

**Samsung Electronics Co., Ltd., Samsung Electronics America, Inc.
v.
Empire Technology Development LLC**

**Patent Owner's Demonstratives
September 17, 2025**

**IPR2024-00896
Patent No. 8,798,120**

Demonstrative Exhibit – Not Evidence

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Claim Construction

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“Idle Power Consumption” Construction

- The Board’s preliminary construction is overbroad because idling does not include times when the transceiver is powered off.
- A transceiver that is waiting to send cannot be powered off.

Board Preliminary Construction
“Power consumption during which the transceiver may be waiting to send data, whether the transceiver is on or off.” Paper 15, 25.

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(PO Sur-Reply, 4; Ex-1050 at 12, 16)

“Idle Power Consumption” Construction

- The Board should construe the term as stated in the District Court’s final construction (below) or as follows:
 - **“power consumed when the mobile station and first and second circuitry are powered on and waiting to send”**

Board Preliminary Construction	District Court Preliminary Construction	District Court Final Construction
“Power consumption during which the transceiver may be waiting to send data, whether the transceiver is on or off.” Paper 15, 25.	“ <i>Power consumed</i> by the first and second circuitry <i>when the mobile station is powered on</i> , enabled for transmitting, <i>but waiting to send.</i> ” ² Ex-2011, 1.	“ <i>Power consumed</i> by the mobile station <i>when the mobile station is powered on and waiting to send.</i> ” Ex-1050, 12.

(PO Sur-Reply, 4; Ex-1050 at 12, 16)

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The District Court's Final Construction Supports Patent Owner

- The District Court's final construction confirms that the transceiver circuitry must be idling and waiting to send.

The Court agrees with Empire that a fully powered-off mobile station does not have "idle power consumption" within the meaning of the claims. Nor must all the circuitry of the mobile station be turned on for it to be "idle." Rather, the specification shows the "idle" time is simply the time in which the device is on and waiting to transmit. '120 Patent at 3:3–5 ("[I]f the transmission rate is too slow, a greater number of transceivers may become idle, waiting to send transmissions over the communication channel."). In the equation set forth by the Detailed Description for the

(PO Sur-Reply, 5-6; Ex-1050 at 12)

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The Specification Supports Patent Owner

- The specification shows that “idle power consumption” is the power consumed when the transceivers are idling and waiting to send.
- The specification supports PO because a transceiver that is powered off is neither idling nor waiting to send.

ceiver during an idle time. The idle time is a time during which the transceiver may be waiting to send data over the communications channel. The transceiver may, for example, be waiting for a scheduled start time for the transceiver to use the communications channel. Generally, greater power is

(Ex-1001 at 2:60-63)

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The Specification Supports Patent Owner

- Idle power is consumed when the transceivers are idling and waiting to send.

a particular average throughput in some examples. However, if the transmission rate is too slow, a greater number of transceivers may become idle, waiting to send transmissions over the communications channel. Even if the idling transceivers turn off their transmission chains, some idle power may be consumed due to leakage current or other effects. The idle

(Ex-1001 at 3:2-7)

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The Specification Supports Patent Owner

- An idling transceiver with its transmission chains off means that the transceiver is idling and not transmitting.

a particular average throughput in some examples. However, if the transmission rate is too slow, a greater number of transceivers may become idle, waiting to send transmissions over the communications channel. Even if the idling transceivers turn off their transmission chains, some idle power may be consumed due to leakage current or other effects. The idle

(Ex-1001 at 3:2-7)

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Plain and Ordinary Meaning of “Idle Power Consumption”



Where the ordinary meaning of claim language is readily apparent, claim construction “involves little more than the application of the widely accepted meaning of commonly understood words.”

Phillips v. AWH Corp., 415 F.3d 1303, 1314 (Fed. Cir. 2005) (en banc)
(internal citation omitted) (PO Response, 12-13)

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“Idle Power Consumption” Construction



“[W]hen the scope of the invention is clearly stated in the specification, and is described as the advantage and distinction of the invention, it is not necessary to disavow explicitly a different scope the claims cannot be of broader scope than the invention that is set forth in the specification.”

On Demand Mach. Corp. v. Ingram Indus., Inc., 442 F.3d 1331, 1340 (Fed. Cir. 2006)
(PO Sur-Reply, 6)

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Petitioners' Expert Supports Patent Owner's Position



Dr. Matthew C. Valenti
Petitioners' Expert

- **Dr. Valenti admits that a powered off transceiver is not waiting to send.**

Q. So *if it is fully powered off, ... the transceiver is not waiting to send, right?*

A. *If it is fully powered off, I think that would be fair* that you would fully power it off at the point that it is no longer wanting to send data, right? So in an idle mode, you would typically have it at least have some power so that it is ready to quickly turn on, right? So, again, you know, I would look at this as *when it is in idle mode, it is just not fully powered off*, but it could be in any of a continuum amount of power usage states.

(PO Sur-Reply, 10-11; Ex-2013, 60:19-61:9)

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Petitioners' Expert Supports Patent Owner's Position



Dr. Matthew C. Valenti
Petitioners' Expert

- **Dr. Valenti states that during idle times the “circuits are powered.”**

⁵ Idle power consumption means that the circuits are powered but have nothing to transmit or receive. For example, the '120 Patent explains that “idle time is a time during which the transceiver may be waiting to send data over the communications channel. The transceiver may, for example, be waiting for a scheduled start time for the transceiver to use the communications channel.” Ex-1001, 2:60-64. On the

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(Ex-1002, ¶86 n.5)

Petitioners' Expert Supports Patent Owner's Position



Dr. Matthew C. Valenti
Petitioners' Expert

- **Dr. Valenti concedes that the transceiver circuitry cannot be powered off during idle times.**

Q When you say "the circuits are powered," you mean that the circuits are powered on, right?

