0006]. In particular, app software can be used by the user to “[a]djust the wind speed, set rotational state, set timed on/off, timed shifting, etc.” (i.e., “*a command*”). *Id.* [0038]. The app software “sends the user’s required state to the cloud server 3 and the cloud server 3 sends the information to the WiFi fan 1.” *Id.*, [0039]. Once WiFi fan 1 receives the “user’s required state” the “control communication module 13 of the WiFi fan 1 will take the corresponding actions according to the received information.” *Id.* Control communication module 13 includes “control module 131” (i.e., “*the first processor*”). *Id.*, [0029]. Therefore, the “user’s required state” is a “*command directed to the first processor*.” *Id.*, Fig. 1; EX1003, ¶¶165-166.

c. Element 8[c]

Yun teaches or renders obvious that the “*second processor*” is configured to “*communicate the command via the Internet and a WiFi router to the first processor.*” EX1003, ¶¶167-171. As explained in §V.A.8.b, when the app software receives a command it “sends the user’s required state to the cloud server 3 and the cloud server 3 sends the information to the WiFi fan 1.” EX1007, [0039]. Once WiFi fan 1 receives the “user’s required state,” the control module 131 (i.e., the first processor) “will take the corresponding actions according to the received information.” EX1007, [0039], [0029]. Therefore, a POSA would have understood that the second processor “*communicate[s] the command... to the first processor,*” because the first processor “take[s] the corresponding actions.” EX1003, ¶¶169-170.

The command is also communicated “*via the Internet and a WiFi router.*” Yun explains that “cloud server 3 sends the information (i.e., control signal) to the WiFi fan 1 through the WiFi router 2.” EX1007, [0039]. The “WiFi fan 1 is connected to the **Internet** through the WiFi router 2” and “communicates with the cloud server 3.” *Id.*, [0023], [0005]. Moreover, Figures 2 and 4 show an “Internet Connection” linking the WiFi router 2 and cloud server 3. *Id.*, Figs. 2 & 4; EX1003, ¶171.



(EX1007 Fig 2) (annotated).

Therefore, a POSA would have understood that the command is sent via the internet and a WiFi router to the first processor. EX1003, ¶171.

9. Claim 9

Yun teaches or renders obvious that the second processor is configured to cause the server “to update information about a state of a device that is in a wireless

local network based on the command.” EX1003, ¶¶172-177. As explained in §V.A.8.b, when the app software receives a “*command*” it “sends the user’s required state to the cloud server 3 and the cloud server 3 sends the information to the WiFi fan 1” which “will take the corresponding actions according to the received information.” EX1007, [0039], [0029]. Yun also explains that after the WiFi fan implements the requested action, “the current state of the WiFi fan 1 will be sent to the cloud server 3 and the cloud server 3 will then forward it to the user’s smart terminal 4.” *Id.*, [0039]. Additionally, “[o]n the smart terminal 4, the user can see the latest state of the smart fan at any time.” *Id.* A POSA would have understood that because the “latest state of the smart fan” is visible at all times and because “the current state of the WiFi fan 1 will be sent to the cloud server 3” after each command the server must “*update information about a state of a device.*” EX1003, ¶175. The “latest state” means that when the fan executes a user command (causing its state to change), the current state of the fan must be updated to a new “latest state.” *Id.* Therefore, the “*second processor*” (e.g., processing module 33 in cloud server 3) is “*configured to cause the server to update information.*” *Id.*, ¶177.

Furthermore, the fan device of Yun operates on a “*wireless local network.*” EX1007, [0030]. As explained in §V.A.4.h, the connection between the WiFi fan 1 and cloud server 3 is enabled over WiFi, via the WiFi router 2. *Id.*, [0014], [0022]. Yun also explains that “the smart fan can form a smart home network with smart

appliances.” *Id.*, Abstract. A POSA would have understood the WiFi fan 1 and WiFi router 2 to comprise a “*wireless local network*.” EX1003, ¶176. Therefore, the fan status sent by the WiFi module to the server is the “*state of a device that is in a wireless local network*.” *Id.*

To the extent Patent Owner argues that the server must “*update information*” within its own memory, Yun discloses or renders obvious this limitation. *Id.* Yun explains that “[o]n the smart terminal 4, the user can see the latest state of the smart fan at any time.” EX1007, [0039], [0024]. A POSA would have understood the ability to “see the latest state of the smart fan at any time” confirms that the “latest state” of the fan is stored in the cloud server 3 storage module 32. EX1003, ¶177. Furthermore, a POSA would have understood that storing the current fan state in the server would be a common-sense way to configure the system, as the server already includes a memory. *Id.* Moreover, Yun’s cloud server 3 possesses intelligent functionality such as “smart timing, remote restart and shutdown, smart shifting, intelligent display, and smart display.” EX1007, [0041]. A POSA would have understood that to perform these functions, the cloud server 3 would need to know the current state of the fan. *Id.*; EX1003, ¶177.

10. Claim 10

Yun teaches or renders obvious a “*second processor [] further configured to cause the server to update the information in response to transmitting the command from the server.*” EX1003, ¶¶178-180.

As explained in §V.A.9, when the WiFi fan 1 receives a “user’s required state” it “will take the corresponding actions according to the received information.” EX1007, [0039], [0029]. After the WiFi fan takes the user requested actions, “the current state of the WiFi fan 1 will be sent to the cloud server 3 and the cloud server 3 will then forward it to the user’s smart terminal 4.” *Id.* [0039]. Once the cloud server 3 forwards the current state of the WiFi fan 1, “the user can see the latest state of the smart fan at any time” (i.e., the server updates the current state of WiFi fan 1 after it sends the command). *Id.* Therefore, cloud server 3 updates the information “*in response to transmitting the command from the server,*” because the fan status is updated in response to a command from the server being executed by the fan. EX1003, ¶179.

Yun also renders this claim limitation obvious. As explained in §V.A.8.b, “the user can see the latest state of the smart fan at any time.” EX1007, [0039]. Therefore, it would have been obvious to a POSA “*to update the information in response to transmitting the command from the server*” to show the most current state of the fan. EX1003, ¶180. A POSA would also understand that to “*update the*

information” after transmission from the server would be a simple optimization of existing components within the system of Yun. *Id.*

B. Ground 2: Claims 1-4 and 8-10 is obvious over Qirong alone

1. Qirong

Qirong (EX1006) discloses a smart fan controllable by a control terminal (e.g., smartphone) and a traditional remote control. *Id.*, [0019], [0025]. The fan device of Qirong comprises two communication interfaces: [1] a WiFi module and [2] a RF wireless remote control receiver circuit. *Id.*, [0019]-[0021], [0030]; EX1001, 11:32-34. The WiFi module enables a user to view and control fan operations (i.e., speed, on-off, mode adjustments) remotely from a device over the internet. EX1006, [0021]. The reception of user commands may occur at either or both the WiFi module or the RF wireless remote control receiver circuit. *Id.*, Fig. 1. Wireless communication between the fan and user device is established via a bridging router and server. *Id.*, [0019]. When the fan performs a requested operation, the WiFi module forwards fan status data from the fan motor to the server, wherein the server uploads the status, and after synchronization, relays the information to the user’s device in real-time. *Id.*, [0023-25]; EX1003, ¶¶181-186.

