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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ERICSSON INC.,

PETITIONER,

V.

GENERAL ACCESS SOLUTIONS, LTD.,

PATENT OWNER.

Case No. IPR2024-00392

U.S. Patent No. 7,230,931

**PATENT OWNER'S PRELIMINARY RESPONSE
UNDER 35 U.S.C. § 313 AND 37 C.F.R. § 42.107**

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I. INTRODUCTION

The Board should deny institution of the Petition for three reasons.

First, Claims 28 and 29 of the '931 Patent (the “Challenged Claims”) were already the subject of a prior IPR that asserted largely the same prior art, *Sprint Spectrum L.P. v. General Access Solutions, Ltd.*, IPR2017-01889. In the prior IPR, Sprint relied on the same primary reference (Vornefeld) Ericsson asserts in this Petition. Sprint’s expert also relied on the same secondary reference Ericsson now asserts in combination with Vornefeld in Ground 2 (Goldburg). In the prior IPR, the Board correctly rejected Sprint’s obviousness challenge as to Claims 28 and 29. And the Federal Circuit affirmed—a critical fact omitted from the Petition.

Ericsson does not even attempt to show that the Board and the Federal Circuit committed any error in rejecting Sprint’s prior, duplicative obviousness challenge.

Second, while Ericsson attempts to dress up its Petition with “new combinations,” these combinations add nothing to the art previously addressed in the Sprint IPR. Ericsson relies on Atsuta and Goldburg to supply the elements of the Challenged Claims the Board and the Federal Circuit previously found to be missing from Vornefeld. But neither Atsuta nor Goldburg disclose transmitting beamformed signals to wireless devices in different sectors in the same portion of the same TDD frame, as expressly required by Claims 28 and 29. In fact, they teach the opposite—assigning different time slots to each of their transmissions.

Both references are also missing other fundamental elements, such as beamforming (Atsuta) and TDD (Goldburg).

Knowing that these references fail to disclose the elements of Claims 28 and 29, Ericsson argues that they are nonetheless sufficient on the theory that the only element the Board and the Federal Circuit previously found to be missing from Vornefeld was the concept of “transmitting to subscribers in different sectors within a single frame.” Pet. at 31; *see also id.* at 2-3, 38-39, 44-47. But Ericsson’s revisionist history ignores the fact that Sprint presented un rebutted evidence that this concept was disclosed in the prior art. Ericsson also ignores the prior art incorporated into the specification of the ’931 Patent that discloses the very thing Ericsson says is newly presented by Atsuta and Goldburg: time slots assigned to multiple users in the same frame. Ericsson’s combinations add nothing new. Just like Sprint, Ericsson has failed to identify any prior art that addressed the challenges of beamforming in a cellular network by sending beamformed transmissions to multiple users, in multiple sectors, in the same downlink portion of the same TDD frame as required by Claims 28 and 29.

Third, strong grounds exist here for the Board to exercise its discretion to deny the petition under 35 U.S.C. § 325(d) and *Fintiv*. Ericsson’s newly cited art is nothing more than a “fig leaf” to seek reconsideration of the Board’s prior decision to sustain the validity of Claims 28 and 29. The Petition offers nothing

new over the art asserted by Sprint in the prior IPR. Moreover, Ericsson has advanced the very same validity challenges in related litigation pending in the Eastern District of Texas, which will go to trial in the Eastern District well before the Board could issue a Final Written Decision if it were to institute review. Given the duplicative nature of Ericsson's Petition and that the very same claims will be resolved earlier in the related litigation, principles of judicial efficiency strongly militate in favor of denying institution.

II. BACKGROUND

A. The '931 Patent

The '931 Patent is entitled "Wireless Access System Using Selectively Adaptable Beam Forming in TDD Frames and Method of Operation." As explained more fully below, the '931 Patent is directed to the coordination of beamformed downlink transmissions from a base station to wireless devices in a cellular wireless network using Time Division Duplexing. Challenged Claims 28 and 29 require that a base station of a cellular wireless network transmit multiple beamformed signals, each of which carries different downlink data to wireless devices in separate geographic sectors of the cell, and that those separate beamformed signals be transmitted in the same downlink portion of the same TDD frame.

use social media, download music and video, and do the many other things smartphones make possible. With this shift in how consumers used their mobile phones, the demand for data on wireless cellular networks grew exponentially. In the five-year period from 2016-2021, for example, mobile data traffic increased 17-fold.¹ To keep pace with the increased demand for data, wireless carriers required new technologies better suited to transmitting large quantities of data.