A What I mean here is that they are not powered off. So "powered" was kind of intentionally vague here. They are certainly not powered off, but -- in the sense that they

(Ex-2013, 49:20-50:7)

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Petitioners' Expert Supports Patent Owner's Position



Dr. Matthew C. Valenti
Petitioners' Expert

- **Dr. Valenti agrees that the Board's preliminary construction covers powered off transceivers.**

Q So under the Institution Decision construction, the transceiver can be powered off and still be within the scope of idle power consumption, correct?

A Yeah, I think that would be fair. I

(Ex-2013, 56:3-7)

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Petitioners' "Transmission Chain" Argument Is Unavailing

- **Petitioners err in their reliance on “transmission chains.”**
 1. Petitioners imply that “idling transceivers” can turn themselves off and still be idling.
 2. “Transmission chain” is not a term of art and the specification does not suggest that it defines the term.
 3. Petitioners did not offer an interpretation in their Petition or an opinion from their expert.
 4. The experts confirmed that turning off transmission chains only means transceivers are not transmitting.

(PO Sur-Reply, 7-9; Ex-1052, 57:19-23, 65:15-24; Ex-2013, 43:12-15)

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Petitioners' "Transmission Chain" Argument Is Unavailing



Dr. Matthew C. Valenti
Petitioners' Expert

Q You can have transmission chains
turned off but circuits and the mobile station
would still be powered, right?

A Yes, certainly. And there could be

(PO Sur-Reply, 9; Ex. 2013, 43:12-15)

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“Leakage Current” Does Not Help Petitioners

- Leakage current is not limited to current in circuitry that is turned off.

the communications channel. Even if the idling transceivers turn off their transmission chains, some idle power may be consumed due to leakage current or other effects. The idle

(Ex-1001 at 3:2-7)

- Leakage current generally includes any unwanted current that flows regardless of whether the circuitry is powered on or not.

(Ex-2023; Ex-2024)

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Ground 1: Li and Siam

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Petitioners' Purported Motivation for Ground 1 Fails

- **A POSITA would not have been motivated to combine Li-Siam based on the alleged motivation of optimizing total power consumption.**
 - This alleged motivation is nothing more than a conclusory statement.
 - Petitioners fail to articulate why a POSITA would have been motivated to combine these specific pieces of prior art.
 - Li is a patent publication while Siam is an article describing simulations.
 - Nothing in Li or Siam suggest a need to improve their mode selection system.

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(PO Response, 28, 31-34; PO Sur-Reply, 11-12)

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Conclusory Statements Are Insufficient



“[O]bviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications or prior art to arrive at the claimed invention.”

Belden Inc. v. Berk-Tek LLC, 805 F.3d 1064, 1073 (Fed. Cir. 2015)
(PO Sur-Reply, 11-12)

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Conclusory Statements Are Insufficient



“[K]nowledge of a problem and motivation to solve it are entirely different from motivation to combine particular references [to reach the claimed invention].”

ActiveVideo Networks, Inc. v. Version Commc'ns, Inc., 694 F.3d 1312, 1328 (Fed. Cir. 2012)
(quoting *Innogenetics, N.V. v. Abbott Labs*, 512 F.3d 1363, 1373 (Fed. Cir. 2008))
(PO Sur-Reply at 12)

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Evidence-Supported Account of the Combination Is Required



“[T]he Board ‘must still be careful not to allow hindsight reconstruction of references . . . Without any explanation as to *how* or *why* the references would be combined to produce the claimed invention.’”

Trivascular, Inc. v. Samuels, 812 F.3d 1056, 1066 (Fed. Cir. 2016)
(internal citation omitted) (PO Response, 27)

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Lack of Motivation to Combine Li and Siam

- **A POSITA would not have been motivated to combine Li and Siam.**
 1. Neither Li nor Siam considers power consumption when not transmitting.
 2. No POSITA would assume that Li purports to solve a problem regarding idle power consumption when it does not address or monitor the problem.
 3. No POSITA would have combined Li and Siam to create a system that uses a control signal based in part on the idle power consumption of the mobile station.

(PO Sur-Reply, 12; Ex-2022, ¶¶ 83-84)

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No Specific Reasoning Why a POSITA Would Have Been Motivated



Dr. Robert Akl
Patent Owner's
Expert

on the combination of Li and Siam. It is my opinion a person of ordinary skill in the art would not have been motivated to combine those two references. While Li is a patent publication, Siam is an article that describes simulations that were performed by the study's authors. It does not disclose a physical system or apparatus, nor did the study's authors build a physical realization of the simulations they performed. I

(PO Response, 28; Ex-2022, ¶ 75)

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No Specific Reasoning Why a POSITA Would Have Been Motivated



Dr. Robert Akl
Patent Owner's
Expert

83. Nothing in Li or Siam suggest a need to improve their mode selection system. To the contrary, Li expressly states that its disclosed embodiments solve the power consumption problem. [0019]. For example, Li states that by switching “STA 120 and STA 150 to a SIMO or MIMO operating mode” the “power consumption for STA 120 and STA 150 may be reduced.” *Id.* Siam simply touts the energy efficiency of its E-BASIC protocol. Ex-1006 at 877. Siam’s simulations using the E-BASIC protocol chose “one of the four modes (SISO, SIMO, MISO, or MIMO) according to the transmission distance, with the goal of minimizing” total energy consumption per bit. *Id.*

(PO Response, 33; Ex-2022, ¶ 83)

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No Specific Reasoning Why a POSITA Would Have Been Motivated



Dr. Robert Akl
Patent Owner's
Expert

84. Even if Li identified and solved a problem with respect to power consumption in idle mode and even if Siam identified and solved a problem with respect to circuit power consumption, neither of which is true, there are many ways of solving these problems without using a control signal based in part on the power consumption of the first and second circuitry and a control signal based in part on idle power consumption of the mobile station. Petitioners provide no explanation for why in a combined Li-Siam system a person of ordinary skill in the art would have used a control signal based on the power consumption of the circuitry and idle power consumption of the mobile station instead of the other, various options.

