

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SMARTSKY NETWORKS LLC,
Petitioner,

v.

GOGO BUSINESS AVIATION LLC,
Patent Owner.

Case No. IPR2025-00672
U.S. Patent No. 9,954,600

PATENT OWNER'S PRELIMINARY RESPONSE

TABLE OF CONTENTS

	<u>Page</u>
I. INTRODUCTION	1
II. OVERVIEW OF THE '600 PATENT	3
III. OVERVIEW OF CERTAIN CITED ART	6
A. de La Chapelle (Ex. 1005)	6
B. Jalali (Ex. 1006).....	8
C. Nelson (Ex. 1007).....	9
D. McGuffin (Ex. 1008)	10
IV. LEVEL OF ORDINARY SKILL IN THE ART	11
V. CLAIM CONSTRUCTION	11
VI. GROUND 1: DE LA CHAPELLE DOES NOT ANTICIPATE ANY OF THE CHALLENGED CLAIMS	12
A. Claims 1 and 13: de La Chapelle's Use of S/I Does Not Disclose Signal-to-Noise Ratio	12
1. The Technical Distinction Between S/I and SNR Is Well-Established.....	13
2. S/I And SNR Are Not "Interchangeable"	16
3. de La Chapelle Does Not Disclose SNR Measurements.....	17
B. Claims 1 and 13: de La Chapelle Does Not Disclose Capacity Estimates or a User Capacity Matrix	18
1. de La Chapelle Does Not Calculate "Capacity" Estimates	19
2. de La Chapelle's One-Dimensional Measurements Are Not A "Matrix"	22

Patent Owner's Preliminary Response

3.	Petitioner's Expert's Conclusory Testimony Cannot Fill These Fundamental Gaps	23
C.	Petitioner's "Equivalence" Argument Is an Improper Inherency Theory	25
1.	Petitioner's Inherency Arguments Are Based on Speculation	26
2.	Expert's Inherency Arguments Are Conclusory	28
3.	Petitioner's "Equivalence" Allegations Are Backdoor Obviousness Arguments	30
D.	Claim 13: de La Chapelle Does Not Disclose a System Configured to Retrieve A Forward-Link User Capacity Matrix Or A Return-Link User Capacity Matrix	32
1.	Petitioner Ignores the Return-Link Requirement and Offers Only Conjecture	32
2.	Even If Only Forward-Link Functionality Were Required, The Petition Still Fails	33
E.	Claims 1 and 13: de La Chapelle Does Not Disclose Commanding Both the Directional Antenna and Transceiver	35
VII.	GROUND 2: THE CHALLENGED CLAIMS ARE NOT OBVIOUS OVER DE LA CHAPELLE AND JALALI	37
A.	A POSITA Would Not Be Motivated To Combine de La Chapelle And Jalali.....	39
B.	Claim 1: Jalali Does Not Disclose a Forward-Link User Capacity Matrix or Capacity Estimates	45
C.	Claim 7: The Combination Of de La Chapelle And Jalali Does Not Render Obvious Claim 7	50
1.	Neither de La Chapelle Nor Jalali Disclose Reverse-Link Noise Estimates	51

Patent Owner's Preliminary Response

2.	Neither de La Chapelle Nor Jalali Disclose A Reverse-Link Noise Matrix.....	52
3.	Neither de La Chapelle Nor Jalali Disclose Using A Matrix To Select Channels Across Ground Stations.....	53
D.	Claim 13: The Combination of de La Chapelle And Jalali Do Not Render Obvious The Remaining Claims.....	55
VIII.	GROUND 3: THE COMBINATION OF DE LA CHAPELLE, JALALI, AND NELSON DOES NOT RENDER CLAIMS 5 AND 16 OBVIOUS	56
A.	A POSITA Would Not Be Motivated To Combine Nelson With de La Chapelle And Jalali	56
B.	Nelson's Single Reference To An "Out-of-Band Protocol" Does Not Render Obvious User Capacity Estimates	58
IX.	GROUND 4: THE COMBINATION OF DE LA CHAPELLE, JALALI, NELSON, AND MCGUFFIN DOES NOT RENDER THE CLAIMS OBVIOUS	60
X.	CONCLUSION	62

EXHIBIT LIST

No.	Exhibit
2001	Declaration of Paul Min, Ph.D.
2002	<i>Curriculum vitae</i> of Paul Min, Ph.D.
2003	“Adaptive Signal Processing in Wireless Communications” by M. Ibnkahla, CRC Press, 2009
2004	“Characterization of Ultra-Wide Bandwidth Wireless Indoor Channels: A Communication-Theoretic View,” by M.Z. Win, IEEE Journal on Selected Areas in Communications, Vol. 20, No. 9, December 2002
2005	Wireless Communications Principle and Practice, by T. Rappaport, Prentice Hall, 2002
2006	“Digital and Analog Communication Systems,” by Leon W. Couch, II, Eighth Edition
2007	“A Survey on the Successive Interference Cancellation Performance for Single-Antenna and Multiple-Antenna OFDM Systems,” by N. Miridakis, IEEE Communications Survey & Tutorials, Vol. 15, No. 1, First Quarter 2013
2008	“An Overview of Using Directional Antennas in Wireless Networks,” by H. N. Dai et. al., International Journal of Communication Systems, 2013
2009	“Antennas and Wave Propagation,” by A. R. Harish, et. al, Oxford University Press, 2007
2010	“Advanced Engineering Mathematics” by Erwin Kreyszig

TABLE OF AUTHORITIES

	<u>Page</u>
<u>Cases</u>	
<i>ActiveVideo Networks, Inc. v. Verizon Commc'ns, Inc.</i> , 694 F.3d 1312 (Fed. Cir. 2012).....	16
<i>Apple Inc. v. MPH Technologies Oy</i> , 28 F.4th 254 (Fed. Cir. 2022).....	29, 30, 34
<i>Arendi S.A.R.L. v. Apple Inc.</i> , 832 F.3d 1355 (Fed. Cir. 2016).....	58
<i>Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.</i> , 776 F.2d 281 (Fed. Cir. 1985).....	40
<i>ATEN Int'l Co., Ltd. v. Uniclass Tech. Co., Ltd.</i> , 932 F.3d 1364 (Fed. Cir. 2019).....	17, 25, 30, 35
<i>Belden Inc. v. Berk-Tek LLC</i> , 805 F.3d 1064 (Fed. Cir. 2015).....	43
<i>Carella v. Starlight Archery & Pro Line Co.</i> , 804 F.2d 135 (Fed. Cir. 1986).....	40
<i>Cargill, Inc. v. Bunge Lodders Croklaan Usa, LLC</i> , IPR2024-01360, Paper 18 (PTAB Apr. 29, 2025).....	43, 44
<i>Cohesive Techs., Inc. v. Waters Corp.</i> , 543 F.3d 1351 (Fed. Cir. 2008).....	31
<i>Continental Can Co. v. Monsanto Co.</i> , 948 F.2d 1264 (Fed. Cir. 1991).....	27, 28
<i>Endo Pharm. Solutions, Inc. v. Custopharm Inc.</i> , 894 F.3d 1374 (Fed. Cir. 2018).....	29
<i>Fantasia Trading LLC v. Cognipower, LLC</i> , IPR2021-00071, Paper 55, 32 (PTAB May 11, 2022), <i>aff'd</i> , No. 2022-2008, 2024 WL 503779 (Fed. Cir. Feb. 9, 2024).....	32

Patent Owner's Preliminary Response

<i>Fantasia Trading LLC v. Cognipower, LLC</i> , IPR2021-00071, Paper 55 (PTAB May 11, 2022), <i>aff'd</i> , No. 2022-2008, 2024 WL 503779 (Fed. Cir. Feb. 9, 2024).....	43
<i>Hangzhou Chic Intelligent Tech. Co., Ltd. v. Chen</i> , IPR2016-01778, Paper 8, 8 (PTAB Mar. 16, 2017).....	30, 40
<i>Helmsderfer v. Bobrick Washroom Equip., Inc.</i> , 527 F.3d 1379 (Fed. Cir. 2008).....	17
<i>Icon Health and Fitness, Inc. v. Strava, Inc.</i> , 849 F.3d 1034 (Fec. Cir. 2017)	30, 34
<i>InTouch Technologies, Inc. v. VGO Communications, Inc.</i> , 751 F.3d 1327 (Fed. Cir. 2014).....	43, 62
<i>Jiangsu Sainty Sumex Tools Corp. Ltd. v. Milwaukee Elec. Tool Corp.</i> , IPR2021-00373, Paper 19, 26 (PTAB July 6, 2021).....	25
<i>KSR Intern. Co. v. Teleflex Inc.</i> , 550 U.S. 398 (2007).....	44, 55, 57
<i>In re Magnum Oil Tools Int'l, Ltd.</i> , 829 F.3d 1364 (Fed. Cir. 2016).....	44
<i>Metalcraft of Mayville, Inc. v. Toro Co.</i> , 848 F.3d 1358 (Fed. Cir. 2017).....	44
<i>Net MoneyIN, Inc. v. VeriSign, Inc.</i> , 545 F.3d 1359 (Fed. Cir. 2008).....	31
<i>Nintendo Co. v. Genuine Enabling Tech LLC</i> , IPR2018-00543, Paper 7 (PTAB Aug. 6, 2018)	16, 29
<i>Palo Alto Networks, Inc. v. Centripetal Networks, LLC</i> , 122 F.4th 1378 (Fed. Cir. 2024).....	44
<i>PAR Pharm., Inc. v. TWI Pharm., Inc.</i> , 773 F.3d 1186 (Fed. Cir. 2014).....	27, 34, 35
<i>Personal Web Techs., LLC v. Apple, Inc.</i> , 848 F.3d 987 (Fed. Cir. 2017).....	57

<i>Phillips v. AWH Corp.</i> , 415 F.3d 1303 (Fed. Cir. 2005).....	12
<i>In re Robertson</i> , 169 F.3d 743 (Fed. Cir. 1999).....	27, 35
<i>Scripps Clinic & Research Foundation v. Genentech, Inc.</i> , 927 F.2d 1565 (Fed. Cir. 1991).....	25, 38
<i>TQ Delta, LLC v. CISCO Sys., Inc.</i> , 942 F.3d 1352 (Fed. Cir. 2019).....	30, 36
<i>Upjohn Co. v. Mova Pharm. Corp.</i> , 225 F.3d 1306 (Fed. Cir. 2000).....	40
<i>Vanguard Products Group, Inc. v. Invue Sec. Products Inc.</i> , IPR2020-00014, Paper 8 (PTAB Apr. 1, 2020).....	29
<i>Virtek Vision Int’l ULC v. Assembly Guidance Sys., Inc.</i> , 97 F.4th 882 (Fed. Cir. 2024).....	45
<i>Whatfix Inc. v. Walkme Ltd.</i> , IPR2023-01379, Paper 36 (PTAB Mar. 18, 2025).....	28
<i>Xerox Corp. v. Bytemark, Inc.</i> , IPR2022-00624, Paper 9 (PTAB August 24, 2022).....	39, 58, 61

Statutes

35 U.S.C. §102	31, 34
35 U.S.C. §103	32

Regulations

37 C.F.R. §42.65.....	16, 29, 34, 35, 39
37 C.F.R. §42.100.....	12

I. INTRODUCTION

Gogo Business Aviation LLC (“Patent Owner” or “Gogo”) is the trusted pioneer of inflight WiFi connectivity. For over 30 years, Gogo has been at the forefront of aviation communications technology—starting from a napkin sketch and evolving into a household name for inflight Wi-Fi. Gogo’s journey began in 1997 as Aircell, providing early satellite phone services, and continued with its groundbreaking launch of inflight Wi-Fi using licensed spectrum in 2008. In the years that followed, Gogo’s innovation trajectory transformed the aviation industry, culminating in its AVANCE systems, software-upgradable 4G solutions, and its announced next-generation Gogo 5G designed to bring customers seamless future-ready upgrades.