3. Time Division Duplexing

Cellular wireless networks must be able to communicate bi-directionally with wireless devices. Specifically, base stations must be able to transmit “downlink” signals to wireless devices, and wireless devices must be able to communicate “uplink” signals to base stations. However, downlink and uplink transmissions can interfere with one another, requiring the use of a duplexing protocol. There are two main approaches to manage bi-directional communications in cellular wireless networks: Frequency Division Duplexing (“FDD”) and Time Division Duplexing (“TDD”). (5:62-64)²

¹ Ex. 2018, Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2017-2022.

² Citations exclusively to page and line numbers are to U.S. Patent No. 7,230,931 (“the ’931 Patent”).

In FDD, downlink and uplink transmissions are each made using separate, dedicated frequencies or “channels.” (5:64-66) Interference between the downlink and uplink transmissions is avoided by spacing the downlink and uplink frequencies. (5:66-6:2) FDD is well suited to voice communication where the amount of information being transmitted in downlink and uplink channels is roughly equal. However, FDD is far less efficient in modern cellular networks, which are focused on data transmission. Most smartphone users typically demand far more downlink data transmissions than uplink. (13:66-14:1) For example, a person who seeks to download a movie sends a relatively tiny uplink request for the download, which triggers the streaming of massive quantities of downlink data. In FDD, such a request can leave the channel dedicated to uplink transmissions largely unused.

In TDD, by contrast, a single band of frequency is used for both downlink and uplink transmissions by allocating separate time intervals or “slots” to each. (6:2-5; 14:7-10) TDD is more efficient for data transmissions than FDD, because bandwidth can be dynamically shifted either to downlink or uplink transmissions by allocating larger time slots to downlink or uplink transmissions. (14:10-14)

In TDD, downlink and uplink transmissions are organized into “TDD frames.” (14:10-16:3) The portion of Figure 3 of the ’931 Patent excerpted below provides an exemplary illustration of a TDD frame.

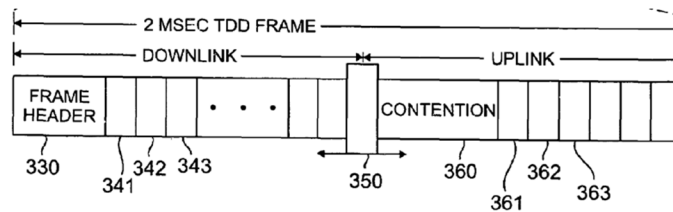


FIG. 3

4. Beamforming

Paul Struhsaker, the inventor of the '931 Patent, understood that for cellular wireless networks to be able to accommodate future demands for data they would need to make use of two critical technologies: Time Division Duplexing and “beamforming.” Prior to Mr. Struhsaker’s invention of the '931 Patent, conventional antennas used in cellular wireless networks broadcasted signals to the entire geographic area covered by the antenna. In the '931 Patent, however, Mr. Struhsaker disclosed critical technology allowing beamforming to be implemented efficiently in cellular wireless networks. Prior to the filing of the '931 Patent, beamforming (which was originally developed for advanced radar systems) had never previously been employed in a commercial cellular wireless network. After the conception of the '931 Patent, Mr. Struhsaker and his colleagues at Raze Technologies worked with antenna manufacturers to develop the advanced antenna arrays necessary to deploy beamforming in cellular wireless networks.

To create beamformed signals, antenna arrays with multiple antenna elements arranged in a line or rectangular grid are used. (26:10-16) By delay- or

phase- weighting the transmissions from each antenna element, a combined wavefront of radio frequency energy can be directed or “steered” in a specific direction. (26:19-63) By focusing the radio frequency energy transmitted by the antenna in a desired direction, a beamforming antenna array can increase the quality and range of the signal sent to the desired area while simultaneously minimizing interference with transmissions to other wireless devices. (25:29-37) Importantly, beamforming can also allow for multiple spatially-separated beams to be sent simultaneously, each carrying different downlink data to wireless devices in different areas using the same frequency, thereby increasing the throughput of the wireless network without requiring the use of additional, scarce spectrum. (25:32-34, 25:63-26:2) Figure 9 of the '931 Patent, reproduced below, and its associated text, explain techniques that can be used to create beamformed signals.