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(PO Response, 33; Ex-2022, ¶ 84)

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Ground 1: Claims 25, 27, and 28 Would Not Have Been Obvious Over Li in View of Siam

- **Li and Siam fail to disclose or suggest the “idle power consumption” limitation of claim 25**
 - It is undisputed that Siam does not mention “idle power” at all,
 - Li does not teach using or monitoring idle power at all.

(PO Sur-Reply, 13-14; Ex-1005, [0018]; Ex-2013, 64:11-14; Ex-2022, ¶¶ 87-89)

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Petitioners' Expert Agrees that Siam Does Not Disclose Idle Power



Dr. Matthew C. Valenti
Petitioners' Expert

Q Siam doesn't say anything about idle power, right?

A Yeah, Siam alone doesn't talk about idle power or idle states. So one would have to

(PO Sur-Reply, 13; Ex-2013, 64:11-14)

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Ground 1: Claims 25, 27, and 28 Would Not Have Been Obvious Over Li in View of Siam

- Li's single mention of "idle mode" says nothing how it could be used or monitored to address power consumption.

[0018] One problem associated with wireless communication devices using carrier sense multiple access/collision detection (CSMA/CD) techniques (e.g., 802.11) is power consumption. For example, a station in idle mode waiting for incoming signals may consume approximately 60% of its battery energy. This inefficient use of energy may be exac-

(PO Sur-Reply, 13-14; Ex-1005, [0018-19])

Demonstrative Exhibit – Not Evidence

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Petitioners' Expert Extrapolates Li's Single Mention of Idle Mode



Dr. Matthew C. Valenti
Petitioners' Expert

Q And Li doesn't say anything about using the power consumption in an idle mode in any way, right?

A Well, there is just a suggestion. So in paragraph 18 it is talking about idle mode, and in paragraph 19 it says that the embodiments solve this problem, "this problem" being the consumption in idle mode. But that would be the extent of Li's consideration of idle mode.

(PO Sur-Reply, 14; Ex-2013, 69:11-69:19)

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Ground 1: Claims 25, 27, and 28 Would Not Have Been Obvious Over Li in View of Siam



Dr. Robert Akl
Patent Owner's
Expert

Li, Ex-2013 at 66:20-67:2. Li does not disclose or suggest how “idle mode” could be used for power consumption, how “idle mode” could be relevant to mode selection, or how “idle mode” might be considered with respect to a control signal received by the mobile station. Dr. Valenti acknowledges that Li does not teach or suggest any inputs or variables that might be used in mode selection. *Id.* at 68:14-69:3. Rather, Li only mentions idle mode to identify the problem of power consumption but offers no teaching or suggestion about the possible use of idle mode. Ex-1005, [0018]; *see also* Ex-2013 at 69:11-19 (confirming that “this

(PO Response, 28, 34-36; Ex-2022, ¶¶ 87-89)

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Petitioners' Expert Agrees that Li Does Not Disclose Inputs for Mode Selection



Dr. Matthew C. Valenti
Petitioners' Expert

Q Now, it doesn't identify any inputs used in determining mode switching, right?

A Right. I mean the mode switching is embodied by that PLCP data unit, but it doesn't explicitly recite how the command and the PLCP data unit is determined.

(PO Sur-Reply, 14; Ex-2013, 68:14-19)

Demonstrative Exhibit – Not Evidence

Petitioners' Expert Agrees that Li Does Not Disclose Variables Used for Mode Selection



Dr. Matthew C. Valenti
Petitioners' Expert

Q And it doesn't identify any variables that are used in determining mode switching, right?

A Right. It does not explicitly recite the variables. Again, it does suggest variables

(PO Sur-Reply, 13-14; Ex-2013, 68:14-69:8)

Demonstrative Exhibit – Not Evidence

Ground 2: Li, Siam, and Cui-2003

Demonstrative Exhibit – Not Evidence

Petitioners' Purported Motivation for Ground 2 Fails

- **A POSITA would not have sought to expand Siam's total energy consumption to include Cui-2003's "sleep mode."**
 - Cui-2003 does not mention idle power or idle power consumption.
 - No POSITA would draw Petitioner's conclusion that the circuitry is active in sleep mode when Cui-2003 states that the circuitry is shut down.
 - A POSITA would not have considered the power expended in sleep mode relevant to transmission mode selection since Cui-2003 sets the power consumed in sleep mode to zero.
 - Petitioners fail to articulate how a POSITA would have combined Li-Siam with Cui-2003's energy equations.

(PO Response, 40-41; PO Sur-Reply, 15-19; Ex-2022, ¶ 98-99; Ex-2013 at 79:19-21)

Demonstrative Exhibit – Not Evidence

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Ground 2: Claims 25, 27, and 28 Would Not Have Been Obvious Over Li-Siam in View of Cui-2003

- Cui-2003’s “sleep mode” is completely distinct from “idling” because “all the circuits in the signal path are shut down for energy saving.”