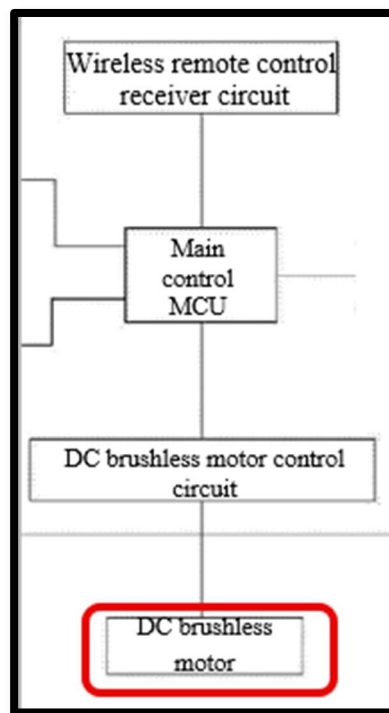
2. Claim 1

a. Element 1[pre]

To the extent the preamble is considered limiting, Qirong teaches or renders obvious the claimed “*system*,” as a “fan control **system**.” EX1006, [0028], Abstract, [0005], Fig. 1; EX1003, ¶¶187-189.

b. Element 1[a]

Qirong teaches or renders obvious the claimed “*fan motor*.” EX1003, ¶¶190-194. Qirong discloses “a brushless ceiling **fan** light... [that] include[es] a DC brushless **motor**.” EX1006, Abstract, [0019], [0033], Fig. 1 (below):



(EX1006 Fig. 1) (annotated).

c. Element 1[b]

Qirong teaches or renders obvious the claimed “*fan motor control circuit*.” EX1003, ¶¶195-198. Qirong describes a “DC brushless fan motor control circuit” that connects the main control microcontroller unit (“MCU”) to the fan motor. EX1006, [0019]. Qirong explains that “[t]he DC brushless motor control circuit adopts an FOC sensorless sine wave drive hardware and its algorithm, enabling sensorless FOC **operation of the motor**.” EX1006, [0033]. A POSA would have understood that the “DC brushless **fan motor control circuit**” is the claimed “*fan motor control circuit*,” and controls the operation of the fan motor. *Id.*; EX1003, ¶196; Fig. 1 (above).

d. Element 1[c]

Qirong teaches or renders obvious a “*processor*.” EX1003, ¶¶198-205. Qirong discloses a microcontroller unit (“MCU”) that “integrates a 50 MHz ARM Cortex-M0 32-bit microcontroller core.” EX1006, [0032]. A POSA would have understood that the ARM Cortex-M0 microcontroller is a processor. EX1003, ¶199. EX1033, 12, 22. Qirong also explains that the MCU is a “highly integrated microcontroller-based universal controller, particularly suitable for motor control applications.” EX1006, [0032], [0033]. The MCU is also connected to and controls a wireless remote control receiver circuit. *Id.*, [0030]. Therefore, a POSA would have understood the MCU includes “*a processor*” because it performs the functions

of a processor such as “motor control applications” and wireless remote control. *Id.*; EX1003, ¶¶200-201; EX1006, [0019], [0025], [0029], [0033] (describing performing “stepless speed regulation, on and off switching, and mode adjustments for the ceiling fan” over the internet).

Qirong further discloses that the processor is “*in electrical communication with the fan motor control circuit.*” Qirong explains that the “MCU is connected to the DC brushless motor through the DC brushless motor control circuit.” EX1006, [0019], Fig. 1 (depicting the MCU in direct electrical connection with the DC brushless fan motor control circuit), [0016] (“connection...should be broadly interpreted.”) Qirong describes electrical and data connections between the MCU and the DC brushless motor control circuit. EX1006, [0024]; *Infra* §V.B.2.g (explaining that the user can use their mobile phone “for controlling... the DC brushless motor control circuit” over the internet); EX1003, ¶203. A POSA would have recognized that the MCU has a processor that provides control signals to, and has electrical and data connections with, the DC brushless motor control circuit to control the DC brushless motor and thus is “*in electrical communication with the fan motor control circuit.*” EX1003, ¶202, ¶205; EX1033, 22.

e. Element 1[d]

Qirong teaches or renders obvious a “*radio frequency wireless interface configured to receive, at a first frequency, a signal.*” EX1003, ¶¶206-211. Qirong

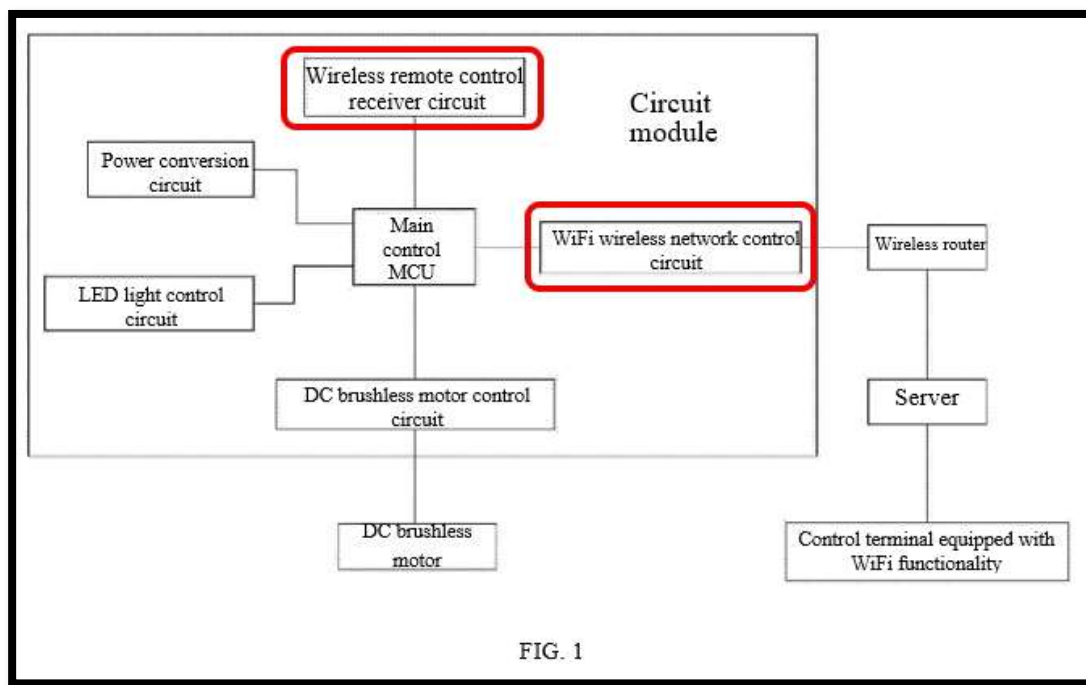
discloses a “wireless remote control receiver circuit” (i.e., a wireless interface) used for “wireless communication.” EX1006, [0030], [Claim 3], [0007]. The “wireless remote control receiver circuit” is connected to the MCU and uses a “frequency of 433 MHz” (i.e., a “*first frequency*”). *Id.*; EX1001, 11:33-34; EX1003, ¶¶207-209. A POSA would have understood that 433 MHz is within “*radio frequency*,” and therefore, the “wireless remote control receiver circuit” is a “*radio frequency wireless interface configured to receive, at a first frequency.*” *Id.*