Gogo’s U.S. Patent No. 9,954,600 (the “’600 Patent”) is a key part of that history of innovation. The ’600 Patent solves a critical problem for inflight WiFi connectivity: the scarcity of allocated RF spectrum forces air-to-ground (ATG) communication systems to use already-allocated or unlicensed frequency bands. None of the Petition’s prior art relates to the same problem, nor does any of the prior art come close to providing an invalidating disclosure.

The Petition's flaws are pervasive and are all grounded in incorrect and conclusory expert testimony, without which the asserted Grounds fall apart:

- **Ground 1** asserts that de La Chapelle anticipates the challenged claims. But de La Chapelle does not disclose numerous critical claim elements, including any form of a “forward-link user capacity matrix.” Nor does de La Chapelle equate signal-to-interference ratio (S/I) with signal-to-noise ratio (SNR) in a manner that would meet the claims or address how a POSITA would understand those terms—they are fundamentally different. SmartSky's theory reduces to an improper inherency argument and an impermissible assumption of equivalence, unsupported by evidence.
- **Ground 2** contends that the combination of de La Chapelle and Jalali renders the claims obvious (the Petition presents de La Chapelle as the primary reference, *see* Pet. 1, 25-52). But the Petition identifies no plausible motivation to combine these fundamentally different references, does not identify anything in Jalali remedying the deficiencies of de La Chapelle's disclosures, such as its failure to teach a forward-link user capacity matrix based on calculated user capacity estimates.

- **Grounds 3 and 4** merely layer additional references (Nelson and McGuffin) onto the defective combinations without addressing the core deficiencies of Grounds 1 and 2, which are fatal to all Grounds. The Petition offers no coherent rationale for why a skilled artisan would combine these disparate teachings, much less a rationale that would yield the claimed inventions.

Across all grounds, SmartSky's arguments rest on *ipse dixit* conclusions of their expert, Dr. Hayes, rather than technical reasoning or evidence. Dr. Hayes merely parrots the Petitioner's assertions without supplying detailed analysis or any explanation of any motivation to combine or reasonable expectation of success. As a result, the Petition fails to establish unpatentability of any challenged claim, and the Board should deny institution.

For all these reasons, as well as those further discussed below, Petitioner fails to meet its burden, and the Board should uphold the challenged claims.

II. OVERVIEW OF THE '600 PATENT

U.S. Patent No. 9,954,600 (the "'600 Patent"), titled "Servicing Cell Selection in Air to Ground Communication Systems," issued on April 24, 2018. Ex. 1001. The '600 Patent describes systems and methods for

improving aircraft communications by dynamically selecting the best available forward link to maximize throughput, particularly in environments with high radio frequency (RF) noise and interference. Ex. 1001, 1:15-20; Ex. 2001, ¶¶56-57.

The '600 Patent identifies a critical problem: the scarcity of allocated RF spectrum forces ATG communication systems to use already-allocated or unlicensed frequency bands, such as the 2.4 GHz range, where RF noise levels have risen substantially over time, leading to significant degradation in link quality and available bandwidth. Ex. 1001, 1:23-40; Ex. 2001, ¶57. Conventional systems that statically assigned serving cells based on instantaneous signal strength or proximity were unable to maintain consistent and reliable data rates in these increasingly noisy environments. Ex. 1001, 1:40-57; Ex. 2001, ¶57.

The '600 Patent proposes an innovative solution to these challenges, embodied in its claims: rather than relying on static measurements, the system dynamically evaluates candidate forward links based on calculated user capacity estimates. Ex. 1001, 4:3-65; Ex. 2001, ¶58. These capacity estimates are based in part on measured “signal-to-noise ratio (SNR)” values for each forward link. Ex. 1001, 1:65-2:15; 5:8-15; Ex. 2001, ¶58.

The user capacity estimates are organized into a “forward-link user capacity matrix,” and a “return-link user capacity matrix.” The forward-link user capacity matrix allows the system to dynamically select the optimal forward link based on predicted throughput rather than instantaneous metrics alone. Ex. 1001, Abstract, 9:37-56; Ex. 2001, ¶59. In contrast, the return-link user capacity matrix organizes noise power measurements taken at different azimuths and elevations to characterize the reverse communication path from the aircraft to ground stations. This matrix helps identify ground stations with favorable reception characteristics for aircraft transmissions, as illustrated in Figures 7 and 8 of the patent. Ex. 1001, 10:29-55, Figs. 7, 8; Ex. 2001, ¶59. This matrix-driven selection approach enables the system to account for multiple candidates and intelligently choose the link offering the highest user capacity in real time. Ex. 1001, 5:8-15; Ex. 2001, ¶59.

Additionally, the '600 Patent discloses that user capacity estimates may be averaged over time using both a “short-term average value” and a “long-term average value,” enabling the system to adapt to transient variations in interference and signal quality. Ex. 1001, 4:60-5:7; Ex. 2001, ¶60. The system can also select between forward-link and return-link user capacity matrices, depending on which link offers better performance under the conditions. Ex. 1001, 8:6-20; Ex. 2001, ¶60.

Through this dynamic, predictive, matrix-based selection mechanism, the '600 Patent provides a significant advance over prior ATG communication systems, enhancing connection stability, maximizing bandwidth, and reducing latency even in noisy RF environments. Ex. 1001, 5:8-15; Ex. 2001, ¶61.

III. OVERVIEW OF CERTAIN CITED ART

The Petition challenges claims 1-19 of the '600 Patent on four asserted grounds. Ground 1 asserts that claims 1-4, 6, 13-15, 17, and 19 are anticipated by de La Chapelle (Ex. 1005). Ground 2 asserts that claims 1-4, 6-15, and 17-19 are rendered obvious by the combination of de La Chapelle and Jalali (Ex. 1006). Ground 3 asserts that claims 5 and 16 are rendered obvious by the combination of de La Chapelle, Jalali, and Nelson (Ex. 1007). Ground 4 asserts that claims 1-19 are rendered obvious by the combination of de La Chapelle, Jalali, Nelson, and McGuffin (Ex. 1008).

Below are short summaries of the references relied on for the challenged claims.

A. de La Chapelle (Ex. 1005)

de La Chapelle, titled "Soft Handoff Method and Apparatus for Mobile Vehicles Using Directional Antennas," issued April 5, 2016. de La Chapelle is the primary reference in all four asserted Grounds.

de La Chapelle describes a system for managing soft handoffs between base stations for mobile vehicles equipped with directional antennas. Ex. 1005, 2:9-54; Ex. 2001, ¶64. The system monitors signal **strength** and **quality** from multiple candidate base stations and selects a new serving base station when signal conditions indicate a better alternative. Ex. 1005, 2:29-60, 16:42-50; Ex. 2001, ¶64. Handoff decisions are made based on current received signal measurements, with particular focus on managing antenna directionality during transitions between cells to maintain strong link quality. Ex. 1005, 2:29-60, 7:31-66; Ex. 2001, ¶64.

de La Chapelle's approach focuses on ensuring service continuity through directional antenna control and **signal-to-interference (S/I)** based comparisons. Ex. 1005, 8:57-9:48; Ex. 2001, ¶65. Despite Petitioner's reliance on this reference as disclosing forward-link user capacity estimates and matrices, de La Chapelle never calculates user capacity estimates or expected data rates based on SNR measurements. Ex. 2001, ¶65. Furthermore, while Petitioner claims de La Chapelle inherently discloses a user capacity matrix, the reference contains no suggestion of organizing quality measurements into any matrix structure for throughput optimization or comparison. Ex. 2001, ¶65. Petitioner's anticipation theory relies on equating S/I with SNR and "quality" with "capacity," but de La Chapelle makes no

such equivalence and lacks any teaching of the specific capacity-based matrix approach claimed in the '600 patent. Pet. 4-5; *see* Ex. 2001, ¶65.

B. Jalali (Ex. 1006)

Jalali, titled “High Data Rate Aircraft to Ground Communication Antenna System,” was published July 17, 2014. Jalali is a secondary reference cited in Grounds 2-4 for SINR measurements and beam selection, but lacks the claimed capacity estimates and matrices.

Jalali describes an antenna system designed to facilitate high data rate communication links between an aircraft and ground stations. Ex. 1006, [0008]-[0012]; Ex. 2001, ¶67. The system uses a multi-beam antenna on the aircraft and directional ground station antennas to maintain communication links as the aircraft moves through different coverage areas. Ex. 1006, [0027]-[0028]; Ex. 2001, ¶67. Jalali explains that the aircraft system selects among available beams based on the relative signal **strength** to different ground station sectors. Ex. 1006, [0008]-[0011], [0059], [0064]; Ex. 2001, ¶68.

While Petitioner relies on Jalali to supplement de La Chapelle's deficiencies regarding capacity calculations and matrices, Jalali itself never calculates forward-link user capacity estimates based on SNR measurements. Ex. 2001, ¶68. The reference merely ranks pilot signals based on signal strength and uses **SINR feedback** to adjust beam direction—it does not

transform these measurements into capacity estimates or organize them into a matrix structure as required by the claims. Ex. 1006, [0059], [0067]; Ex. 2001, ¶68. Petitioner's obviousness theory depends on Jalali teaching capabilities it does not possess—nowhere does Jalali suggest calculating expected throughput across candidate links or using a matrix-based selection approach. Pet. 5; Ex. 2001, ¶68.

C. Nelson (Ex. 1007)

Nelson, titled "Aircraft Data Communications Services for Users," issued February 13, 2007. Nelson is a secondary reference used in Grounds 3 and 4 only for dependent claims 5 and 16, which require transmitting capacity matrices through an out-of-band channel.

Nelson describes systems for providing wireless data communication services to passengers aboard an aircraft. Ex. 1007, Abstract, 3:30-37; Ex. 2001, ¶70. Petitioner relies on Nelson solely for its brief mention of an "out-of-band protocol," but this reference falls far short of teaching the claimed use of an out-of-band channel for transmitting user capacity matrices. Ex. 1007, 10:23-27; Ex. 2001, ¶71. Nelson's *single reference to an out-of-band protocol* occurs in a specialized modem negotiation context and provides no architectural disclosure of using out-of-band channels for transmitting system management data like capacity matrices. Ex. 1007, 10:9-11:14; Ex. 2001, ¶71.

Critically, Nelson does not mention capacity estimates, SNR measurements, or matrices of any kind, making it impossible for Nelson to teach or suggest transmitting such data via an out-of-band channel as claimed. Ex. 2001, ¶71.