We assume a node has L bits to transmit with a deadline T . The transceiver spends time $T_{on} \leq T$ to communicate these bits, where T_{on} is a parameter to optimize, and then returns to the sleep mode where all the circuits in the signal path are shut down for energy saving. Although the transient duration from active mode to sleep mode is short enough to be negligible, the start-up process from sleep mode to active mode may be slow due to the finite Phase Lock Loop (PLL) settling time in the frequency synthesizer. Thus, the transmission period T is

(PO’s Response, 42-44; PO Sur-Reply, 18-19; Ex-2022, ¶ 103-04; Ex-1007, 2806)

Demonstrative Exhibit – Not Evidence

Petitioners' Expert Agrees that Cui-2003's Circuitry Is Shut Down in Sleep Mode



Dr. Matthew C. Valenti
Petitioners' Expert

Q So switching from sleep mode to active mode would require powering on the circuits that were powered off, correct?

A I would probably characterize that as powering up the circuits that were shut down in order to use the language of Cui.

(PO Sur-Reply, 19; Ex-2013, 95:9-14)

Demonstrative Exhibit – Not Evidence

No POSITA Would Conclude That the Circuitry Is Active in Sleep Mode



Dr. Robert Akl
Patent Owner's
Expert

Petitioners' argument that "mobile stations in sleep mode may nevertheless continue to consume power since they are not completely shut down," *id.*, is belied by Cui-2003's explicit description that in sleep mode "all the circuits in the signal path *are shut down* for energy saving," Ex-1007 at 2806. Petitioners' other references also establish that in sleep mode, unlike in idle mode, as many circuit blocks as possible are *shut down* to conserve power. Ex-1031, ¶¶ 49, 51. Petitioners' attempt to equate

(PO Response, 16; Ex-2022, ¶ 111)

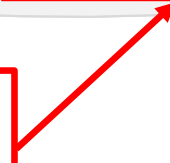
Demonstrative Exhibit – Not Evidence

Ground 2: Claims 25, 27, and 28 Would Not Have Been Obvious Over Li-Siam in View of Cui-2003

- In “sleep mode,” Cui-2003 assumes the power consumption is zero because it is negligible.

In the sleep mode, the power consumption is dominated by the leaking current I_l of the switching transistors if the circuitry is properly designed. Since CMOS technology is exclusively used in our analysis, the leaking current $I_l \approx 0$ [11] compared with the active mode. Thus, we set $P_{sp} = 0$. Our analysis can

Sleep mode power
consumption = 0



(Ex-1007, 2806; PO Response, 42-44; PO Sur-Reply, 18-19; Ex-2022, ¶ 103, n.1)

Demonstrative Exhibit – Not Evidence

Petitioners' Expert Agrees that Idling Consumes Non-Negligible Energy



Dr. Matthew C. Valenti
Petitioners' Expert

- Unlike Cui-2003's "sleep mode," idling consumes energy.

Q And in that passage Li is basically saying that idling consumes significant processing and transceiver power if it takes up 60 percent of the battery energy, correct?

just transceiver. I think what it is trying to get at is just that, yeah, there is a non-negligible energy consumption when idling and there is a desire to improve that.

(PO Response, 44; Ex-2022, ¶ 104; Ex-2013, 102:3-22)
Demonstrative Exhibit – Not Evidence

Power Expended in Sleep Mode Would Not Be Considered Relevant to Transmission Mode Selection



Dr. Robert Akl
Patent Owner's
Expert

evidence, and based on hindsight. A person of ordinary skill in the art reading Cui-2003 would have noticed that in sleep mode “all the circuits in the signal path are shut down for energy saving,” Ex-1007 at 2806, and Cui-2003 sets the power consumed in sleep mode to zero. These facts suggest that sleep mode has no impact at all on selecting an efficient transmission mode. A person of ordinary skill in the art would not have considered the power expended in sleep mode to be relevant to transmission mode selection since Cui-2003 sets the power consumed in sleep mode to zero.

(PO Response, 40-41; PO Sur-Reply, 16; Ex-2022, ¶ 98)

Demonstrative Exhibit – Not Evidence

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No POSITA Would Conclude that the Circuitry Is Active in Sleep Mode



Dr. Robert Akl
Patent Owner's
Expert

99. Even if a person of ordinary skill in the art understood Cui-2003's sleep mode to be consuming power, which is not the case, in my view there are many ways of addressing sleep mode without using a control signal based in part on the idle power consumption of the mobile station. Petitioners and Dr. Valenti provide no explanation for why in a combined Li-Siam system a person of ordinary skill in the art would have thought that considering the power consumption in Cui-2003's sleep mode would improve Li-Siam's system. Petitioners also do not explain why or how a person of ordinary skill in the art would have taken Cui-2003's sleep mode and used it Li-Siam's system to arrive at a control signal based in part on idle power consumption of the mobile station instead of the other, various options.

Demonstrative Exhibit – Not Evidence (PO Response, 41; PO Sur-Reply, 16-17; Ex-2022, ¶ 99, 106)

Non-Zero Power Consumption in Sleep Mode is Speculative



“‘[L]egal determinations of obviousness, as with such determinations generally, should be based on evidence rather than on mere speculation or conjecture.’”

Los Angeles Biomedical Res. Inst. v. Eli Lilly & Co., 849 F.3d 1049, 1066 (Fed. Cir. 2017)
(quoting *Alza Corp. v. Mylan Labs., Inc.*, 464 F.3d 1286, 1290 (Fed. Cir. 2006)
(PO Sur-Reply, 16-17)

Demonstrative Exhibit – Not Evidence

Petitioners' Expert Concedes Power in Sleep Mode Is Speculative



Dr. Matthew C. Valenti
Petitioners' Expert

Q So in Cui 2003, the power consumed in sleep mode is limited to the leaking current, correct?