Moreover, the “wireless remote control receiver circuit” receives “*a signal.*” For example, Qirong explains that the wireless remote control receiver circuit uses a “frequency of 433 MHz” (i.e., a “*first frequency*”) for “wireless communication.” EX1006, [0030], [Claim 3], [0007]. A POSA would have understood that “wireless communication” includes sending and receiving a signal. EX1003, ¶209. Moreover, a POSA would have understood that the “**wireless remote control** receiver circuit” is used to wirelessly communicate with a “remote control.” EX1006, [0030]. Qirong explains that “[c]ompared with a traditional TV remote control,” the “wireless remote control receiver circuit” has several advantages. EX1006, [0030]. A POSA would have understood that the “wireless remote control receiver circuit” receives “*a signal*” from the RF remote control to enable it to perform the types of functionalities associated with a “traditional TV remote control.” EX1003, ¶¶209-

210 (explaining that using an RF remote control to control fan operations would have been obvious to a POSA, since this is how a fan is “usually operated.”).

f. Element 1[e]

Qirong teaches or renders obvious a “*WiFi interface configured to communicate at a second frequency that is different from the first frequency.*” EX1003, ¶¶212-215. In Figure 1, Qirong depicts the two communication modules: (1) an RF interface (“remote control receiver unit”) and (2) a WiFi interface (“WiFi wireless network control circuit”); EX1003, ¶213.



(EX1006 Fig. 1) (annotated).

Qirong explains that the WiFi module within the fan is “connected to a wireless router” and uses “the TCP/IP protocol” to communicate with a server. *Id.*,

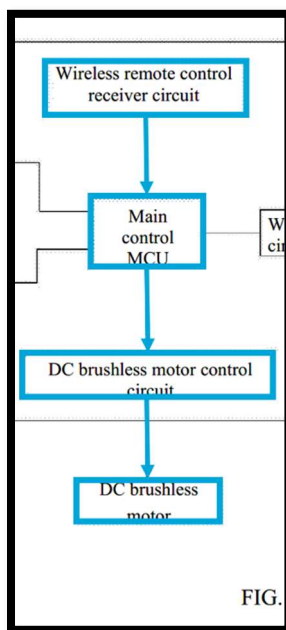
[0023]. A POSA would have understood that “TCP/IP” is a “transmission control protocol” used to communicate over the internet. EX1003, ¶214. Likewise, the WiFi module enables **data communication** to the server via a UART serial port enabling the motor driver to convey fan status to the WiFi module. EX1006, [0024], [0025]. Therefore, a POSA would have understood that the WiFi module is a “*WiFi interface configured to communicate.*” EX1003, ¶214.

Additionally, the WiFi module communicates “*at a second frequency that is different from the first frequency.*” Qirong explains that the “**WiFi** module... is connected to a wireless router,” enabling “remote control over the Internet.” EX1006, [0021], [0023]. A POSA would have understood that “WiFi” is a “wireless Ethernet link operating in the 2.4 GHz band and conforming to IEEE 802.11b.” EX1028, 4; EX1003, ¶215; EX1001, 11:34. Thus, the 2.4 GHz WiFi signal (i.e., the “*second frequency*”) differs from the 433 MHz RF signal (i.e., “*the first frequency*”) received by the wireless remote control receiver unit. EX1006, [0030].

g. Element 1[f]

Qirong teaches or renders obvious a “*fan motor control circuit [] configured to cause the fan motor to perform an operation in response to the signal.*” EX1003, ¶¶216-221. As explained in §V.B.2.c, a POSA would have understood that the “DC brushless fan motor control circuit” controls a “*fan motor*” and is a “*fan motor control circuit.*”

The “DC brushless fan motor control circuit” is also configured to “*cause the fan motor to perform an operation.*” In particular, the DC brushless fan motor control circuit uses “drive hardware and its algorithm... [in the] operation of the motor.” EX1006, [0033]. And, as explained in §V.B.2.d, the MCU provides control signals to the DC brushless motor control circuit to control the DC brushless motor. EX1003, ¶218; EX1006, [0032] (“The **main control MCU**... [is] particularly suitable **for motor control.**”). Qirong also explains that the “wireless remote control receiver circuit [is] connected to the main control MCU” and “wireless[ly] communicat[es]” with the WiFi fan. *Id.*, [0030]. A POSA would have understood that when a user command is received by Qirong’s “wireless remote control receiver circuit,” the MCU processes the request and relays the command to the DC brushless fan motor control circuit to use “[in the] operation of the motor.” EX1006, [0033]. Therefore, the DC brushless fan motor control circuit controls the motor in response to commands received by the MCU and the wireless remote control receiver circuit, as illustrated below:



(EX1006 Fig. 1) (annotated)

Additionally, the DC brushless fan motor control circuit “*cause[s] the fan motor to perform an operation in response to the signal.*” As explained in §V.B.2.e, a POSA would have understood that the “wireless remote control receiver circuit” receives a signal from the remote control to enable it to perform the types of functionalities associated with a “traditional TV remote control.” EX1003, ¶219; EX1006, [0030]. For example, Qirong explains that “remote controls” (such as the one used with the “wireless remote control receiver circuit”) “possesses practical functions such as remote timing switch, **stepless speed regulation**, light control adjustment, and fault alarm.” EX1006, [0011]. Therefore, a POSA would have understood that the fan motor control circuit causes the fan motor to perform an

“*operation*” (i.e., increasing speed, adjusting the light) in response to a signal from the RF remote control. EX1003, ¶219.

To the extent Patent Owner argues that Qirong does not expressly disclose this claim element it would have been obvious. Qirong states that “[c]ompared with a traditional TV **remote control**,” the wireless remote control receiver circuit receiving the signal via the RF interface, has the “advantages of directionality, is not obstructed by objects, is less susceptible to interference, and [has] greater stability.” EX1006, [0030]. Qirong adds that “remote controls” “possesses practical functions such as remote timing switch, stepless **speed regulation**, light control adjustment, and fault alarm.” *Id.*, [0011]. A POSA reading the disclosures in Qirong would have been motivated to use the RF remote control disclosed in Qirong to control the operation of the fan because of the benefits associated with RF remote controls, and using a remote control to operate the fan would have been cheap, reliable, and well-understood, and thus obvious to try. EX1003, ¶220; *supra* §V.B.2.e.