D. McGuffin (Ex. 1008)

McGuffin, titled “Method and System for Datalink Ground Station Selection,” published July 14, 2010. McGuffin is a secondary reference used only in Ground 4 for all challenged claims, specifically cited for its ***data tables*** that Petitioner argues could be modified to store capacity estimates.

McGuffin describes systems for selecting ground stations for communication with aircraft. Ex. 1008, Abstract; Ex. 2001, ¶73. McGuffin discloses that an aircraft can evaluate candidate ground stations based on metrics such as signal strength, data traffic loading, and geographic proximity. Ex. 1008, [0005], [0008], [0012]; Ex. 2001, ¶73. The system may collect signal strength and loading information from multiple ground stations and select the ground station expected to provide the best communication performance. Ex. 1008, [0008], [0034]-[0038]; Ex. 2001, ¶73.

Petitioner's reliance on McGuffin's data tables as a foundation for the claimed capacity matrices is misplaced—McGuffin's tables store only basic signal strength values and message traffic density, not calculated capacity estimates based on SNR as required by the claims. Ex. 1008, [0034]-[0038];

Ex. 2001, ¶74. Petitioner concedes this deficiency by arguing McGuffin's tables "could easily be augmented" with capacity data, tacitly admitting McGuffin does not actually disclose the claimed matrix structure or contents. Pet. 56; Ex. 2001, ¶74. Furthermore, McGuffin's selection method uses simple signal strength comparisons rather than the sophisticated capacity-based selection method of the '600 patent that maximizes throughput in high-interference environments. Ex. 1008, [0034]-[0038]; Ex. 2001, ¶74.

IV. LEVEL OF ORDINARY SKILL IN THE ART

For purposes of this preliminary response, Patent Owner applies Petitioner's proposed level of skill. Pet. 7; Ex. 2001, ¶¶10-14. Patent Owner's expert, Dr. Paul Min, was a POSITA under Petitioner's definition at the time of the '600 patent. Ex. 2001, ¶¶1-9; *see also* Ex. 2002.

V. CLAIM CONSTRUCTION

In an *inter partes* review, claim terms receive their plain and ordinary meaning in light of the specification of the patent in which they appear, following the same standard used in district court. 37 C.F.R. § 42.100(b); *see Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005). Petitioner states that no constructions are necessary. Pet. 3. Patent Owner agrees that solely for the purposes of determining institution, the Board need not construe any claim

terms to resolve any current dispute between the parties. Ex. 2001, ¶¶20-22, 26.

VI. GROUND 1: DE LA CHAPELLE DOES NOT ANTICIPATE ANY OF THE CHALLENGED CLAIMS

A. Claims 1 and 13: de La Chapelle's Use of S/I Does Not Disclose Signal-to-Noise Ratio

First, claim 1 of the '600 patent expressly requires the measurement of a **signal-to-noise ratio** ("SNR") for two distinct communication channels. Specifically, the claim recites:

"command a directional antenna installed on the aircraft and a transceiver disposed within the aircraft to measure a first **signal-to-noise ratio** of a first communication channel..."

"command the directional antenna and the transceiver to measure a second **signal-to-noise ratio** of a second communication channel..."

Ex. 1001, 15:59-67. The Petition does not identify any portion of de La Chapelle that discloses the use of SNR in its handoff logic or selection process. Instead, it argues that de La Chapelle's use of a **signal-to-interference ratio** (S/I) is "interchangeable" with SNR, based on the mere fact that both terms appear in the reference. See Pet. 10; Ex. 1002 ¶46. But a person of ordinary skill in the art (POSITA) would understand these terms are not equivalent. Ex. 2001, ¶¶75-84. This fundamental technical error undermines Petitioner's entire anticipation theory.

1. The Technical Distinction Between S/I and SNR Is Well-Established

The '600 patent specification distinguishes between noise and interference, noting that “radio frequency spectrum surveys show that RF noise and interference sources have risen over time” and that “such high levels of interference have the ability to significantly degrade the quality and available data bandwidth of the radio link.” Ex. 1001, 1:28-36. In doing so, the patent treats noise and interference as distinct sources of signal degradation. Moreover, in other instances, the patent expressly describes a “noise-plus-interference” ratio, called SINR, further confirming that the '600 patent distinguishes between noise and interference. *See, e.g.*, Ex. 1001, 5:1-2; Ex. 2001, ¶¶83-84. The claims then specifically require measurement of a **signal-to-noise ratio**, not signal-to-interference, confirming that the applicants chose to focus on **noise** and not **interference** for the claimed measurements. Ex. 2001, ¶¶83-84.

Signal-to-interference ratio and signal-to-noise ratio represent fundamentally different measurements that serve different purposes in communication system design. Ex. 2001, ¶¶37-50, 77-79. SNR compares the desired signal power to the background noise power, while S/I compares the desired signal power to interfering signals from other transmitters. Ex. 2001,

¶¶77-79. These measurements capture different aspects of channel quality and lead to different optimization strategies. *Id.*

That distinction is well-understood in wireless communications. Ex. 2001, ¶¶37-50. As used in the art, “noise” refers to any source of unwanted modifications to a signal during transmission, including baseline background power levels from thermal and environmental sources which can vary based on the communication environment (i.e., a “noisy” signal), whereas “interference” refers to competing transmissions from nearby systems or devices (i.e., “interfering” signals). Ex. 2001, ¶78. Noise can be reduced through signal processing to recover the original signal from the one corrupted by noise. Ex. 2001, ¶78. Interference, on the other hand, requires the use of interference cancellation or avoidance techniques. Ex. 2001, ¶78. Interference can therefore contribute to a noisy signal, but noise and interference are not interchangeable as the Petition argues. Ex. 2001, ¶80-82.

A person of ordinary skill in the art would understand that signal-to-interference ratio and signal-to-noise ratio are fundamentally different measurements that cannot be used interchangeably. Ex. 2001, ¶37-50, 77-79. As explained in the authoritative communications textbook by Leon W. Couch, channel capacity is determined by the signal-to-noise ratio and channel bandwidth according to the fundamental equation: $C = B \log_2 \left(1 + \frac{S}{N} \right)$,

where C is channel capacity, B is channel bandwidth, and S/N is the signal-to-noise power ratio. Ex. 2006 at 19; Ex. 2001, ¶¶33-36.

de La Chapelle does not disclose SNR as part of its handoff logic. Ex. 2001, ¶79. Instead, de La Chapelle teaches relying exclusively on S/I ratio as the controlling metric. Ex. 2001, ¶79. Throughout, de La Chapelle teaches periodically computing a “best Signal/**Interference** (S/I) ratio” to determine when to initiate a handoff and contrasts this method with simpler proximity-based algorithms. Ex. 1005, 8:57-9:47; Ex. 2001, ¶¶76, 79. The distinction is particularly important in de La Chapelle’s context. The reference explicitly defines its approach: “ S ” is the signal power from the selected BTS targeted by the main lobe, and “ I ” is the aggregate interference power from all other BTSs received on the sidelobes or side of the main lobe. Ex. 1005, 9:8-27; Ex. 2001, ¶79. This approach fundamentally differs from measuring noise within a single communication channel as the claims require. As contemplated by de La Chapelle, the aggregate interference power, “ I ,” is measured on the sidelobes or side of the main lobe, which are spatially separate from the main lobe. Since the aggregate interference power can be separately measured from the signal, de La Chapelle is considering the sidelobes or side of the main lobe as not part of the same communication channel comprising the main lobe,

making de La Chapelle's measurements categorically different from the claimed SNR measurements. Ex. 2001, ¶79.

2. S/I And SNR Are Not "Interchangeable"

The Petition's argument that S/I and SNR are "interchangeable" lacks any technical basis, other than the conclusory testimony of its expert Dr. Hayes. Ex. 1002, ¶46; Ex. 2001, ¶¶80-82. That conclusory testimony does not suffice to carry Petitioner's burden. *See, e.g., Nintendo Co. v. Genuine Enabling Tech LLC*, IPR2018-00543, Paper 7 at 24 (PTAB Aug. 6, 2018) (denying institution because petitioners' "only support [was] a conclusory statement [from their expert] without any evidentiary support, which has no weight"); *ActiveVideo Networks, Inc. v. Verizon Commc'ns, Inc.*, 694 F.3d 1312, 1327 (Fed. Cir. 2012); 37 C.F.R. §42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.").

Dr. Hayes provides no industry standards, technical literature, or factual support for his equivalency claim. He simply asserts that a POSITA would find S/I and SNR interchangeable without explaining the technical basis for this conclusion. Ex. 1002, ¶46. This type of *ipse dixit* assertion is precisely what the Federal Circuit has rejected. *See ATEN Int'l Co., Ltd. v. Uniclass Tech. Co., Ltd.*, 932 F.3d 1364, 1368 (Fed. Cir. 2019) ("Testimony concerning

anticipation must typically explain in detail how each claim element is disclosed in the prior art reference. The testimony is insufficient if it is merely conclusory.”).

Furthermore, the fact that both S/I and SNR appear somewhere in the same document demonstrate their interchangeability; to the contrary, it only reinforces that the terms were used differently and deliberately. *Helmsderfer v. Bobrick Washroom Equip., Inc.*, 527 F.3d 1379, 1382 (Fed. Cir. 2008) (“[D]ifferent claim terms are presumed to have different meanings.”); Ex. 2001, ¶¶83-84. There is no disclosure in de La Chapelle of measuring SNR, using it in any decision-making, or treating it as a stand-in for S/I. Ex. 2001, ¶79.

3. de La Chapelle Does Not Disclose SNR Measurements

de La Chapelle does not disclose SNR as part of its handoff logic. Ex. 2001, ¶79. Instead, de La Chapelle teaches relying exclusively on S/I ratio as the controlling metric. Throughout, de La Chapelle teaches periodically computing a “best Signal/*Interference* (S/I) ratio” to determine when to initiate a handoff and contrasts this method with simpler proximity-based algorithms. Ex. 1005, 8:57-9:47; Ex. 2001, ¶76.

The *only* mention of SNR in de La Chapelle appears once in a dependent claim—claim 2—and not in connection with any described handoff

procedure. Ex. 1005 at Claim 2 (“The method of claim 1. further comprising calculating one or more values of signal-to-noise ratio (SNR) for signals received by the first communication lobe, wherein fading out the first communication lobe is based on the calculated SNR values relative to a predetermined threshold.”); Ex. 2001, ¶79.

There is no disclosure in de La Chapelle of measuring SNR, using it in any decision-making, or treating it as equivalent to S/I. Ex. 2001, ¶79. Accordingly, de La Chapelle does not disclose or render obvious the SNR measurement limitations of claims 1 and 13.

B. Claims 1 and 13: de La Chapelle Does Not Disclose Capacity Estimates or a User Capacity Matrix

Claim 1 of the '600 patent requires that the computer processor:

calculate a first **forward-link user capacity estimate** using the first signal-to-noise ratio of the first communication channel

calculate a second **forward-link user capacity estimate** using the second signal-to-noise ratio of the second communication channel, and

calculate a **forward-link user capacity matrix** using the first forward-link user capacity estimate and the second forward-link user capacity estimate.