A Well, it says it "is dominated by the leaking current." I don't think it says it is exclusively leaking current. And it also says, "if the circuitry is properly designed."

So, for instance, you know, if the circuitry is not properly designed, there could be other sources of power consumption.

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(Ex-2013, 93:4-13; Ex-1002, ¶ 86, n.5)

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Ground 2: Claims 25, 27, and 28 Would Not Have Been Obvious Over Li-Siam in View of Cui-2003



Dr. Robert Akl
Patent Owner's
Expert

105. Cui-2003 never mentions power consumption during an idle time, just like the '120 Patent never mentions power consumption during sleep mode. *See* Ex-1001; Ex-1007. Petitioners and their expert spend considerable effort seeking to conflate these two distinct modes. Petitioners' other references confirm that sleep mode and idle mode are distinct, showing that a person of ordinary skill in the art would not treat sleep mode to disclose or suggest the claimed "idle power." *First*, while Cui-2003 explains that there is almost no power consumed during sleep mode, Ex-1007 at 2806, Li states that a device in idle mode "may consume approximately 60% of its battery energy," Ex-1005 ¶ 18. The vast difference in power consumed in sleep and idle mode demonstrates that these modes are distinct.

(PO Response, 44-45; PO Sur-Reply, 18-19; Ex. 2022, ¶¶ 104-05)

Demonstrative Exhibit – Not Evidence

Ground 2: Claims 25, 27, and 28 Would Not Have Been Obvious Over Li-Siam in View of Cui-2003

- Other prior art cited by Petitioners reinforces the distinction between “sleep” and “idle” modes.

[0051] In the Sleep state, wireless device 100a may shut down as many circuit blocks as possible to conserve power. Wireless device 100a does not transmit or receive data while in the Sleep state. Wireless device 100a may maintain a timer to determine when to wake up from the Sleep state and may monitor for certain interrupts (e.g., user input) that can trigger an immediate transition to the Idle state.

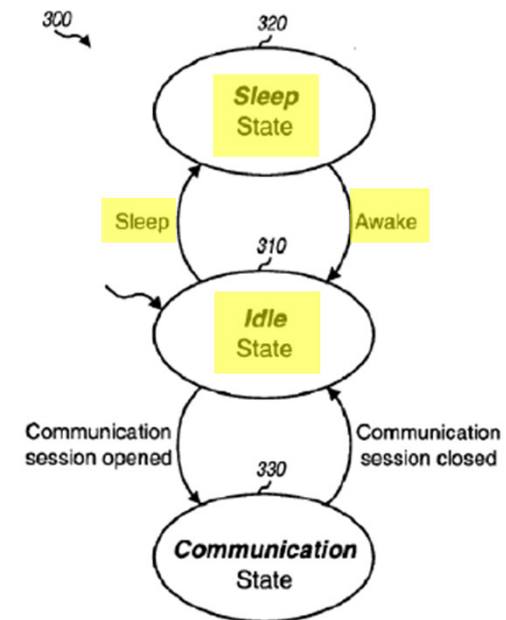


FIG. 3A

(PO Response, 45-46; Ex-1031 Figs. 3A-3B, ¶¶ 45-61)

Ground 2: Claims 25, 27, and 28 Would Not Have Been Obvious Over Li-Siam in View of Cui-2003



Dr. Matthew C. Valenti
Petitioners' Expert

- **Dr. Valenti admits that idling is not powered off.**

Q. So *if it is fully powered off, ... the transceiver is not waiting to send, right?*

A. *If it is fully powered off, I think that would be fair* that you would fully power it off at the point that it is no longer wanting to send data, right? So in an idle mode, you would typically have it at least have some power so that it is ready to quickly turn on, right? So, again, you know, I would look at this as *when it is in idle mode, it is just not fully powered off*, but it could be in any of a continuum amount of power usage states.

(PO Response, 14; PO Sur-Reply, 10; Ex-2013, 60:19-61:9)

Demonstrative Exhibit – Not Evidence

Ground 2: “Sleep Mode” in Cui-2003 Was Presumptively Considered During Prosecution



“When no prior art other than that which was considered by the PTO examiner is relied on by the attacker, he has the added burden of overcoming the deference that is due to a qualified government agency presumed to have properly done its job, which include one or more examiners who are assumed...to be familiar from their work with the level of skill in art...”

Ultra-Tex Surfaces, Inc. v. Hill Bros. Chem. Co., 204 F.3d 1360, 1367 (Fed. Cir. 2000)
(quoting *Am. Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1359 (Fed. Cir. 1984)
(PO Response, 47-48)

Demonstrative Exhibit – Not Evidence

PTO Examiner Already Considered “Sleep Mode”

- **Petitioners’ cited disclosure for “idle power consumption” was already considered during prosecution.**

Relied Upon Disclosures in Cui-2003	Disclosures in Cui-2005
“Cui-2003 ‘assume[s] that the transceiver circuitry works on a multimode basis: when there is a signal to transmit all circuits work in active mode, <i>when there is no signal to transmit they work in sleep mode</i> , and when switching from sleep mode to active mode there is a transient mode.’ Ex-1007, 2806. This ‘multi-mode operation’ allows significant energy to be saved when the sleep mode is used. Ex-1007, 2806; Ex-1002 ¶¶145-146.” Pet. at 50.	“It is assumed that the transceiver circuitry works on a multi-mode basis: When there is a signal to transmit, all circuits work in the active mode, <i>when there is no signal to transmit they work in the sleep mode</i> , and when switching from sleep mode to active mode, there is a transient mode. The multimode operation provides a significant savings of energy when the sleep mode is deployed.” Ex-1025 at 2350 (emphasis added).