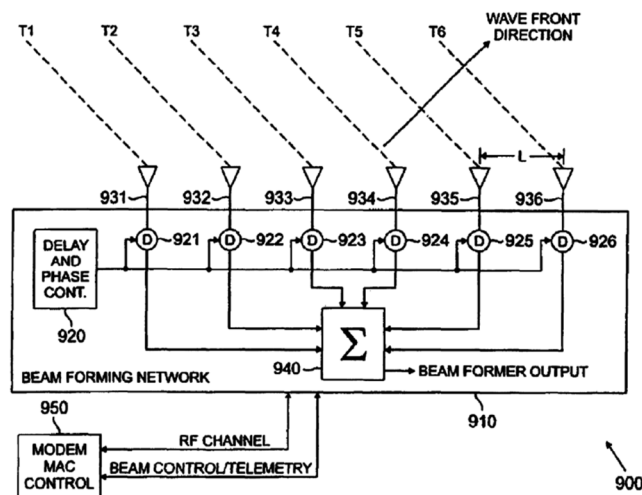


FIG. 9

5. The Teachings of the '931 Patent

The use of beamforming with TDD in a cellular wireless network presented a number of novel challenges. As discussed above, the use of TDD requires precise scheduling of uplink and downlink transmissions so they do not interfere with one another. (16:4-8) The complexity of doing so increases dramatically as cells are divided into numerous sectors and multiple beamformed transmissions are sent simultaneously to multiple wireless devices in different areas of the cell. (16:20-34, 25:63-26:2)

As stated in the '931 Patent, “[a] key aspect of the present invention is that the timing of the downlink and uplink positions of each TDD frame must be precisely aligned in order to avoid interference between sectors within the same cell and/or to avoid interference between cells.” (16:4-8) The patent explains that “antennas for different sectors in the same cell site are mounted on the same tower and are located only a few feet apart,” and that if one antenna is “transmitting in the downlink” while another is “receiving in the uplink,” “the power of the downlink transmission will overwhelm” the uplink transmission.³ (16:13-19) The

³ Downlink transmissions from base station antennas are typically at least an order of magnitude more powerful than the uplink transmissions from wireless devices

patent goes on to explain that it is therefore critical that all downlink transmissions be completed before any uplink transmissions begin. (16:20-38)

Beamforming can significantly improve the quality of signals received by wireless devices, but also introduces new challenges not experienced by systems that transmit omnidirectionally. For example, “[b]eam forming and advanced antennas change the basic paradigm that all subscribers have the capability of simultaneously receiving broadcast information from the base station.” (25:51-54) Instead of all wireless devices in the cell receiving all the transmissions all the time, “[t]ransmit and receive beams are formed to optimize communications with a

such as smartphones. Cell phones are generally limited to no more than 3 watts of antenna power while outdoor base station antennas may transmit at over 100 watts. *See, e.g.*, 47 C.F.R. § 27.50 (noting that handheld mobile devices “are limited to 3 watts”); *RF Safety FAQ*, FCC.gov (last visited September 18, 2023), <https://www.fcc.gov/engineering-technology/electromagnetic-compatibility-division/radio-frequency-safety/faq/rf-safety> (noting that it is possible for base stations to radiate “at very high power levels,” but that “the maximum power radiated in any direction usually does not exceed 500 watts”). As a result, even downlink transmissions directed to other areas of a cell can drown out uplink transmissions.

given subscriber.” (25:54-55) In other words, while communications with the specific wireless devices being served by a beamformed signal can be significantly improved, beamforming can create latency and actually slow down a wireless network; if only one beam is formed at a time, other users may experience communication gaps before the base station forms a beam in their direction. The patent also explains that “[a]n important issue when using a spatial/beam component in wireless access network 100 is subscriber acquisition and maintaining system synchronization.” (28:24-26) Previously-existing “round robin polling” methods would not work because “[t]he revisit time to any specific beam may result in subscribers falling out of synchronization.” (28:28-33)