Moreover, a POSA would have found it obvious to use an RF remote control in Qirong to perform the same types of operations that the user’s smart terminal can perform over the internet—such as “stepless speed regulation, on and off switching, and mode adjustments for the ceiling fan light remotely over the Internet.” EX1006, [0025], [0006], [0023], [0005]; EX1003, ¶221.

h. Element 1[g]

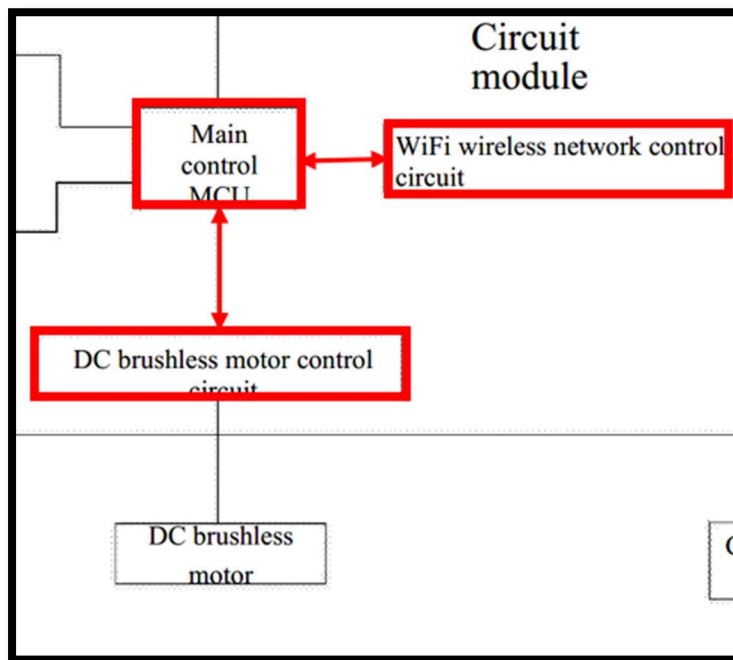
Qirong teaches or renders obvious a “*processor [] configured to transmit, via the WiFi interface, to a server, an indication corresponding to the operation.*” EX1003, ¶¶222-230.

As explained in §V.A.4.h, in the ITC Investigation both parties proposed competing constructions for the term “*an indication corresponding to the operation,*” however, the ALJ did not construe this term. Regardless, Qirong discloses this claim element under either construction. EX1003, ¶224.

First, Qirong discloses “*a server.*” Qirong explains that “the WiFi module” (i.e., the WiFi interface) is connected to a “wireless router.” EX1006, [0023]. In turn, the “wireless router is connected to the Internet, and a connection to the server is established.” *Id.* Therefore, the WiFi module facilitates communication with the server over the internet. *Id.*, [0019]; EX1003, ¶¶226-228.

Second, the MCU (i.e., “*processor*”) in Qirong is connected to the WiFi module. EX1003, ¶225; EX1006, [0019]; Fig. 1. The MCU and the WiFi module are in communication with each other. *Id.*, [0024]. Qirong explains that the “WiFi module of the ceiling fan light is connected to a motor driver through the UART serial port, thereby enabling **data communication.**” *Id.* A POSA would have understood that the “motor driver” system is the DC brushless fan motor control circuit, because it is the circuit that drives the “operation of the motor.” EX1003,

¶227. Moreover, as explained in §V.B.2.g, the “motor driver” controls the motor in response to commands received by the MCU. Therefore, a POSA would have understood that the “data communication” between the WiFi module and the DC brushless fan motor control circuit is enabled via the MCU, as depicted in **red** in the figure below:



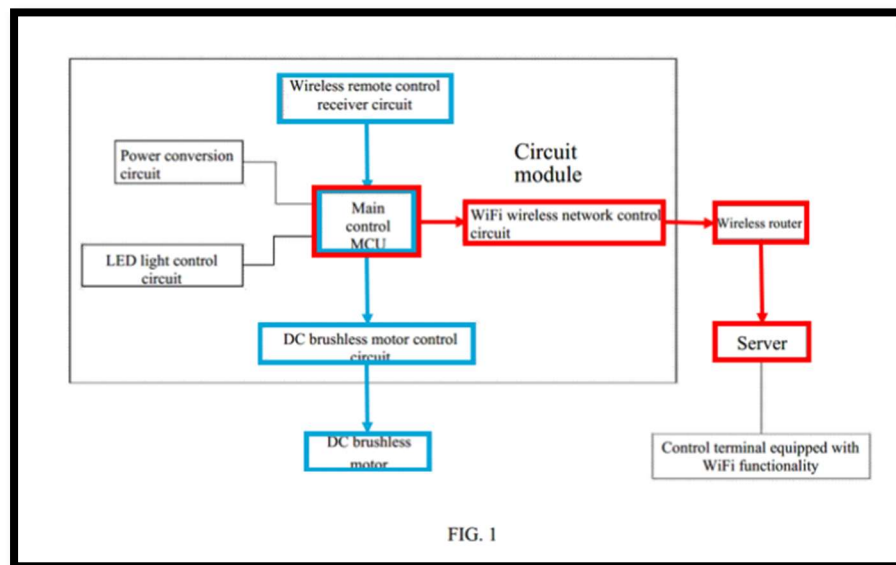
(EX1006, Figure 1) (annotated); EX1003, ¶227.

Qirong explains that a user may remotely control fan operations over the internet (i.e., “stepless speed regulation, on and off switching, and mode adjustments”). EX1006, [0025]. User requests are sent from the user’s phone through the server, router, and WiFi module until it reaches the MCU. *Id.*, [0019]. The MCU then performs the user’s request. *See* §V.B.2.g. The fan “status is [then]

uploaded to the server through the WiFi module and synchronized for push notifications to” the user’s phone. *Id.*, [0025]. Based on these disclosures, a POSA would have understood that the MCU of Qirong is configured to transmit the status of the fan, “*via the WiFi module, to a server*” and the user’s phone. EX1003, ¶228. A POSA would have understood that the fan “status” is an “*an indication corresponding to the operation,*” because it is a message that indicates that an operation has been performed by the fan. *Id.*; EX1001, 12:8-13:4, 3:42-47, 10:42-46, 10:58-60. Moreover, the fan “status” is an indication that corresponds to the operation because it changes when an operation is executed. EX1003, ¶228.

Moreover, the MCU (i.e., processor) is “*configured to transmit, via the WiFi interface, to a server, an indication corresponding to the operation.*” Qirong explains that the WiFi module “upload[s] to the server” the “synchronized” fan status over the internet. EX1006, [0025]. As explained above, the MCU is configured to transmit the status of the fan, via the WiFi module, to the server. A POSA would have understood that “synchronized” means “[t]o cause (data or files) to remain identical in more than one location, changes made to a copy in one location being propagated to the others.” EX1029, 4. Here, a POSA would have understood that to keep the fan status on the server “synchronized” at all times, when an operation (e.g., speed regulation, light adjustment, or on/off switching) is performed using the RF remote control, the MCU would transmit a new fan status to the server.

Therefore, the MCU (i.e., processor) transmits the operation of the DC brushless fan motor (i.e., a change in fan status as shown in blue), via the WiFi interface (i.e., the WiFi module) to a server, as illustrated below (in red). EX1003, ¶229.