(PO Preliminary Response, 19; PO Response, 9, 47-48)

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Petitioners Cannot Overcome Deference Due to PTO Examiner

- **Ground 2 fails because Petitioner cannot overcome the deference due to PTO examiner.**
 - Ground 2 relies only on Cui-2003 for the idle power limitation.
 - The idle power limitation was the PTO examiner's reason for allowance.
 - Petitioners' Ground 2 requires reversing the PTO examiner's decision.

9. The following is a statement of reasons for the indication of allowable subject matter: Re claims 5, 20 and 32; the prior art of record fails to anticipate or render obvious the limitations regarding the consideration of power during idle periods in the mode selection processing. Re claims 6 and 10, the prior art of record fails to anticipate

(PO Response, 9, 47-48; Ex-1004, 100)

Demonstrative Exhibit – Not Evidence

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Ground 5: Li, Siam, and Tirola

Demonstrative Exhibit – Not Evidence

Petitioners' Purported Motivation to Combine for Ground 5 Fails

- **A POSITA would not have used a recognition that MIMO may save power as a reason to combine Li-Siam with Tirola.**
 - Li-Siam and Tirola contain divergent views on the use of MIMO technology.
 - Tirola shows that uplink MIMO has a mostly negative impact on performance.
 - Petitioners new reply theory that any effect on mode selection due to the number of users fails because Tirola shows that number of users has no effect since there is no crossover point.

(PO Response, 51-52; PO Sur-Reply, 20-21)

Demonstrative Exhibit – Not Evidence

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Tirola Does Not Teach “That Channel Noise Considerations Might Favor...a MIMO Mode Over a SIMO Mode...”

Performance of a UMTS Uplink MIMO Scheme

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Abstract—In this study uplink (UL) performance was studied in the 3rd generation UMTS (Universal Mobile Telecommunications System) system assuming different SIMO/MIMO (Single/Multiple Input Multiple Output) approaches. Link simulations and theoretical analysis were used to investigate the uplink capacity and coverage of the considered antenna configurations. Link simulations assumed that the user equipment (UE) has a maximum of two transmit antennas while the base station can employ up to four antennas. The considered MIMO scheme can be classified as diversity MIMO, which means that the UE transmits the same data symbols via two antennas. Results of the performance evaluation demonstrate that receive diversity is a dominant factor in improving uplink capacity and coverage. For example, in terms of isolated cell capacity, a MIMO technique with 2 transmit (Tx) and 2 receive (Rx) antennas performed approximately 50% worse than a traditional approach with 1 Tx and 4 Rx antennas. Results show also that MIMO transmission will provide some benefits (up to 2 dB) for UL coverage and UE battery consumption. However, doubling the number of receiving antennas is still much more efficient than introducing the 2nd transmit antenna at the UE. Based on this study the MIMO concept does not seem feasible for improving UMTS uplink performance.

I. INTRODUCTION

Multimedia messaging is expected to dominate wireless communications in near future, which demands enhanced data throughput for both uplink and downlink directions. It is well acknowledged that improved data rates with good spectral efficiency can be achieved by increasing the number of transmit and receive antennas [1]. This MIMO approach is still in a starting phase in different standardization bodies for radio communications.

As videophones become more and more popular, it is extremely important to reach high spectral efficiency also for the uplink direction. The goal is to achieve reasonably high data rates with limited transmission power of the user equipment. Enhanced uplink performance is crucial for reducing the UE transmission power requirements, especially for high data rate applications. In addition to reduced UE battery consumption, an improved UL performance translates into better coverage area for the high data rate services [2, 3, 4, 5]. On the other hand increasing the uplink capacity and coverage reduces the number of base station sites and the overall cost of the network. Thus the performance

UL coverage and UE battery consumption. However, doubling the number of receiving antennas is still much more efficient than introducing the 2nd transmit antenna at the UE. Based on this study the MIMO concept does not seem feasible for improving UMTS uplink performance.

The paper is organized as follows. Section II introduces the considered transmission/reception schemes and describes the main assumptions for the performance evaluation. Section III illustrates the simulated link performance results for single user scenario. In Section IV the UL capacity results for isolated cell are presented. Section V presents and discusses the UL coverage results and finally, concluding remarks will be given.

As a summary, it can be said that the doubling of the number of receiving antennas will almost double the isolated cell capacity, whereas the increase of the number of transmit antennas will mostly have negative impact on the isolated cell capacity. Moreover, the capacity gain from doubling the Rx

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Petitioner Samsung Ex-1008, 0001

(Ex.1008, 657, 660; PO Response, 51-55; Pet., 67)

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Tirola's Simulations Show that MIMO Has a Mostly Negative Impact