Ex. 1001, 16:4-12. Claim 13 similarly recites a processor “configured to: retrieve at least one of: (i) a **forward-link user capacity matrix** comprising a plurality of **forward-link user capacity estimates** each associated with a

respective signal-to-noise ratio measurement ... [or] (ii) a **return-link user capacity matrix** comprising a plurality of **return-link user capacity estimates** each associated with a respective noise power level.” Ex. 1001, 18:42-52.

1. **de La Chapelle Does Not Calculate “Capacity” Estimates**

The Petition argues that de La Chapelle discloses these limitations because its use of a “best S/I” algorithm is equivalent to identifying the cell with “best capacity.” See Pet. 11-12. But that mischaracterizes both the reference and the claims. Even assuming de La Chapelle teaches using SNR, de La Chapelle does not calculate or even mention a **capacity** estimate, and it makes no reference to assembling such estimates into a **matrix**. Ex. 2001, ¶¶85-90.

de La Chapelle does not disclose calculating user capacity estimates. Ex. 2001, ¶¶86-88. Instead, the reference focuses on “quality” comparisons for handoff management. Ex. 1005, 4:20-27, 16:12-42; Ex. 2001, ¶87. The terms ‘signal quality’ and ‘channel capacity’ represent fundamentally different concepts in wireless communications. Ex. 2001, ¶¶28-36.

The fundamental distinction is that signal quality focuses on the characteristics of the received signal at a particular moment, while channel capacity represents the maximum rate of information transfer that can be

achieved over a communication channel over time. Ex. 2001, ¶¶28-36, 87-88.

The quality of a signal is the same whether this signal spans a short time period or a longer time period, whereas the capacity is tightly related to the time—how many bits can be sent reliably over a unit time. Ex. 2001, ¶¶28-36, 87-88.

A true user capacity estimate requires a rigorous mathematical calculation that accounts for both signal-to-noise ratio and available bandwidth. As the authoritative Couch textbook demonstrates, channel capacity is calculated using the fundamental equation $C = B \log_2 \left(1 + \frac{S}{N} \right)$,

where the capacity estimate depends on both the signal-to-noise ratio and the channel bandwidth. Ex. 2006 at 19; Ex. 2001, ¶¶87-88. This fundamental relationship shows that capacity estimation requires specific knowledge of the signal-to-noise ratio and bandwidth, not merely qualitative assessments of “signal quality.” Ex. 2001, ¶¶28-36, 87-88. de La Chapelle makes no such calculation and provides no method for determining actual user capacity from its S/I measurements. Ex. 2001, ¶86. While the word “estimate” appears elsewhere in de La Chapelle, it is never used in connection with any capacity estimate or capacity calculation. Further, de La Chapelle never uses S/I ratio to calculate a capacity value of any kind. Ex. 2001, ¶79.

Patent Owner's Preliminary Response

To the extent de La Chapelle refers to link “quality,” it does so only in vague, relative terms based on signal strength and heading, and provides no teaching equating quality to the claimed capacity. For example, in the embodiment shown in Figures 15 and 16, on which the Petitioner relies, the system periodically adjusts beam pointing to maximize the “quality of the link” with the serving base station. Ex. 1005, 16:12-64; Pet. 12. The algorithm scans for RF signals from neighboring base stations and, based on signal strength and predicted direction of travel, selects the BTS that is expected to offer a “**higher quality link**.” Ex. 1005, 16:28-50. Nowhere does de La Chapelle suggest that “quality” is measured or calculated using SNR, let alone converted into a throughput or data rate estimate (i.e., capacity). Ex. 2001, ¶¶79, 86-88.

The '600 patent, by contrast, describes capacity with mathematical specificity. It teaches calculating expected data rates based on measured signal-to-noise values across multiple sub-bands and using those values to populate a forward-link user capacity matrix:

The [expected forward-link data rate,] FR, is a single metric that accounts for the SINR and **the total available bandwidth**, this number can be used as the figure of merit to identify the serving cell that can provide the highest [forward link] **throughput**.

Ex. 1001, 9:51-54; Ex. 2001, ¶¶58-61, 90. That is the type of **capacity estimate** the claims require—a quantifiable value derived from measured

noise-based metrics and used to compare candidate cells. de La Chapelle does not perform such a calculation. Ex. 2001, ¶¶76-79. Thus, even if S/I could substitute for SNR (and it cannot), de La Chapelle still does not teach using S/I to calculate a data rate or any other capacity figure. Ex. 2001, ¶88.

2. de La Chapelle's One-Dimensional Measurements Are Not A "Matrix"

Even more fundamentally, de La Chapelle's measurements have only one-dimensional indexing and therefore cannot constitute the required matrix structure. A matrix, as illustrated in Figure 5 of the '600 patent, requires two-dimensional indexing with both rows and columns that allow systematic organization and comparison of capacity estimates across multiple dimensions. Ex. 1001, Fig. 5; Ex. 2001, ¶89.

The matrix structure claimed in the '600 patent serves a specific technical purpose in enabling efficient comparison and selection among multiple candidates based on predicted capacity. Ex. 2001, ¶¶59-61, 90. A matrix requires two-dimensional indexing with both rows and columns that allow systematic organization and comparison of capacity estimates across multiple dimensions, as illustrated in Figure 5 of the '600 patent. Ex. 2001, ¶¶51-55, 90.

de La Chapelle's S/I measurements are indexed only by base transceiver station (BTS) number, creating at most a simple one-dimensional

list. Ex. 1005, 9:8-27; Ex. 2001, ¶¶89-90. de La Chapelle's measurements have only one-dimensional indexing (i.e., the BTS number) and therefore cannot constitute the required matrix structure. Ex. 2001, ¶¶89-90. Even if de La Chapelle's S/I measurements could somehow be transformed into signal-to-noise ratios (which they cannot), and even if those ratios could somehow be converted into capacity estimates (which they cannot), the results would still be organized only in a one-dimensional index and could not form the required two-dimensional matrix structure. Ex. 2001, ¶¶89-90.

3. Petitioner's Expert's Conclusory Testimony Cannot Fill These Fundamental Gaps

The Petition's argument boils down to the assertion that because de La Chapelle compares S/I ratios, it must inherently be comparing capacity. *See* Pet. 11-12 ("A POSA would appreciate that Chapelle's teaching the 'best S/I' algorithm, describes a particular way to employ a "best capacity" algorithm or 'best quality' algorithm for BTS selection in handoff."); Ex. 2001, ¶¶80-82. Dr. Hayes similarly asserts that quality parameters are "directly related to channel capacity, and easily substituted for or interchangeable in this context by a POSA." Ex. 1002, ¶66.

Dr. Hayes attempts to bridge these gaps through assertions that de La Chapelle "inherently" employs capacity matrices and that "quality" is equivalent to "capacity." Ex. 1002, ¶66; *but see* Ex. 2001, ¶¶91-92. However,

he provides no technical analysis explaining how signal measurements could be transformed into capacity estimates, no structural description of how one-dimensional data could form a two-dimensional matrix, and no explanation for why “quality” equals “capacity.” Ex. 2001, ¶91. As explained above, the quality of a signal is the same whether this signal spans a short time period or a longer time period, whereas the capacity is tightly related to the time—how many bits can be sent reliably over a unit time. Ex. 2001, ¶¶28-36.

These conclusory assertions cannot bridge the fundamental technical gaps in de La Chapelle's disclosure. Expert testimony cannot substitute for missing disclosures in the prior art. *Jiangsu Sainty Sumex Tools Corp. Ltd. v. Milwaukee Elec. Tool Corp.*, IPR2021-00373, Paper 19, 26 (PTAB July 6, 2021) (“Petitioner's repeated and ubiquitous attempts to fill gaps in the disclosures of the prior art, by reference to the extrinsic opinions of [experts], fall short of meeting the evidentiary threshold necessary to support institution of a trial.”); *see also Scripps Clinic & Research Foundation v. Genentech, Inc.*, 927 F.2d 1565, 1576 (Fed. Cir. 1991) (“The role of extrinsic evidence is to educate the decision-maker to what the reference meant to persons of ordinary skill in the field of the invention, not to fill gaps in the reference.”).

Dr. Hayes provides no calculation method showing how S/I measurements could be transformed into capacity estimates, no technical

explanation for why “quality” equals “capacity,” and no structural description of how one-dimensional data could form a two-dimensional matrix. Ex. 1002, ¶66. His testimony consists entirely of *ipse dixit* assertions without the underlying technical foundation required for expert testimony. See *ATEN Int'l Co., Ltd. v. Uniclass Tech. Co., Ltd.*, 932 F.3d 1364, 1368 (Fed. Cir. 2019) (“Testimony concerning anticipation must typically explain in detail how each claim element is disclosed in the prior art reference. The testimony is insufficient if it is merely conclusory.”) (cleaned up).

Unfortunately for SmartSky, the claims do not recite generic “quality” or “link strength.” Ex. 2001, ¶85. They are more specific—they recite calculation of user capacity estimates based on SNR or noise power, and organization of those estimates into a matrix. Ex. 1001, 16:14-23, 18:44-54; Ex. 2001, ¶90. de La Chapelle contains no such calculations, and no data structure that constitutes or implies a matrix of user capacity estimates. Ex. 2001, ¶90.

Accordingly, the Petition fails to show that de La Chapelle anticipates the capacity estimation and matrix limitations of claims 1 and 13.

C. Petitioner's “Equivalence” Argument Is an Improper Inherency Theory

Next, the Petition fails to identify any express disclosure in de La Chapelle of either a forward-link user capacity matrix or any forward- or

return-link user capacity estimates. Instead, Petitioner relies on two flawed theories: (1) that these features are “inherent” in de La Chapelle’s functionality, and (2) that de La Chapelle’s approach is “equivalent” to the claimed invention. *See* Pet. 13-14. Both theories fail as a matter of law.

1. Petitioner’s Inherency Arguments Are Based on Speculation

Petitioner argues that “[f]or the quality related parameters of Chapelle to be compared for its stated purpose of determining when a higher quality communications link is available, the computing device of Chapelle (i.e., the antenna controller) would ***inherently*** employ a matrix of the quality related parameters in order to perform the task.” Pet. 14. Elsewhere, Petitioner claims that “the best S/I algorithm” disclosed in de La Chapelle would be “***equivalent to***” the capacity-based approach described in the ’600 patent. Pet. 11-13. These assertions—that a POSITA would find the approaches “equivalent,” or that certain data structures or calculations must be “inherent”—fail under established Federal Circuit precedent.

Anticipation requires that each claim limitation be either expressly disclosed or necessarily and inevitably present in the prior art. *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999). Inherency cannot be based on what might be helpful, implied, or theoretically possible—it must be the “natural result” of what is actually taught. *PAR Pharm., Inc. v. TWI Pharm., Inc.*, 773 F.3d

1186, 1194-95 (Fed. Cir. 2014) (“Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.”); *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268 (Fed. Cir. 1991) (“[W]hen the reference is silent about the asserted inherent characteristic . . . evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.”). The Board has consistently applied this strict standard, rejecting inherency arguments where a feature is merely likely or theoretically possible. *E.g.*, *Whatfix Inc. v. Walkme Ltd.*, IPR2023-01379, Paper 36 (PTAB Mar. 18, 2025) (finding “Petitioner and [Petitioner’s expert’s] showing insufficient to meet the high standard of inherency.”).