(EX1006 Fig. 1) (annotated)

Moreover, a POSA would have found it obvious to transmit operational changes made by the RF remote to the server. EX1003, ¶230; §V.B.2.g. For example, a POSA would have understood that the MCU tracks the operational state of the fan and transmits status data to the sever. *Id.* This is further evidenced by the disclosed real-time remote viewing and control functionality of Qirong. EX1006, [0028]. Therefore, it would have been obvious to transmit the most up-to-date and accurate operational status, regardless of which interface was used to control the fan. EX1003, ¶230. As explained in §V.B.7, Qirong discloses that a user may perform

fan adjustments (such as on/off switching and speed regulation) remotely over the internet via a control terminal. *Infra*, §V.B.7; EX1006, [0021], [0023], [0025]. Qirong also explains that after the user issues a “*command*” for fan adjustment (and the command is executed) the fan “status is then uploaded to the server through the WiFi module and synchronized.” *Id.*, [0025]. Therefore, it would have been obvious to upload an “*indication corresponding to the operation*” is response to an operation performed at the request of the RF remote control, because the fan is already updating its status with the server after each operation performed by the user’s control terminal. Additionally, since the fan of Qirong includes a WiFi module in communication with a remote server, transmitting status changes in response to received RF control signals would be cheap and easy to implement. *Id.*

3. Claim 2

a. Element 2[a]

Qirong teaches or renders obvious “*a first signal, the operation is a first operation, and the indication is a first indication.*” for the same reasons described in §V.B.2.e (“*a signal*”), §V.B.2.g (“*an operation*”), and §V.B.2.h (“*indication*”). EX1003, ¶¶231-233.

b. Element 2[b]

Qirong teaches or renders obvious “*a light.*” EX1003, ¶¶234-235. Qirong explains that their invention “relates to a ceiling fan **light**,” and includes “both the decorative function of a light and the practicality of a fan.” EX1006, [0001], [0008].

c. Element 2[c]

Qirong teaches or renders obvious “*a light control circuit configured to cause the light to perform a second operation in response to a second signal received by the radio frequency interface.*” EX1003, ¶¶236-240.

First, Qirong discloses “*a light control circuit.*” Qirong describes a “LED light control circuit” that connects to the MCU. EX1006, [0019]. The LED light control circuit is further connected to a “LED cold light source,” which provides “high efficiency, and uniform brightness.” *Id.*, [0031]. Therefore, a POSA would have understood that the “LED **light control circuit**” is a “*light control circuit*,” and controls the operation of the “*light.*” EX1003, ¶237.

Second, as explained in § V.B.2.g, Qirong explains that “remote controls” (such as the one used with the “*radio frequency interface*”) “possesses practical functions such as remote timing switch, stepless speed regulation, **light control adjustment**, and fault alarm.” EX1006, [0011]. In particular, a POSA would have understood that the “*radio frequency interface*” receives a signal (i.e., “*a second signal*”) from the RF remote control for “light control adjustment”—i.e., “*cause the*

light to perform a second operation”—for the same reasons discussed in §V.B.2.e. EX1003, ¶¶238-239.

Third, Qirong explains that a user can use the APP software to control “mode adjustments for the ceiling fan light remotely over the Internet.” EX1006, [0025], [0029]. Therefore, a POSA would have understood that the LED light control circuit performs “*a second operation in response to a second signal*” no matter if the signal originates from the APP software or RF remote control. EX1003, ¶240.

d. Element 2[d]

Qirong teaches or renders obvious “*the processor is further configured to transmit to the server, via the WiFi interface, a second indication corresponding to the second operation.*” *Id.*, ¶¶241-243. As explained in §V.B.2.h, the MCU of Qirong is configured to transmit the status of the fan, “*via the WiFi module, to a server*” and the user’s phone. EX1006, [0019], [0025]. Therefore, the “*processor*” of Qirong would transmit a “*a second indication corresponding to the second operation*” for the same reason as in §V.B.2.h. EX1003, ¶243.

4. Claim 3

As explained in §V.A.6, Elements 3[a] and [b] recites a “*group consisting of*” and are thus disclosed “by any prior art device that had any one of the listed units.” *Fresenius*, 582 F.3d at 1298.

a. Element 3[a]

Qirong teaches or renders obvious Element 3[a]. EX1003, ¶¶244-246.

As explained in §V.B.2.h, Qirong describes users sending “status” commands for “stepless speed regulation, [and] on and off switching.” EX1006, [0011], [0025]. A POSA would have understood that “stepless speed regulation” includes commands to change the speed of the fan (“*fan speed-up, fan speed-down*”) and on and off switching includes “*fan on, fan off*” commands. EX1003, ¶246.

b. Element 3[b]

Qirong teaches or renders obvious Element 3[b]. EX1003, ¶¶247-249.

As explained in §V.B.3.c, Qirong includes commands for “on and off switching, and mode adjustment for the ceiling fan light.” EX1006, [0025], [0011]. A POSA would have understood that “on and off switching” and “light control adjustment” include commands to control lighting (“*light on, light off, light power state change, light increase, and light decrease.*”) EX1003, ¶249.

5. Claim 4

Qirong discloses or renders obvious “*a housing; wherein the fan motor, the fan motor control circuit, the processor, the radio frequency interface, and the WiFi interface are disposed in the housing.*” EX1003, ¶¶250-254. Qirong explains it is an improvement over “prior art [] ceiling fans.” EX1006, [0003]. These ceiling fans serve a “decorative function” and “perfectly embodies the fusion of classical and

modern styles, making it the preferred choice for indoor decoration.” *Id.*, [0002]. A POSA would have understood that these “prior art” fans included “*a housing*” that included all the components of the fan. EX1003, ¶253; EX1024, 2 (explaining typical electric fans comprise a “**fabricated housing**.”). Moreover, it would have been obvious to a POSA to include the components of Qirong in a fan housing because using a fan housing would (1) protect the fan components, (2) protect the user, and (3) was well-known and commonplace. EX1003, ¶254; EX1024, 2; EX1025, [0008]; EX1008, [0005].

6. Claim 8

a. Element 8[a]

Qirong teaches or renders obvious that “*the server includes a second processor.*” EX1003, ¶¶255-261. As explained in §V.B.2.h, Qirong discloses a server in wireless communication with the fan device. EX1006, Abstract, [0019], [0025]. A POSA would have understood that a server is “a computer running administrative software that controls access to the network and its resources.” EX1027, 484. A POSA would also have understood that as a computer, the server comprises “*a second processor.*”

Qirong’s architecture indicates that the server includes a processor. For example, the disclosed server communicates with a WiFi wireless network control circuit (using TCP/IP) and with a control terminal equipped with WiFi functionality.

EX1006, [0019]. By this structure, a user can send commands to the ceiling fan light over the internet. *Id.*, [0025]. Further, the status of the ceiling fan light is sent to the server “through the WiFi module” and is “uploaded to the server.” *Id.* Once synchronized, the server pushes notifications of the updated status to the control terminal equipped with WiFi functionality. *Id.* Based on this architecture, a POSA would have understood that the server in Qirong includes a processor that can provide at least communication and data storage services. EX1003, ¶259, ¶261.