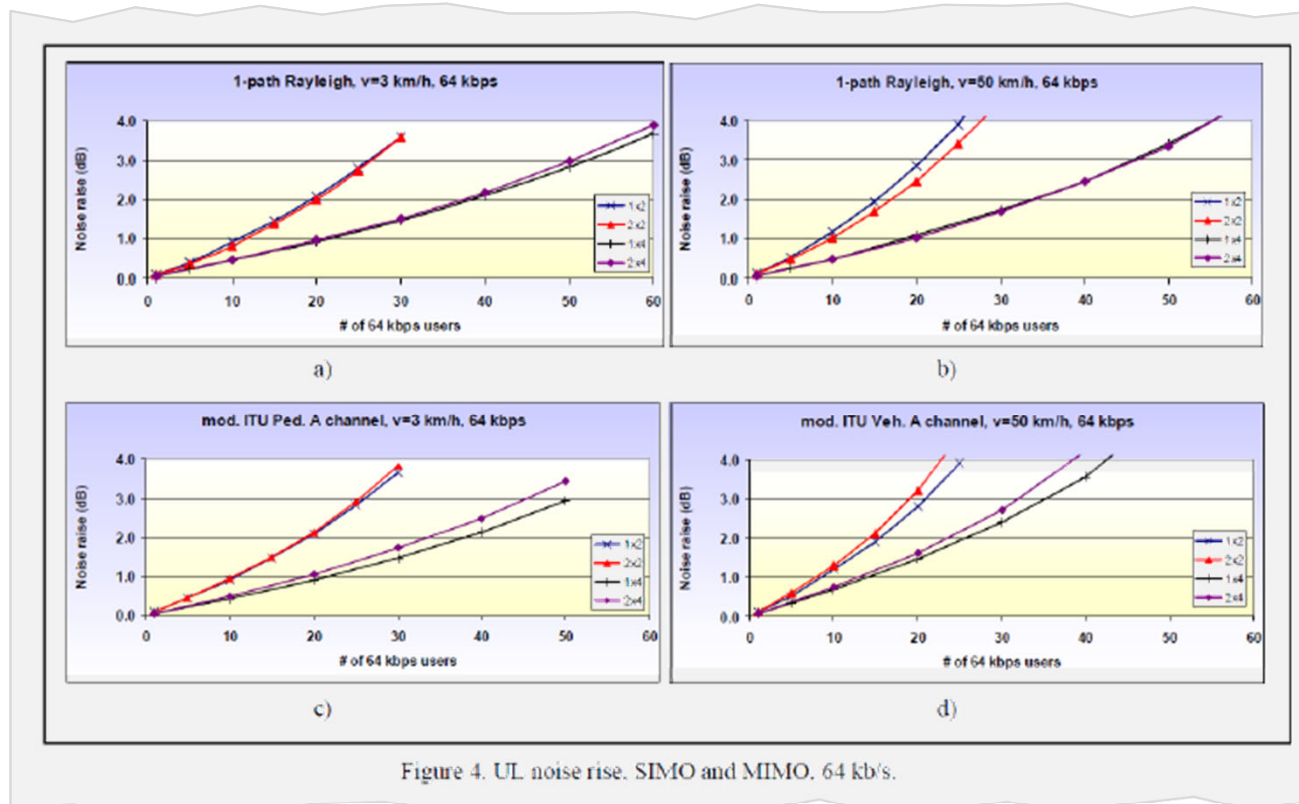


Figure 4. UL noise rise, SIMO and MIMO, 64 kb/s.

(Ex.1008, 661; PO Response, 51-54)

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Petitioner's Expert Agrees that Tirola Shows Uplink MIMO Has a Mostly Negative Impact



Dr. Matthew C. Valenti
Petitioners' Expert

A I would agree, especially to the extent that he does use the term or the word "mostly," so -- and, as we discussed, "most" meaning the majority of the cases that he looked at showed kind of a negative gain from going from SIMO to MIMO. But he does show at least one case where there is a benefit, and, you know, he doesn't say uniformly better. He just says mostly.

(PO Sur-Reply, 10-11; Ex-2013, 144:21-145:17)

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No Motivation to Combine Where Tirola's Entire Teachings Present Drawbacks with MIMO



“The relevant inquiry is whether or not a person having ordinary skill in the art would be motivated to combine references despite drawbacks that the combination might present.[] The Board must weigh the benefits and drawbacks of the modification against each other, to determine whether there would be a motivation to combine.”

Arctic Cat Inc. v. Polaris Indus. Inc., 795 F.App’x 827, 833 (Fed. Cir. 2019)
(internal citation omitted) (PO Response, 55-56)

Demonstrative Exhibit – Not Evidence

Ground 5: Claim 29 Would Not Have Been Obvious Over Li-Siam in View of Tirola



Dr. Robert Akl
Patent Owner's
Expert

125. None of the asserted references disclose a “control signal based, at least in part, on the number of users of the communication system,” as recited in claim 29. Petitioners exclusively rely on Tirola for the “number of users” limitation. Pet. at 65-68. But Tirola merely describes a simulation in which signal noise increases in SIMO and MIMO transmission modes as the number of users increase. See Ex-1008 at 659, 661. As stated above, Petitioners rely on only one example of these simulations to assert that, overall, Tirola teaches that “the advantage of a MIMO mode increases with increasing number of users.” Pet. at 66-67.

(PO Sur-Reply, 23-24; Ex. 2022, ¶¶ 124-25)

Demonstrative Exhibit – Not Evidence

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Petitioners' Reply Theory of Any Effect on Mode Selection Fails Because There Is No Crossover Point in Tirola

- The number of users has no effect on SIMO/MIMO selection because no crossover point is shown between SIMO and MIMO in Tirola.