Nothing in de La Chapelle necessarily requires the formation of a capacity matrix or the calculation of user capacity estimates. The reference describes a handoff algorithm based on S/I measurements, but provides no disclosure—express or inherent—of the sophisticated matrix-based capacity calculation approach claimed in the ’600 patent. Ex. 1005, 8:57-9:47, 16:12-50; Ex. 2001, ¶¶86-88. It is, therefore, not “clear” that capacity matrices are “necessarily present” in de La Chapelle. *See Continental Can*, 948 F.2d at 1268.

2. Expert's Inherency Arguments Are Conclusory

Nor can Petitioner's expert fill in these gaps. Dr. Hayes provides no substantive technical analysis explaining why a matrix structure is necessarily present in de La Chapelle's system. Instead, he merely assumes matrices must exist because comparisons require matrices, without establishing that de La Chapelle performs matrix-based comparisons. Ex. 1002, ¶66. This conclusory testimony is legally insufficient. *See Endo Pharm. Solutions, Inc. v. Custopharm Inc.*, 894 F.3d 1374, 1381 (Fed. Cir. 2018) (requiring more than expert interpretation to establish inherent disclosure).

The Board has consistently rejected expert testimony that lacks factual support. *Nintendo Co. v. Genuine Enabling Tech LLC*, IPR2018-00543, Paper 7, 24 (PTAB Aug. 6, 2018) (denying institution because petitioners' "only support [was] a conclusory statement [from their expert] without any evidentiary support, which has no weight"); *Vanguard Products Group, Inc. v. Invue Sec. Products Inc.*, IPR2020-00014, Paper 8 at 18 (PTAB Apr. 1, 2020) (finding the expert's "supporting testimony is replete with conclusory statements that are insufficient to support a ground of unpatentability based on obviousness"). Under 37 C.F.R. § 42.65(a), "[e]xpert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight."

The Federal Circuit has similarly emphasized that expert testimony must be supported by factual evidence and detailed reasoning. In *Apple Inc. v. MPH Technologies Oy*, 28 F.4th 254 (Fed. Cir. 2022), the Federal Circuit upheld The Board's decision to reject expert testimony that it found to be conclusory and lacking factual support. The expert's use of phrases such as "would naturally have included" and "it would be logical" without underlying evidence was deemed insufficient. *Id.* at 262-63. Similarly, in *Icon Health and Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1045-46 (Fec. Cir. 2017), the court found the Board's adoption of the examiner's conclusory statements, which merely agreed with and incorporated by reference the petitioner's comments, inadequate because it lacked factual findings and explanations. Finally, in *ATEN Int'l Co., Ltd. v. Uniclass Tech. Co., Ltd.*, 932 F.3d 1364, 1368 (Fed. Cir. 2019), the court held that "[t]estimony concerning anticipation must typically explain in detail how each claim element is disclosed in the prior art reference. The testimony is insufficient if it is merely conclusory."

Moreover, Dr. Hayes's testimony simply repeats the Petition's legal arguments rather than providing independent technical analysis. When an expert merely parrots attorney arguments without adding substantive analysis, such testimony carries no evidentiary weight. *TQ Delta, LLC v. CISCO Sys., Inc.*, 942 F.3d 1352, 1358-60 (Fed. Cir. 2019) (rejecting expert testimony that

simply repeats in a conclusory fashion); *Hangzhou Chic Intelligent Tech. Co., Ltd. v. Chen*, IPR2016-01778, Paper 8, 8 (PTAB Mar. 16, 2017) (finding the expert “fails to provide any sufficient explanation, as [his] testimony substantially repeats the arguments in the Petition”).

Here, Dr. Hayes provides no explanation for why de La Chapelle's system would “inherently” use a capacity matrix, offering instead only the bare conclusion that it must exist. Ex. 1002, ¶66. Such conclusory expert testimony cannot bridge the fundamental gaps in prior art disclosure.

3. Petitioner's “Equivalence” Allegations Are Backdoor Obviousness Arguments

Petitioner's repeated claims of “equivalence” between de La Chapelle's quality measurements and the '600 patent's capacity matrices are legally improper. Pet. 11-13, 15. There is no “doctrine of equivalents” in anticipation law. Either a single reference discloses the claimed elements or it does not. *See Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008).

By arguing that de La Chapelle's approach is “equivalent to” the '600 patent's capacity-based selection method, Petitioner is essentially making an obviousness argument in disguise—suggesting that a POSITA would modify de La Chapelle's quality measurements to calculate capacity estimates. Pet. 13-15. But Petitioner fails to satisfy any of the requirements for an obviousness analysis: it offers no motivation to make such a modification, no

reasonable expectation of success, and no explanation of how such a modification would be implemented. This fails to satisfy the requirements for either anticipation or obviousness. *Cohesive Techs., Inc. v. Waters Corp.*, 543 F.3d 1351, 1363 (Fed. Cir. 2008) (“[N]ovelty under 35 U.S.C. §102 and nonobviousness under 35 U.S.C. §103 are separate conditions of patentability.”).

The Board has repeatedly rejected such improper obviousness theories masquerading as anticipation arguments. When a petitioner's motivation to modify a reference consists almost entirely of expert assertions rather than evidence from the reference itself, the analysis is inadequate. *Fantasia Trading LLC v. Cognipower, LLC*, IPR2021-00071, Paper 55, 32 (PTAB May 11, 2022), *aff'd*, No. 2022-2008, 2024 WL 503779 (Fed. Cir. Feb. 9, 2024) (finding that where the Petition provided no “analysis or evidence to support the [expert's] assertion that an ordinarily skilled artisan would have been motivated to use” the prior art's teaching for the claimed purpose, “Petitioner has not proven that an ordinarily skilled artisan would have combined [the references'] teachings”).

The fact that de La Chapelle and the '600 patent may share a general objective—optimizing handoffs for airborne connectivity—does not mean they disclose the same techniques. Ex. 2001, ¶65. Petitioner's logic relies on

impermissible hindsight, assuming that because both references seek to optimize link quality, they must use the same mechanism. Ex. 2001, ¶¶65, 85-88. That is not a proper anticipation analysis.

Because Petitioner fails to identify any express or inherent disclosure of a capacity estimate or capacity matrix in de La Chapelle, its anticipation arguments for claims 1 and 13 fail as a matter of law.

D. Claim 13: de La Chapelle Does Not Disclose a System Configured to Retrieve A Forward-Link User Capacity Matrix Or A Return-Link User Capacity Matrix

Claim 13 is an independent system claim that requires, among other elements already covered above, the ability to retrieve (i) a forward-link user capacity matrix or (ii) a return-link user capacity matrix. Ex. 1001, 18:41-62.

1. Petitioner Ignores the Return-Link Requirement and Offers Only Conjecture

Petitioner makes no attempt to show that de La Chapelle discloses a return-link user capacity matrix. There is no mention in de La Chapelle of return-link signal measurements, noise power levels, azimuth or elevation angles from the aircraft, or any corresponding capacity estimates. Ex. 2001, ¶¶59-61, 65, 85-88.

Instead, Petitioner offers a single sentence of conjecture: it would be “well within the capability of a POSA to perform the same operations described above for the forward-link on the return-link.” Pet. 21. That

statement is wholly unsubstantiated. There is no technical support, no structural explanation, and no cited disclosure in de La Chapelle that even hints at return-link matrix functionality. Ex. 2001, ¶91; *see Apple*, 28 F.4th at 265; *Icon Health*, 849 F.3d at 1048; 37 C.F.R. § 42.65.

A POSITA's theoretical ability to extend the system is irrelevant under § 102, because anticipation requires that the claimed limitation be expressly or inherently disclosed, not that it could be retrofitted into the system by a skilled artisan. *See PAR Pharm.*, 773 F.3d at 1194-95.

2. Even If Only Forward-Link Functionality Were Required, The Petition Still Fails

Even under Petitioner's misreading of the claim—that it is satisfied by a system configured only to retrieve a forward-link matrix—the Petition fails. Petitioner argues that de La Chapelle anticipates claim 13 because it “describes a handover to provide a higher quality communications link” and therefore must “inherently” use a forward-link capacity matrix. Pet. 20-21.

That reasoning is speculative and unsupported. The cited passages in de La Chapelle reference general link quality selection based on signal strength and beam direction—not signal-to-noise ratio, not data rate, and not capacity estimates organized in a matrix. *See* Ex. 1005, 4:11-31, 16:43-50, 9:16-21, 17:48-53.

Petitioner's expert asserts that the system "inherently" uses "a matrix involving the compared forward link collected parameters indicating quality (i.e., signal strength, interference and/or noise), which are also directly related to channel capacity, and easily interchangeable in this context by a POSA." Pet. 21; Ex. 1002, ¶66. This inherency argument fails as a matter of law. Inherency requires that the undisclosed feature be "necessarily present" in the reference, not merely possible or likely. *See PAR Pharm.*, 773 F.3d at 1195-96 ("Inherency... may not be established by probabilities or possibilities."); *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999); *see supra* § VI.C.

The expert's testimony on inherency amounts to nothing more than conclusory assertions without technical explanation. Dr. Hayes provides no explanation for why de La Chapelle's system would "inherently" use a capacity matrix, offering instead only the bare conclusion that it must exist. Ex. 1002, ¶66. Such conclusory expert testimony is entitled to "little or no weight" under 37 C.F.R. § 42.65(a). The Federal Circuit has repeatedly rejected attempts to use expert testimony to fill fundamental gaps in anticipation evidence. *ATEN Int'l Co., Ltd. v. Uniclass Tech. Co., Ltd.*, 932 F.3d 1364, 1368 (Fed. Cir. 2019) ("Testimony concerning anticipation must typically explain in detail how each claim element is disclosed in the prior art reference. The testimony is insufficient if it is merely conclusory.").

Moreover, Dr. Hayes's testimony merely parrots the Petition's assertions without providing independent analysis or technical reasoning. Ex. 1002, ¶¶66. When an expert merely repeats attorney arguments without adding substantive analysis, such testimony carries no evidentiary weight. *TQ Delta, LLC v. CISCO Sys., Inc.*, 942 F.3d 1352, 1358-59 (Fed. Cir. 2019) (rejecting expert testimony that simply repeats in a conclusory fashion).

Petitioner's inherency theory is not a disclosure. It is an improper reconstruction of the claimed invention using hindsight, attempting to retrofit the '600 patent's capacity matrix approach onto de La Chapelle's fundamentally different system. Ex. 2001, ¶¶91, 96-97.

Because Petitioner fails to show that de La Chapelle discloses either a return-link matrix or a system capable of retrieving both types of matrices, and because even the forward-link theory is unsupported, the anticipation challenge to claim 13 must be rejected.