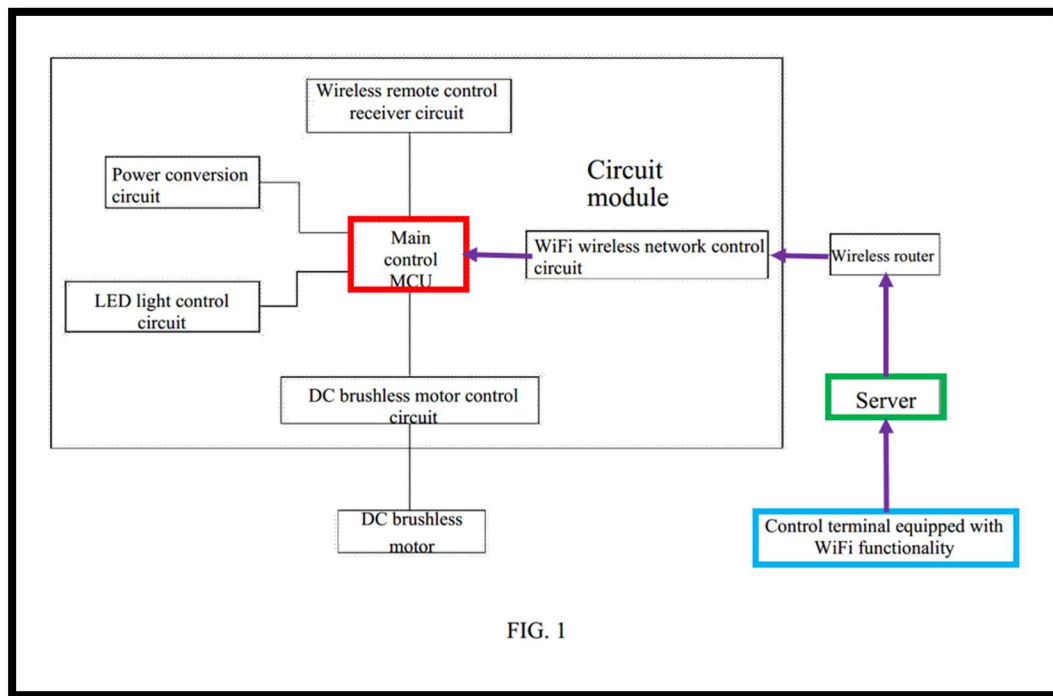
Likewise, a POSA would have understood that the server embodies the functions of a processor. EX1003, ¶260. For example, “wireless communication[s],” sending commands to the fan, receiving status updates, and synchronizing the fan and the server. EX1006, [0019], [0025]; EX1003, ¶260; *supra*, §V.B.2.f.; §V.B.2.h; *infra*, §V.B.6.b. Thus, Qirong teaches or renders obvious this limitation.

b. Element 8[b]

Qirong teaches or renders obvious that the claimed second processor “receive[s] a command directed to the first processor.” EX1003, ¶¶261-265. In particular, Qirong describes the server as bridging the wireless communication between a control terminal (e.g., smartphone) and the fan processor (e.g., MCU), where the control terminal sends operation commands to the server to be received by the fan device. EX1006, [0005], [0006], [0023], [0025]. For example, the user

can “remote control” the smart fan by using a smartphone “equipped with an app software for controlling the LED light control circuit and the DC brushless motor control circuit.” *Id.*, [0028]-[0030]. Using the app, the user can issue command to control various operations of the fan remotely over the internet (i.e., speed regulation, on and off switching, and mode adjustments). *Id.* After the user issues a “*command*” for fan adjustment (and the command is executed) the fan “status is then uploaded to the server through the WiFi module and synchronized.” EX1006, [0021], [0023], [0025]; §V.B.2.h. A POSA would have understood that a command to control the operations of the fan is a “*command directed to the first processor*” because the “*first processor*” (i.e., the MCU) controls the fan. *Supra* §V.B.2.g; V.B.2.d; EX1003, ¶263.

Qirong explains that this command is received by the “*second processor*.” For example, Qirong explains that the server is used to connect the MCU and WiFi module on the one hand, and the control terminal on the other. EX1006, [0019]; Fig. 1. Therefore, a POSA would have understood that a command (**purple**) sent from the app (**blue**) is relayed through (and received by) the server (**green**) (i.e., “*the second processor*”) before being sent to the first processor (**red**), as depicted below. EX1003, ¶¶264-265.



EX1006 Fig. 1, Abstract.

c. Element 8[c]

Qirong teaches or renders obvious that the second processor “*communicate[s] the command via the Internet and WiFi router to the first processor.*” EX1003, ¶¶266-269. As explained in §V.B.6.b, a POSA would have understood that a command sent from the APP is received by the second processor before being sent to the first processor. *Supra* §V.B.6.b; EX1006, [0021], [0023], [0025]. After the command is received the “status” of the fan is updated and “synchronized” in the server. EX1006, [0025]. A POSA would have understood that the command must be communicated to the first processor for the first processor to execute it. EX1003, ¶268.

Qirong also explains that this command is communicated to the MCU “*via the Internet and WiFi router.*” For example, as explained above in §V.B.2.f, the WiFi module within the ceiling fan is “connected to a wireless router” and uses “the TCP/IP protocol” for data communication. EX1006, [0023]. The WiFi module also transmits and receives commands for the MCU. *Supra* §V.B.2.f. Qirong also explains that the “wireless router is connected to the Internet, and a connection to the server is established therethrough.” EX1006, [0019], [0023]; Fig 1. A POSA would have understood that the second processor uses this connection (i.e., “*via the Internet and WiFi router*”) to communicate commands to the first processor. EX1003, ¶¶269.

7. Claim 9

Qirong teaches or renders obvious that the second processor is configured to cause the server “*to update information about a state of a device that is in a wireless local network based on the command.*” EX1003, ¶¶270-276. As explained in §V.B.6.b, Qirong explains that after the user issues a “*command*” for fan adjustment (and the command is executed) the fan “status is then uploaded to the server through the WiFi module and synchronized.” EX1006, [0021], [0023], [0025]. As commands are received and executed, and change the state of the fan, a new status is “uploaded to the server”—i.e., “*update information about a state of a device.*” *Id.*; §V.B.2.h. A POSA would have understood that the uploading and synchronization

of fan status data is commonly performed by a processor (i.e., *second processor*). EX1003, ¶¶273-274.

Moreover, the fan device of Qirong operates on a “*wireless local network*.” The fan WiFi module is connected to the wireless router through TCP/IP protocol, wherein the router is connected to the external server via the internet. EX1006, [0023]. A POSA would have understood that a WiFi network is a type of local area network (LAN). EX1003, ¶275. Therefore, the fan status data sent by the WiFi module to the server includes a “*state of a device that is in a wireless local network*”—i.e., the fan. EX1006, [0025].