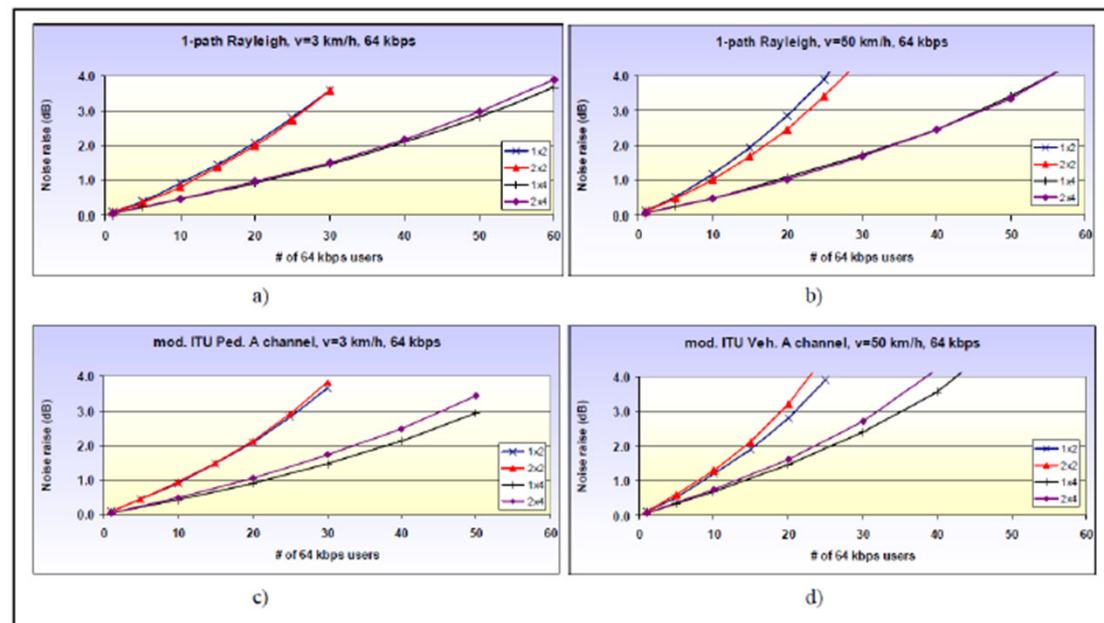


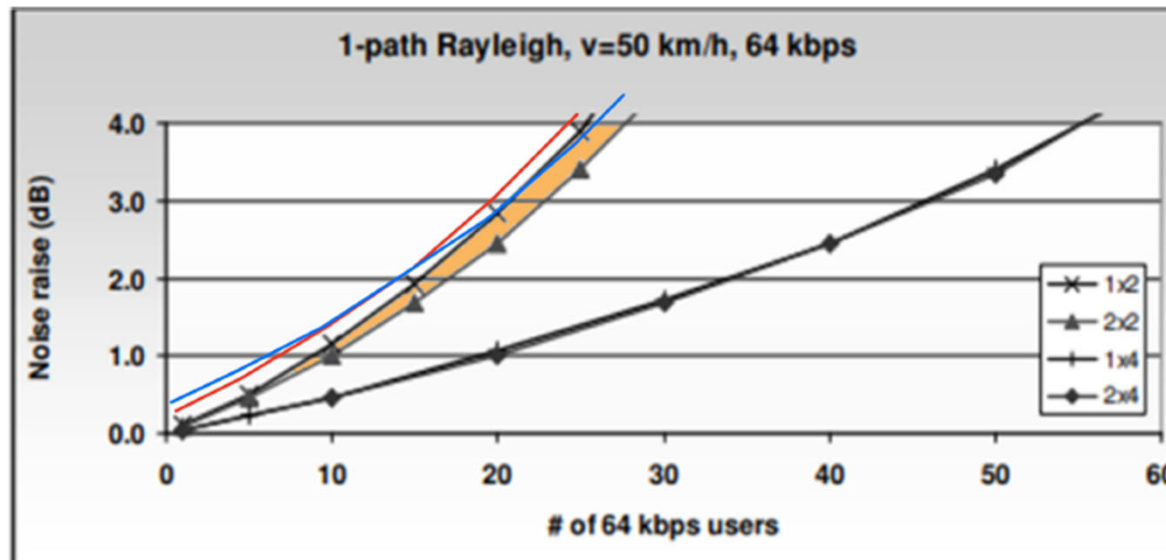
Figure 4. UL noise rise, SIMO and MIMO, 64 kb/s.

(PO Sur-Reply, 21; Ex. 1008, 659-61)

Demonstrative Exhibit – Not Evidence

Petitioners' Expert's Modified Figure Attempting to Recreate the Claimed Invention Is Improper

- Petitioner's expert's modified figure does not disclose or suggest a "control signal based at least in part on the number of users of the communications system."



(Ex. 1002, ¶¶ 179-80; PO Sur-Reply, 21-24)

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Petitioners' Use of a Modified Figure Is Improper



“‘[C]rediting such testimony risks allowing the challenger to use the challenged patent as a roadmap to reconstruct the claimed invention using disparate elements from the prior art—i.e., the impermissible ex post reasoning and hindsight bias that *KSR* warned against.’”

TQ Delta, LLC v. Cisco Sys., Inc., 942 F.3d 1352, 1361 (Fed. Cir. 2019)
(PO Sur-Reply, 23-24)

Demonstrative Exhibit – Not Evidence

Ground 5: Claim 29 Would Not Have Been Obvious Over Li-Siam in View of Tirola



Dr. Robert Akl
Patent Owner's
Expert

Although Li discloses switching operating modes, Li does not mention the number of users of the communications system and, and unlike the '120 Patent, does not use the term crossover point. Ex-1001 at 4:62-64 ("A crossover point for when SIMO consumes less power than MIMO, or vice versa, may be considered a function of any of a variety of variables...."). And Tirola's rejection of the viability of MIMO also suggests that a person of ordinary skill in the art would not have been motivated to combine Tirola's teaching with the Li-Siam system to arrive at a mobile station that receives "a control signal based at least in part on the number of users of the communications system." *See, e.g., id.*; Ex-1005 ¶ 24. Therefore, it is my opinion that Li-Siam-Tirola does not disclose claim 29 of the '120 Patent because Tirola, and the other asserted art from Ground 1, do not disclose the "number of users" limitation.

(PO Sur-Reply, 23-24; Ex. 2022, ¶ 127)

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