E. Claims 1 and 13: de La Chapelle Does Not Disclose Commanding Both the Directional Antenna and Transceiver

Claims 1 and 13 require that the "computer processor" "command a directional antenna installed on the aircraft and a transceiver disposed within the aircraft" to measure signal-to-noise ratios. Ex. 1001, 15:58-67, 18:41-62. The claims specifically require commanding both components together for the measurement process.

de La Chapelle fails to disclose this limitation. While de La Chapelle describes that the aircraft radio terminal (ART) determines or controls the directional antenna, it does not command the transceiver disposed within the aircraft. Ex. 1005, 6:39-45 (“the ART determines antenna pointing directions completely independently of the operation of the radio transceivers. This is a significant feature because it permits the use of commercial off-the-shelf (COTS) transceiver modules and transmission standards that are designed to operate with standard cellular handsets having omnidirectional antennas.”); Ex. 2001, ¶¶93-95.

The transceiver module disclosed in de La Chapelle is described as a commercial off-the-shelf transceiver module with an omnidirectional antenna that operates independently and requires no controlling by a computer processor. Ex. 1005, 6:39-45; Ex. 2001, ¶94. While the transceiver is certainly used to receive signals, the computer processor in the ART does not command or control its operation for signal measurement purposes as required by the claims. Ex. 2001, ¶94.

This represents yet another fundamental gap between de La Chapelle's disclosure and the claimed invention. The claims require coordinated control of both the directional antenna and the transceiver by the computer processor to perform the required SNR measurements. de La Chapelle's system lacks

this coordinated control structure, instead relying on an independent, uncontrolled transceiver module. Ex. 2001, ¶95.

Petitioner cannot cure this deficiency through expert testimony or inherency arguments. The reference simply does not disclose the required command structure, and no amount of expert speculation can supply what is missing from the prior art disclosure. *See Scripps Clinic*, 927 F.2d at 1576.

* * *

Because Petitioner fails to identify disclosures in de La Chapelle that expressly or inherently discloses each element of any challenged claim, its anticipation challenge under Ground 1 must be rejected.

VII. GROUND 2: THE CHALLENGED CLAIMS ARE NOT OBVIOUS OVER DE LA CHAPELLE AND JALALI

In Ground 2, Petitioner contends that the challenged claims would have been obvious over the combination of de La Chapelle and Jalali. But this combination, which relies on de La Chapelle, suffers from the same fundamental deficiencies as Ground 1: neither reference discloses critical claim limitations such as the forward- and return-link user capacity matrices, user capacity estimates based on measured SNR, threshold comparisons, or temporal averaging of signal measurements. The Petition does not explain how combining de La Chapelle's directional antenna handoff procedures with Jalali's beam-based antenna system would result in the claimed matrix-based

throughput optimization approach. In fact, the Petition provides ***no explanation whatsoever*** which elements of the claims Jalali would supply, instead of de La Chapelle, in their purported combination.

More critically, the Petition's motivation to combine analysis is cursory and boilerplate. For this combination, the Petition merely states, at the end of its analysis of claim 1: "A POSA would be motivated to combine Jalali and Chapelle since they provide similar solutions to the same problem, and would have had a reasonable expectation of success since there are a limited number of parameters of the directional beams that can be measured and estimated for consideration and comparison in making handoff decisions. The resulting combination also combines known prior art elements according to known methods to yield nothing more than predictable results." Pet. 32. And their expert, in the single paragraph cited, (Ex. 1002, ¶80), merely parrots the exact same language.

But it is well-settled that expert testimony that merely parrots the Petition is insufficient to meet a Petitioner's burden of proof. *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15 (PTAB August 24, 2022) (precedential) (holding "declaration testimony is conclusory and unsupported, adds little to the conclusory assertion for which it is offered to support, and is entitled to little weight."); 37 C.F.R. § 42.65(a) ("Expert testimony that does

not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”); *Upjohn Co. v. Mova Pharm. Corp.*, 225 F.3d 1306, 1311 (Fed. Cir. 2000) (“Lack of factual support for expert opinion to factual determinations, however, may render the testimony of little probative value in a validity determination.”) (quoting *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 294 (Fed. Cir. 1985)); *Carella v. Starlight Archery & Pro Line Co.*, 804 F.2d 135, 138 (Fed. Cir. 1986) (“Although in some circumstances unsupported oral testimony can be sufficient to provide prior knowledge or use, it must be regarded with suspicion and subjected to close scrutiny.”); see also *Hangzhou Chic Intelligent Tech. Co., Ltd. v. Chen*, IPR2016-01778, Paper 8 at 8 (PTAB Mar. 16, 2017) (finding the expert “fails to provide any sufficient explanation, as [his] testimony substantially repeats the arguments in the Petition.”).

A. A POSITA Would Not Be Motivated To Combine de La Chapelle And Jalali

The Petition offers no reasoned explanation for why a skilled artisan would have been motivated to combine de La Chapelle and Jalali. Instead, it recites boilerplate language derived from *KSR*, copied above, without tying that language to any specific technical rationale. Pet. 32. This conclusory “analysis” is legally insufficient. Petitioner does not explain what specific problem each reference addresses, how those problems are related, or why a

POSITA would look to Jalali to modify de La Chapelle (or vice versa). Instead, Petitioner merely states without evidence that because there are only a “limited number of parameters” available for beam measurement, a POSITA would naturally select the exact ones recited in the ’600 patent—namely, signal-to-noise ratio measurements used to compute user capacity estimates. But this cannot be correct—neither de La Chapelle nor Jalali discloses user capacity estimates or SNR-based capacity calculations, highlighting the flaw in this logic. Ex. 2001, ¶¶86-88, 106-107. These failures are compounded by the technical incompatibilities and missing disclosures discussed in Sections B through D, which further undercut any plausible motivation to combine. *See infra* §§ VII.B–D.

More fundamentally, the references address entirely different technical challenges using incompatible measurement approaches and time-dependent capacity requirements. Ex. 2001, ¶¶99-100. The distinction between signal quality and channel capacity is not merely terminological—it represents a fundamental conceptual difference in how communication systems operate. *See supra* § VI.A.1; Ex. 2001, ¶¶28-36. The quality of a signal is the same whether this signal spans a short time period or a longer time period, whereas the capacity is tightly related to the time—how many bits can be sent reliably over a unit time. Ex. 2001, ¶¶28-36. This time-dependency distinction means

that combining de La Chapelle's quality-based handoff decisions with Jalali's beam selection approach would not yield the claimed capacity-based optimization system requiring systematic matrix organization of SNR-based capacity estimates. Ex. 2001, ¶¶99-102.

Additionally, the references employ fundamentally different signal processing methodologies. de La Chapelle relies on signal-to-interference ratio (S/I) measurements, while Jalali uses signal-to-interference-plus-noise ratio (SINR) measurements. Ex. 2001, ¶101. As demonstrated by the fundamental Shannon capacity equation, $C = B \log_2 \left(1 + \frac{S}{N} \right)$, accurate capacity calculations require isolation of the noise component from interference. Ex. 2001, ¶¶104-105. The spatial separation between main lobe and sidelobes means that interference can be modeled and sometimes removed through signal processing techniques, but noise is random and cannot be cancelled. Ex. 2001, ¶¶37-50. Neither reference provides a mechanism for converting between these measurement approaches or for deriving the SNR-based capacity calculations required by the claims. Ex. 2001, ¶¶103-105.

Petitioner's logic presupposes the invention and works backward from it, offering hindsight dressed up as motivation. Obviousness requires more. As an initial matter, "obviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the

combinations or modifications of prior art to arrive at the claimed invention.” *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) (citing *InTouch Technologies, Inc. v. VGO Communications, Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014)) (emphasis in original). The Petition does not acknowledge, let alone address, this distinction. Instead, the Petition’s ‘limited number of parameters’ analysis falls into this ‘could have made’ obviousness trap.

A legally sufficient obviousness analysis requires identification of a **motivation** to make the proposed combination at the time the invention was made. *See Cargill, Inc. v. Bunge Lodgers Croklaan Usa, LLC*, IPR2024-01360, Paper 18 at 4-7 (PTAB Apr. 29, 2025); *see also Fantasia Trading LLC v. Cognipower, LLC*, IPR2021-00071, Paper 55 at 12 (PTAB May 11, 2022), *aff’d*, No. 2022-2008, 2024 WL 503779 (Fed. Cir. Feb. 9, 2024) (where the Petition provided no “analysis or evidence to support the [expert’s] assertion that an ordinarily skilled artisan would have been motivated to use” the prior art’s teaching for the claimed purpose, “Petitioner has not proven that an ordinarily skilled artisan would have combined [the references’] teachings.”). The Petition provides no explanation whatsoever of what the required motivation would be.

Moreover, Petitioner's reliance on generic *KSR* phrases—such as combining “combines known prior art elements according to known methods to yield nothing more than predictable results”—without any technical substance fails to establish a reasoned basis for combining these particular teachings. Pet. 32; *see also id.* 46-48, 52; *KSR Intern. Co. v. Teleflex Inc.*, 550 U.S. 398, 418-20 (2007) (explaining that while combination of familiar elements may be obvious, the analysis must still be “explicit” and include “a reason for combining the elements in the manner claimed”); *see also Cargill*, IPR2024-01360, Paper 18 at 6 (“As a factfinder, we must be aware ‘of the distortion caused by hindsight bias and must be cautious of arguments reliant on ex post reasoning.’” (quoting *KSR*, 550 U.S. at 421)).

Indeed, conclusory assertions of this type are routinely rejected by this Board and the Federal Circuit. *See, e.g., Metalcraft of Mayville, Inc. v. Toro Co.*, 848 F.3d 1358, 1366 (Fed. Cir. 2017) (“Without any explanation as to how or why the references would be combined to arrive at the claimed invention, we are left with only hindsight bias that *KSR* warns against.”); *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016) (“To satisfy its burden of proving obviousness, a petitioner cannot employ mere conclusory statements.”); *Cargill*, IPR2024-01360, Paper 18 at 6-7.

Critically, the Petition never identifies a specific feature of Jalali that would have resolved any shortcoming in de La Chapelle. *Palo Alto Networks, Inc. v. Centripetal Networks, LLC*, 122 F.4th 1378, 1384 (Fed. Cir. 2024) (“[T]he test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.”); Ex. 2001, ¶¶101-102. Nor does it identify any synergistic benefit or technological compatibility that would support their combination. Ex. 2001, ¶¶99-100. Petitioner points to no incompatibility being solved, no performance improvement being achieved, and no reason a POSITA would look to combine these two unrelated systems. *Virtek Vision Int’l ULC v. Assembly Guidance Sys., Inc.*, 97 F.4th 882, 887 (Fed. Cir. 2024) (“[T]here must exist a motivation to combine various prior art references in order for a skilled artisan to make the claimed invention.”); Ex. 2001, ¶¶99-100. In other words, the Petition does not identify a motivation to combine.

Indeed, de La Chapelle and Jalali operate on fundamentally different principles—de La Chapelle uses forward-link S/I to make handoff decisions, while Jalali uses ground-based SINR beam selection—and neither provides a mechanism or rationale for combining these disparate systems. Ex. 2001, ¶¶101-102, 113-114.

Because Petitioner fails to articulate a specific motivation to combine de La Chapelle and Jalali—only providing boilerplate statements—its obviousness challenge must be rejected.