A POSA would have further considered it a matter of predictable design choice to configure the server processor to update the device status information in response to an executed command. EX1003, ¶276. Qirong describes the benefit of server-side handling, where the server provides the connection between the fan and user device and enables real-time remote viewing and control of the fan device from the user device. EX1006, Abstract, [0028].

8. Claim 10

Qirong teaches or renders obvious that the “*second processor is further configured to cause the server to update the information in response to transmitting the command from the server.*” EX1003, ¶¶277-279.

As explained in §V.B.7, Qirong discloses that the server (i.e., second processor) updates and “synchronizes” information about the fan status after the fan executes a command. *Supra* §V.B.7; EX1006, [0025]. Therefore, a POSA would have understood (1) that the server is always “synchronized” with the latest operational status of the fan, and (2) that the fan status changes when the fan receives a new command from the server. EX1003, ¶278. Therefore, after the server transmits a command to the fan, the fan will execute the command, and update its new status with the server. To remain “synchronized” the server will then “*update the information*” in its memory and send a “push notification” to the control terminal. *Id.*; EX1006, [0025]. Therefore, the second processor “*updates the information*” (i.e., fan status) in response to transmitting the command from the server to the first processor. *Id.*

Qirong also renders this limitation obvious. A POSA would have known that the continuous “remote viewing” of fan device status from a user control terminal would require the server to update status information in response to transmitting a command to the device or the terminal. *Id.*, [0028]; EX1003, ¶279; If the status information available on the server was out-of-date, a user could not “remote view” the fan status. *Id.*, ¶279. A POSA would have considered it a matter of predictable design choice to configure the server processor to update the information in response to the transmission of the command from the server. *Id.* Qirong describes the benefit

of server-side handling, where the server provides the connection between the fan and user device, enabling real-time remote viewing and control of the fan device. *Id.*; EX1006, Abstract, [0028].

C. Ground 3: Claims 1-4 and 8-10 are obvious over Qirong/Yun

Ground 3 is based on the combination of Qirong and Yun (Qirong/Yun), where the server-side architecture and functionality of Yun is combined with the system of Qirong. Moreover, where the two systems disclose analogous functionality, such as a processor, server, WiFi interface, router, fan motor, fan controller, etc., their techniques are combined, as a POSA would prioritize efficiency and common sense in implementing the individual, nonredundant features into the combined system to obtain the benefits of both. EX1003, ¶280.

1. Motivation to Combine

A POSA would have been motivated to combine Qirong and Yun for many of the same reasons they would be motivated to combine McPherson and Yun. *Supra* §V.A.3. The combination of Qirong and Yun would have been obvious for several more reasons. EX1003, ¶281.

Qirong, Yun, and the '854 Patent are analogous art, since each is directed to the same field of endeavor (i.e., the remote control of smart fans). EX1007, [0004]; EX1006, Abstract; EX1001, 1:14-17; EX1003, ¶281-290. Further, Qirong and Yun

are reasonably pertinent to the problem addressed by the '854 Patent—an “improved method of controlling a fan.” *Id.*; EX1001, 1:59-60.

It would have been obvious to make this combination because to do so would have been [1] an arrangement of old elements (i.e., the server-side architecture and functionality of Yun, and the system of Qirong) [2] with each performing the same function it had been known to perform (a smart fan with multiple interface modalities (Qirong); Internet-based remote control of a ceiling fan (Yun)) and [3] yielding no more than what one would expect from such an arrangement (a fan system capable of both internet and RF remote control). EX1003, ¶283, ¶291; EX1025, [0025]-[0026].

And, as explained above, using both WiFi and RF remote control in a ceiling fan was known in the prior art. *Supra* §III. Both Yun and Qirong explain that their disclosures are not limited to any one physical configuration. EX1007, [0020]; EX1006, [0014]. Therefore, a POSA would have a reasonable expectation of success in using the remote-control functionality of Qirong within the Yun system because doing so involves applying the straightforward solution of Yun with no undue level of unpredictability. EX1003, ¶284.

Additionally, a POSA would have been motivated to combine Qirong and Yun because they both explain the benefits of integrating remote control over the internet. For example, Qirong explains that “ceiling fan lights are no longer

restricted to remote control, wall control, and chain control methods, thereby enhancing the usability thereof.” EX1003, ¶285; EX1006, [0020], [0022]. Likewise, Yun explains that a cloud server (1) “enabl[es] the smart terminal to remotely control,” (2) allows control of “multiple smart fans,” (3) “can realize functions such as smart timing, remote restart and shutdown, smart shifting, intelligent display, and smart display,” and (4) “form a home network with smart appliances.” EX1007, [0014]. Therefore, a POSA would have been motivated to incorporate both Qirong and Yun to benefit from both. EX1003, ¶286. Additionally, a POSA would have known that using known techniques to improve similar devices in the same way and represent a choice among a finite number of identified, predictable solutions. *Id.*

Moreover, a POSA would have known that the Qirong and Yun disclose a similar architecture for their WiFi fan systems, including: a smart terminal, server, wireless router, communication modules, processors, local control, etc. *Id.*, ¶287 (showing the overlap between Qirong and Yun). Therefore, a POSA would have known that there would be a high degree of success when combining Qirong and Yun. *Id.*, ¶¶286-288.

Because Qirong includes WiFi functionalities configured to transmit information to and receive information from a remote server, a POSA would have been motivated to identify a server-side architecture to communicate with the fan

and provide server-side functionalities that can be implemented with the fan. *Id.*, ¶¶288-291. Yun discloses a server-side architecture that can be configured to store fan status data and communicate with the fan and its user controller (e.g., a smartphone), thus motivating a POSA to combine its disclosures with Qirong. *Id.* EX1007, [0041], [0024], [0039]. Therefore, a POSA would have combined Qirong and Yun.

2. Claim 1

a. Elements 1[pre]-1[f]

Qirong teaches or renders obvious each of these limitations, for the same reasons as discussed in §V.B.2 of **Ground 2**. EX1003, ¶¶291-292.

b. Element 1[g]

Yun teaches or renders obvious claim limitation 1[g] for the same reasons as discussed in §V.A.4.h of **Ground 1** of Yun. EX1003, ¶¶293-294. In the combination of Qirong and Yun, the processor of Qirong is combined with the server-side architecture and functionality of Yun (as described in §V.C.1), such that the communications and control signals of Yun are integrated into the system of Qirong. Additionally, both Qirong and Yun disclose a processor, therefore, a POSA would have been motivated to combine the analogous functionality of each processor to obtain the benefits of both. *Supra* §V.C.1.

3. Claims 2-4 and 8-10

Both Yun and Qirong disclose Claims 2-4 and 8-10 for the same reasons as discussed above in **Grounds 1 and 2**. EX1003, ¶295.