B. Claim 1: Jalali Does Not Disclose a Forward-Link User Capacity Matrix or Capacity Estimates

Petitioner's Ground 2 suffers from a fundamental logical flaw. The Petition treats de La Chapelle as the primary reference and Jalali as secondary, yet inconsistently relies on both references for the same claim elements without explaining what Jalali contributes to the combination. Pet. 25-31. For claim 1's critical matrix limitations, the Petition first argues de La Chapelle "inherently" discloses forward-link user capacity estimates and matrices (Pet. 11-14), then simultaneously argues Jalali also discloses these same elements (Pet. 28-31). This duplicative approach only highlights that neither reference actually discloses the claimed elements.

Examining the Petition's treatment of Jalali reveals this confusion. For the SNR element, Petitioner asserts that S/I (from de La Chapelle), SNR, and SINR (from Jalali) are merely "obvious alternatives of one another for use in the same process." Pet. 27. Yet the Petition never explains why a POSITA would specifically substitute Jalali's SINR for de La Chapelle's S/I when de La Chapelle already provides its own handoff mechanism or, indeed, why a POSITA would choose to use one or another in the de La Chapelle and Jalali

combination. Ex. 2001, ¶¶103-105. Instead, the Petition conflates distinct metrics without support. *Id.* But SNR and SINR are technically distinct, and neither reference discloses using SNR to calculate user capacity as required in claim 1 of the '600 Patent. *See supra* § VI.A; Ex. 2001, ¶¶37-50.

In practice, SINR is easier to estimate, but it provides a composite value that masks the true noise level in the channel that is essential for accurate capacity calculations. *See* Ex. 2001, ¶105. Because Jalali measures SINR by subtracting the pilot signal from the total received signal (Ex. 1006, [0059]), the remainder includes both interference and noise. Jalali makes no effort to isolate noise or calculate SNR. *Id.*; Ex. 2001, ¶105. Without SNR, Jalali cannot calculate user capacity as required by the '600 patent. Ex. 2001, ¶105.

Petitioner next argues that Jalali discloses user capacity estimates by referencing its title (“High data rate aircraft to ground communication antenna system”) and stated goal of providing a high data rate to aircraft. Pet. 29; *see* Ex. 1006, [0025] (“Aspects of the present disclosure provide a high data rate aircraft to ground communication antenna system”). But simply mentioning “high data rate” in a title is not equivalent to teaching calculation of user capacity estimates based on SNR. Ex. 2001, ¶106.

More fundamentally, the time-dependent nature of capacity calculations distinguishes them from the signal quality measurements that

Jalali actually performs. Ex. 2001, ¶107. The quality of a signal is the same whether this signal spans a short time period or a longer time period, whereas the capacity is tightly related to the time—how many bits can be sent reliably over a unit time. Ex. 2001, ¶¶28-36, 106-107. A true user capacity estimate requires a rigorous mathematical calculation that accounts for both signal-to-noise ratio and available bandwidth over time, as demonstrated in the Shannon capacity equation. Ex. 2001, ¶¶28-36.

Jalali never calculates or estimates user capacity. Ex. 2001, ¶106. Its beam selection algorithm compares SINR values to determine the best communication beam—not capacity or data rate. See Ex. 1006, [0059] (“The aircraft will report SINR measurements.... [T]he ground base station may find the improved or optimal transmit beam by adjusting its beam based on the SINR feedback received from the aircraft.”). There is no teaching in Jalali of computing an expected data rate based on SINR, or of using SINR to estimate forward-link capacity as in the ’600 patent. Ex. 2001, ¶107. A reference aimed at “providing” a high data rate does not teach one that calculates it. Ex. 2001, ¶107. Instead, POSITA would understand that stating a system goal—such as delivering high throughput—does not teach the specific computations or measurements required to achieve that goal. See Ex. 2001, ¶106. Petitioner’s

reliance on Jalali's title and abstract goal—without any corresponding disclosure—is misplaced.

Petitioner's argument regarding the matrix is even more speculative. Petitioner admits Jalali does not disclose a "user capacity matrix," but asserts that "computers cannot make analog comparisons" and therefore "must store values in tables (e.g., matrices)." Pet. 30 ("The use of a matrix is an inherent feature of computer based comparison or decision tools based on lists of measured parameters."). That is not the law. Inherency requires a feature to be necessarily and inevitably present—not theoretically possible. *See supra* § VI.C. A POSITA would not understand Jalali's SINR feedback to imply calculation of user capacity estimates and creation of a capacity matrix. Ex. 2001, ¶108.

The matrix structure claimed in the '600 patent serves a specific technical purpose in enabling efficient comparison and selection among multiple candidates based on predicted capacity. Ex. 2001, ¶¶58-59. A matrix requires two-dimensional indexing with both rows and columns that allow systematic organization and comparison of capacity estimates across multiple dimensions, as illustrated in Figure 5 of the '600 patent. Ex. 2001, ¶¶51-55, 59.

Jalali organizes SINR values only by ground station number or beam ID—a one-dimensional list. *See* Ex. 1006, [0059]-[0060]. The '600 patent, by contrast, teaches a structured, two-dimensional matrix indexed across azimuth and frequency or direction and link type. *See* Ex. 1001, Fig. 5; Ex. 2001, ¶108. Thus, even if the SINR measurements in Jalali is the claimed “signal-to-noise ratio” (which is not) and from the SINR measurements the “user capacity estimate” can be made (which cannot), the results can only be organized in one-dimensional index, and cannot be made into a matrix. Ex. 2001, ¶108. Jalali provides no such structure, and Petitioner's inherency theory fails on this basis as well.

Next, Petitioner claims that “Jalali's ranking of pilot signals represents the use of a decision matrix.” Pet. 31. But Jalali compares pilot signal strength, not calculated capacity, and does not describe or require storing these values in any matrix structure. Ex. 2001, ¶¶106-108. Ranking based on signal strength is not equivalent to assembling and comparing user capacity estimates based on SNR across multiple sub-bands, as the claims require. *See* Ex. 1001, 9:37-56, claim 1; Ex. 2001, ¶108. The fundamental distinction between signal quality measurements and time-dependent capacity calculations means that Jalali's signal strength comparisons cannot satisfy the claimed capacity estimation requirements. Ex. 2001, ¶107.

Petitioner's attempt to retrofit Jalali's SINR-based beam selection into the '600 patent's matrix-driven user capacity calculation amounts to hindsight reconstruction—not a disclosure of the claimed subject matter.

Additionally, Jalali fails to disclose the claimed “computer processor [configured] to command a directional antenna” and associated transceiver. As shown in Figure 2 of Jalali, each antenna element covers a fixed azimuth and is associated with a dedicated transceiver. *See* Ex. 1006, Fig. 2; *id.*, [0030] (“In this aspect, each element is coupled to its own transceiver.”). There is no disclosure of steering, tuning, or processor-based command of the antenna. Instead, the antenna array consists of fixed, sectorized elements with pre-assigned transceivers, requiring no processor command. Ex. 1006, Fig. 2, [0030]; *see* Ex. 2001, ¶109. This structure cannot satisfy the claims' requirement that the processor command the antenna and transceiver to perform directional SNR measurements. Ex. 2001, ¶109.

C. Claim 7: The Combination Of de La Chapelle And Jalali Does Not Render Obvious Claim 7

Petitioner fails to demonstrate that the combination of de La Chapelle and Jalali discloses or suggests the requirements of independent claim 7, including reverse-link noise estimates, a reverse-link noise matrix, or matrix-based channel selection.

1. Neither de La Chapelle Nor Jalali Disclose Reverse-Link Noise Estimates

Claim 7 requires “calculating, with the computer processor, a first reverse-link noise estimate” and “a second reverse-link noise estimate” using respective noise power levels. Ex. 1001, 17:30-36. Petitioner asserts that maximizing SNR or SINR “necessarily” involves measuring noise power, and that “estimated noise based on the noise power measurement [is] inherently required to be employed.” Pet. 39 (citing Ex. 1002 ¶98). But neither de La Chapelle nor Jalali discloses calculating directional reverse-link noise estimates at defined azimuths and elevations. Ex. 2001, ¶110.

Directional reverse-link noise estimation requires the system to isolate noise power received from specific angular directions—defined by azimuth and elevation—and associate that with a given communication link. *See* Ex. 1001, 17:30-36; Ex. 2001, ¶111. This cannot be inferred from a single SINR value or from ambient noise levels, which are not spatially resolved. Ex. 2001, ¶111. Jalali and de La Chapelle do not disclose any mechanism for measuring noise directionally, and certainly not in the reverse link (aircraft to ground). Their systems lack the directional antenna control and per-beam measurement logic needed to make such estimates. Ex. 2001, ¶111.

Jalali describes SINR-based beam adjustments (Ex. 1006, ¶[0059]), and de La Chapelle evaluates forward-link S/I from the aircraft (Ex. 1005, 8:57-

9:47), but neither reference teaches the claimed directional noise measurements or the calculation of reverse-link estimates from those measurements. Petitioner's inherency argument is speculative and unsupported by any actual disclosure in the cited passages. Ex. 2001, ¶112.

2. Neither de La Chapelle Nor Jalali Disclose A Reverse-Link Noise Matrix

Claim 7 next requires “calculating, with the computer processor, a reverse-link noise matrix using the first reverse-link noise estimate and the second reverse-link noise estimate.” Ex. 1001, 17:36-38. Petitioner contends that such a matrix is “an inherent feature of a computer,” arguing that signal comparisons must “necessarily” involve matrix structures. Pet. 40; Ex. 1002 ¶100. That argument is legally and factually incorrect. The claimed reverse-link noise matrix is not a simple table of values—it is a spatially organized data structure indexing noise estimates across direction or position. *See* Ex. 1001, Fig. 7; Ex. 2001, ¶¶51-55, 59. The Petition cites no disclosure of such structure in either reference.

As discussed *supra* § VI.C, a matrix is not inherently formed by comparing values. The '600 patent describes a particular type of matrix that organizes directional noise data across spatial dimensions. *See* Ex. 1001, Fig. 7, 10:29-55; Ex. 2001, ¶59. Neither reference discloses forming a matrix structure based on reverse-link noise estimates, nor do they discuss storing or

organizing directional noise data in any way that would satisfy the claimed matrix. Ex. 2001, ¶108. Moreover, even if noise values could be measured, organizing them into a matrix for decision-making across multiple beams and stations requires intentional design and is not an automatic consequence of signal comparison. See Ex. 2001, ¶108. Petitioner's assertion that the references "*inherently* disclose[] calculation of a reverse link noise matrix to permit comparisons" is therefore both unsupported and incorrect. Pet. 40.

3. Neither de La Chapelle Nor Jalali Disclose Using A Matrix To Select Channels Across Ground Stations

Claim 7 concludes by requiring that "the reverse-link noise matrix is utilized to select communication channels to utilize for transmissions between a plurality of ground stations disposed on the ground and the airborne aircraft." Ex. 1001, 17:39-42. Petitioner argues that both references discuss selecting "higher quality communications links" and that such decisions would inherently involve matrix-based comparisons. Pet. 42. But neither de La Chapelle nor Jalali discloses using a reverse-link noise matrix—let alone using one to select channels across multiple ground stations. Ex. 2001, ¶108.