VI. SECONDARY CONSIDERATIONS

Petitioner is unaware of any publicly available secondary considerations evidence bearing any nexus to the purported claimed invention. No secondary considerations were asserted or relied on during prosecution. EX1002. Patent Owner has introduced evidence in the parallel ITC proceeding purportedly related to secondary indicia of non-obviousness, including evidence of commercial success. However, that evidence is subject to a protective order and Petitioner is precluded from submitting or addressing it in this petition. Regardless, “weak secondary considerations generally do not overcome a strong prima facie case of obviousness” such as the one presented here. *Genentech, Inc. v. Sandoz Inc.*, 55 F.4th 1368, 1378 (Fed. Cir. 2022). Petitioner reserves the right to address secondary considerations should Patent Owner raise them. EX1003, ¶¶295-298.

VII. DISCRETIONARY DENIAL IS NOT WARRANTED

A. Discretionary Denial Is Not Warranted Under 35 U.S.C. §314(a)

The Board should decline to exercise its discretion to deny institution of this Petition. On June 21, 2022, the USPTO issued a memorandum in which the Director clarified that “[t]he PTAB will not discretionarily deny petitions based on applying

*Fintiv*⁶ to a parallel ITC proceeding.” See Director Vidal, Memorandum, “Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation,” 5–7 (June 21, 2022) (“Guidance Memo”). This Guidance Memo is followed by the Board and should be applied here because, as noted in §VIII.C, the ’854 Patent is part of a parallel ITC Investigation, and the related district court proceeding has been stayed. *Id.*; *Roku, Inc. v. Universal Electronics Inc.*, IPR2021-00263, Paper 19 at 7-9 (PTAB Feb. 8, 2023).

B. Discretionary Denial Is Not Warranted Under 35 U.S.C. §325(d)

Denial under §325(d) is not warranted because the challenges presented in this Petition are neither cumulative nor redundant to art considered in prosecution. *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8 (PTAB Feb. 13, 2020).

The petitioned art, Qirong, Yun, and McPherson were not cited during prosecution of the ’854 Patent and are not cumulative to the prior art or prior art combinations considered during examination. EX1002, 162. The arguments raised herein are substantially different than those raised in prosecution. *Supra* §IV.B. In particular, the prior art here discloses each and every limitation of the claims as amended. Therefore, the petitioned art and combinations thereof are not cumulative.

⁶ *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential) (“*Fintiv*”).

VIII. MANDATORY NOTICES**A. Grounds for Standing (37 C.F.R. §42.104(a))**

Petitioner certifies it is not barred or estopped from requesting *inter partes* review of the '854 Patent. Neither Petitioner, nor any party in privity with Petitioner, has filed a civil action challenging the validity of any claim of the '854 Patent. *See* 35 U.S.C. §315(a). The '854 Patent has not been the subject of a prior *inter partes* review by Petitioners or a privy of Petitioners. Further, the '854 Patent was issued on June 8, 2021, which is more than nine months before this Petition. Petitioner therefore certifies this patent is available for *inter partes* review.

B. Real Parties-in-Interest (§42.8(b)(1)):

Petitioner Minka Lighting, LLC is the real party-in-interest.

C. Related Matters (§42.8(b)(2)):

Petitioner identifies the following related matters:

- *Smart Ceiling Fans, Components Thereof, and Associated Systems and Software*, Inv. No. ITC-337-TA-1374 (“ITC Investigation”).
- *Minka Lighting, LLC v. Wangs Alliance Corporation*, Case No. 5-23-cv-02493-AB-SHK, (C.D. Cal.) (“District Court Case”).

The '854 Patent is involved in the above litigations along with related patents U.S. Patent Nos. 11,598,345 (“’345 patent”) and 10,488,897 (“’897 patent”).⁷ The

⁷ On April 23, 2024, the ALJ granted Patent Owner’s Motion to Terminate the ’897 Patent from the ITC Investigation.

'854 Patent shares a common specification with the '345 patent. All three patents are the subject of a declaratory judgment action asserting claims of non-infringement (but not invalidity) in the District Court Case. The District Court Case is stayed pending the outcome of the ITC Investigation. EX1026.

D. Counsel, Service, and Fee Information (§42.8(b)(3)):

Pursuant to 37 C.F.R. §42.8(b)(3) and 37 C.F.R. §42.10(a), Petitioner appoints:

<u>Lead Counsel</u>	John Scheibeler (Reg. No. 35,346) White & Case LLP 1221 Avenue of the Americas New York, NY 10020-1095 jscheibeler@whitecase.com Tel: (516) 343-4680
<u>Backup Counsel</u>	Yar Chaikovsky (Reg. No. 39,625) White & Case LLP 3000 El Camino Real, 2 Palo Alto Square Suite 900, Palo Alto, CA 94306 yar.chaikovsky@whitecase.com Telephone: (650) 213-0300 Ethan Plail <i>pro hac vice</i> motion to be submitted White & Case LLP 701 Thirteenth Street, NW Washington, DC 20005-3807 ethan.plail@whitecase.com Telephone: (202) 626-3586 Jake Gold <i>pro hac vice</i> motion to be submitted White & Case LLP

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<u>Service Information</u>	W&CMinkaIPR@whitecase.com White & Case LLP 1221 Avenue of the Americas New York, NY 10020-1095

Pursuant to 37 C.F.R. §42.10(b), a power of attorney is being filed with this designation of counsel.

E. Fee for *Inter Partes* Review (§42.15(a))

The U.S. Patent & Trademark Office is authorized to charge the fee specific by 37 C.F.R. §42.15(a), and any other required fees, to Deposit Account No. 50-3672.

IX. CONCLUSION

Inter partes review of claims 1-4 and 8-10 of U.S. Patent No. 11,028,854 is requested based on the grounds described above.

Dated: June 13, 2024

/s/ John Scheibeler

John Scheibeler (Reg. No. 35,346)

WHITE & CASE LLP

1221 Avenue of the Americas

New York, New York 10020-1095

Attorney for Petitioner

CERTIFICATION OF SERVICE (37 C.F.R. §§42.6(e), 42.105(a))

The undersigned hereby certifies that the above-captioned PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO. 11,028,854, Petitioner's power of attorney, and all associated exhibits were served in their entirety on June 13, 2024, on the following parties via Express Mail:

Wangs Alliance Corporation d/b/a
WAC Lighting
44 Harbor Park Drive
Port Washington, New York 11050
Telephone: (800) 526-2588

Weiss & Arons LLP
63 South Main Street
Spring Valley, NY 10977

Dated: June 13, 2024

/s/ John Scheibeler
John Scheibeler (Reg. No. 35,346)
WHITE & CASE LLP
1221 Avenue of the Americas
New York, New York 10020-1095

Attorney for Petitioner

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. §42.24 *et seq.*, the undersigned certifies that this Petition complies with the 14,000-word type-volume limitation. The Petition contains 13,776 words, which is the sum of 13,478 words calculated by Microsoft Word's word-count feature and 294 words hand-counted in the figures. This total excludes the cover page, signature block, and the parts of the Petition exempted by 37 C.F.R. § 42.24(a)(1).

Dated: June 13, 2024

/s/ John Scheibeler

John Scheibeler (Reg. No. 35,346)

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