The claimed selection logic requires the processor to evaluate matrix entries corresponding to different azimuth/elevation pairs and make channel assignments accordingly. See Ex. 1001, 17:39-42. Jalali's beam selection is performed by the ground station based on SINR, and does not involve

selecting between different communication channels across multiple stations.

Ex. 1006, [0059]-[0060]; Ex. 2001, ¶109. de La Chapelle also lacks any discussion of reverse-link selection based on directional noise—its link handoff is based solely on forward-link S/I measured at the aircraft. *See* Ex. 1005, 4:11-31.

de La Chapelle describes handoff decisions based on forward-link S/I measurements taken from the aircraft, not matrix-based channel selection at the ground station (*see* Ex. 1005, 4:11-31, 9:8-27; *supra* § VI.D), while Jalali's discussion of SINR and beam steering focuses on antenna alignment, not multi-station channel assignment using reverse-link noise metrics (*see* Ex. 1006, [0059]-[0060]; *supra* § VII.B). But Petitioner's conclusory assertions that a POSITA "would clearly understand from Jalali and Chapelle that noise parameters can advantageously be used in a matrix form" ignores the fundamental technical distinction between signal quality measurements and the time-dependent capacity calculations required by the claims. Pet. 43; Ex. 2001, ¶¶28-36. This is classic *ex post* reasoning—obviousness cannot be grounded in hindsight or assumptions about what might be desirable, especially when the references are silent on the specific technique claimed. *See KSR*, 550 U.S. at 421.

D. Claim 13: The Combination of de La Chapelle And Jalali Do Not Render Obvious The Remaining Claims

Claim 13 requires retrieving either a forward-link or return-link user capacity matrix. Ex. 1001, 18:41-62. This limitation of claim 13 presumes that such a matrix was previously calculated and stored in a structured format accessible to the processor. See Ex. 2001, ¶108. But as explained above, neither de La Chapelle nor Jalali discloses calculating such a matrix in the first place—let alone storing or retrieving one. Jalali's beam selection system compares SINR values in real-time for local optimization at the ground station and lacks any persistent matrix or directional SNR-based user capacity logic. See Ex. 1006, [0059]-[0060]; Ex. 2001, ¶¶106-107. Similarly, de La Chapelle relies on forward-link S/I measurements to inform handoff decisions but does not calculate, retain, or retrieve matrices of link quality or noise performance. See Ex. 1005, 4:11-31, 9:8-27; Ex. 2001, ¶79.

For the same reasons discussed with respect to claims 1 and 7, neither Jalali nor de La Chapelle discloses any forward- or reverse-link user capacity matrix, nor the retrieval and use of such a matrix in selecting among serving cells or ground stations. See *supra* §§ VI.D, VII.C.

VIII. GROUND 3: THE COMBINATION OF DE LA CHAPELLE, JALALI, AND NELSON DOES NOT RENDER CLAIMS 5 AND 16 OBVIOUS

Claims 5 and 16 introduce a distinct feature not present in claims addressed under Grounds 1 and 2: transmitting either the forward-link or return-link user capacity matrix using an “out-of-band communication channel.” Ex. 1001, 16:53-58; 19:7-10. Petitioner’s Ground 3 attempts to remedy this gap by adding Nelson to the combination of de La Chapelle and Jalali. Ground 3 has no independent claims not covered by Ground 2 and therefore fails for the same reasons as Ground 2. In addition, this combination fails for multiple independent reasons.

A. A POSITA Would Not Be Motivated To Combine Nelson With de La Chapelle And Jalali

Petitioner’s motivation to combine Nelson with de La Chapelle and Jalali is perfunctory at best. The entirety of Petitioner’s motivation argument consists of a single conclusory statement: a POSITA “would find motivation from Nelson’s discussion of the use of out-of-band protocols to employ the Ka and Ku bands of Jalali to provide the forward-link user capacity matrix to a ground station controller.” Pet. 55. Petitioner then states this “would merely combine known elements to yield predictable results, and would be advantageous in improving communication channel performance by not overburdening data channels.” *Id.*

This perfunctory statement fails to provide any specific technical rationale for why a POSITA would combine Nelson with de La Chapelle and Jalali. The Federal Circuit has repeatedly held that such conclusory assertions are insufficient to establish obviousness. *See KSR*, 550 U.S. at 418; *Personal Web Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 993 (Fed. Cir. 2017) (finding Board's analysis inadequate because it did not adequately explain why a POSITA would have been motivated to combine references); *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1362 (Fed. Cir. 2016).

Petitioner identifies no problem recognized in the art that would have prompted a POSITA to incorporate Nelson's out-of-band protocol specifically for transmitting capacity matrices. Ex. 2001, ¶¶115-117. The alleged benefit of "not overburdening data channels" (Pet. 55) appears nowhere in the cited references, and Petitioner provides no evidence that channel congestion was a recognized issue requiring the use of out-of-band signaling for matrix transmission. Ex. 2001, ¶¶116-117. Nor is Dr. Hayes's conclusory statement parroting the Petition sufficient basis for supplying this motivation to combine. *Xerox*, IPR2022-00624, Paper 9 at 15.

Moreover, the Petition misrepresents Jalali's Ka- or Ku-band disclosures as being "out-of-band," when in fact Jalali uses those bands for the main communication channel—not for a secondary or control link. Pet.

55; *see* Ex. 1006, [0065]; Ex. 2001, ¶¶116-117. This distinction further undercuts any motivation to combine, because neither reference discloses using a separate band for signaling matrix-related information.

B. Nelson's Single Reference To An "Out-of-Band Protocol" Does Not Render Obvious User Capacity Estimates

Even if a motivation existed (which it does not), Nelson's disclosure would not render the claimed invention obvious. Nelson briefly mentions an "out-of-band protocol" in a single passage describing data flow during modem negotiation: "data can flow through the air link using an 'out-of-band' protocol." Ex. 1007, 10:24-26. This isolated reference appears in a technical description of modem negotiation—not in the context of system management data transmission. Ex. 2001, ¶¶118-119.

Nelson's out-of-band protocol relates specifically to the physical connection between modems in a circuit mode data solution. Ex. 1007, 10:23-27; Ex. 2001, ¶118. The reference provides no details about this protocol, its capabilities, or its potential applications beyond modem negotiation. Ex. 2001, ¶118. Nelson does not suggest using an out-of-band channel for transmitting management information such as capacity matrices, nor does it contemplate anything resembling the system optimization data described in the '600 patent. Ex. 2001, ¶118. Nelson's out-of-band protocol is geared toward maintaining modem communication during call setup and

negotiation—not for transmission of complex control structures such as capacity matrices. *See* Ex. 1007, 10:23-27; Ex. 2001, ¶¶119-120. Even assuming an out-of-band channel were used, Nelson provides no mechanism for encoding, transmitting, or interpreting a matrix of user capacity estimates. Ex. 2001, ¶¶119-120.

Petitioner's argument assumes the existence of a forward-link capacity matrix (which, as established in discussion of Grounds 1 and 2 *supra*, is not disclosed by either de La Chapelle or Jalali), and then asserts it would be obvious to transmit this non-existent matrix using an out-of-band channel. Pet. 55-56. This circular reasoning cannot establish obviousness. A skilled artisan cannot be motivated to transmit a data structure that the prior art does not teach in the first place. Ex. 2001, ¶120. Moreover, the claimed capacity matrices require systematic organization of time-dependent capacity calculations across multiple dimensions. Ex. 2001, ¶59. Nelson's brief reference to an out-of-band protocol provides no mechanism for encoding, transmitting, or interpreting such complex data structures. Ex. 2001, ¶119.

Because Petitioner has failed to establish both a motivation to combine Nelson with the other references and that the combination would teach the claimed out-of-band transmission of capacity matrices, Ground 3 must fail.

IX. GROUND 4: THE COMBINATION OF DE LA CHAPELLE, JALALI, NELSON, AND MCGUFFIN DOES NOT RENDER THE CLAIMS OBVIOUS

In Ground 4, Petitioner asserts that all challenged claims (1-19) would have been obvious over the combination of de La Chapelle, Jalali, Nelson, and McGuffin. Petitioner fails to provide any coherent rationale for combining all four references.

Petitioner's motivation for combining all four references consists of a boilerplate assertion: "a POSA would have been motivated to combine the teachings of Jalali and de La Chapelle (along with Nelson and McGuffin), since the references clearly teach similar methods for solving the same problem." Pet. 58. This generic statement fails to identify any specific technological problem that would motivate a POSITA to combine these particular references in the manner claimed. Ex. 2001, ¶¶121-122. And Petitioner's expert, Dr. Hayes, offers nothing more than the same conclusory testimony, which does nothing to remedy the Petition's deficiency in this regard. *Xerox*, IPR2022-00624, Paper 9 at 15.

Critically, Petitioner provides no explanation of how these four disparate technologies would work together or why a POSITA would combine them. Ex. 2001, ¶¶121-122. The Petition recites that a POSITA "would have had a reasonable expectation of success" (Pet. 58), but offers no technical

reasoning for this conclusion. It does not explain how McGuffin's signal strength tables would interact with de La Chapelle's directional antennas, Jalali's beam switching, and Nelson's modem protocols. Ex. 2001, ¶123. This lack of technical substance in the motivation argument is fatal to Petitioner's obviousness theory.

Petitioner's four-way combination represents precisely the kind of hindsight reconstruction that courts have consistently rejected. *See InTouch Techs., Inc. v. VGO Commc'ns, Inc.*, 751 F.3d 1327, 1351 (Fed. Cir. 2014) ("VGo's expert also succumbed to hindsight bias in her obviousness analysis").

Petitioner's reliance on McGuffin's Tables 1–4 is similarly flawed. While those tables are presented in a two-dimensional format, they do not disclose or suggest the claimed user capacity matrix. The row entries are indexed by base station number, but the column headings reflect separate metrics—such as message traffic density, signal strength, and average delay—not SNR-based capacity estimates. *See* Ex. 1008, [0034]-[0037]; Ex. 2001, ¶¶124-125. In substance, McGuffin presents three parallel one-dimensional data series, not a true two-dimensional matrix indexed across spatial or directional parameters. Ex. 2001, ¶126. Simply presenting multiple metrics side-by-side does not convert the table into a user capacity matrix of the kind

claimed in the '600 patent. *Id.* The claimed user capacity matrices require systematic indexing across both spatial and directional parameters to enable the dynamic, predictive selection methodology described in the '600 patent. Ex. 2001, ¶127. McGuffin's simple tabular presentation of unrelated metrics cannot satisfy this structural requirement.

Because Petitioner has failed to establish that McGuffin discloses the claimed capacity matrices or that a POSITA would have been motivated to combine all four references, Ground 4 must fail.

X. CONCLUSION

For the foregoing reasons, Patent Owner respectfully submits that the Board should uphold the challenged claims.

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CERTIFICATE OF LENGTH

Pursuant to 37 C.F.R. § 42.24, the undersigned hereby certifies that, according to the word-processing system used to prepare the foregoing document, this document has 12,714 words and thus complies with the applicable word limit.

Date: July 14, 2025

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6, The undersigned hereby certifies that the foregoing document was served in its entirety on July 14, 2025 upon the following parties via Electronic Mail:

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