To address these and other issues, the '931 Patent disclosed a novel communications protocol for cellular wireless networks in which the base station antennas broadcast synchronization and control information at the start of a TDD frame, and then subsequently transmit downlink traffic using multiple, simultaneous beamformed signals—each of which carries different data to users located in different sectors of the cell in the same portion of a common TDD frame. (30:44-52; 32:24-34) The process starts with a “broadcast beam” signal transmitted at the start of a TDD frame. (30:44-45; 32:24-25) That broadcast beam synchronizes the wireless devices with the base station and one another. (32:27-28) The broadcast beam may also optionally transmit a variety of additional control

information to enable the wireless devices to acquire the appropriate beamformed signal and decode subsequent downlink transmissions from the base station. After the broadcast beam provides this common scheduling and acquisition information to all wireless devices in the cell, multiple narrower, directed scanning beams are used to simultaneously transmit downlink data to wireless devices in different portions of the cell. (25:61-26:2; 33:1-34:6)

Figures 12A and 13A of the '931 Patent depict a simple example in which a “broadcast beam” is transmitted to a 90-degree portion of a cell site, and nine beamformed “directed scanning beams” are subsequently transmitted to smaller 10-degree sectors of that area:

'931 Patent: Figures 12A and 13A

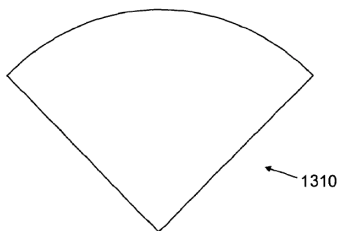


FIG. 13A illustrates an exemplary broadcast pattern according to one embodiment of the present invention;

Ex. 1001 at 11:35-36

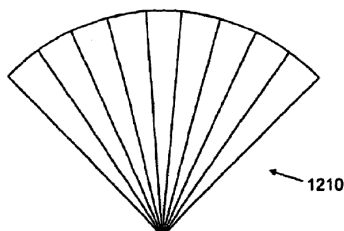
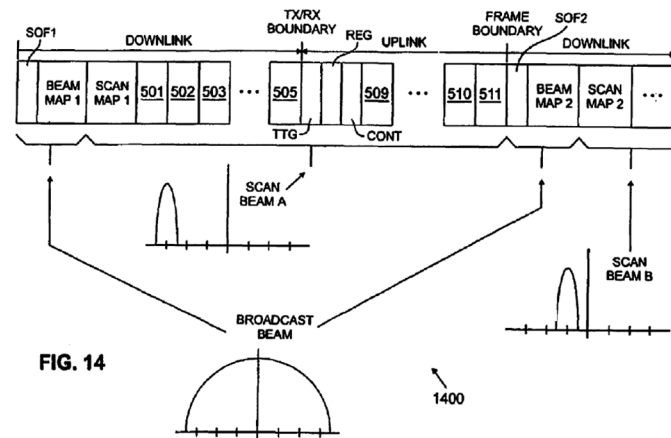


FIG. 12A illustrates an exemplary beam scanning pattern according to one embodiment of the present invention;

Ex. 1001 at 11:30-31

Figure 14 of the '931 Patent illustrates an example of a TDD frame in accordance with the teachings of the patent. As shown in Figure 14, a broadcast beam is transmitted to a 90-degree sector at the start of each TDD frame (labeled “SOF1” and “SOF2”) representing the entire coverage area of the antenna. After the broadcast beam is transmitted, downlink data is transmitted on narrower scanning beams (labeled “SCAN BEAM A” and “SCAN BEAM B”) to smaller 10-degree sectors of the area covered by the broadcast beam.



This elegant, highly coordinated approach to beamforming in conjunction with TDD allows for efficient, simultaneous beamformed downlink transmissions to multiple wireless devices in different areas of the cell. As explained in the specification: “These simple sequential cases can be expanded to advanced beam forming techniques to provide simultaneous multiple access to spatially independent users. A beam-forming network can create two or more independent

beams with low self-interference that allow simultaneous communications using the same frequency.” (25:63-26:2)

6. Challenged Claims 28 and 29

Independent Claims 1 and 19 (from which challenged Claims 28 and 29 depend) address embodiments of the invention involving only a single beamformed downlink transmission in a TDD frame. Claims 1 and 19 require that the base station transmit a “broadcast beam signal” to wireless devices “within more than one” sector of the cell at the start of the TDD frame. Claims 1 and 19 further require that the base stations subsequently transmit downlink data traffic using a “directed scanning beam signal” sent to “substantially only” wireless devices within “one of said sectors.” (30:44-52; 32:24-34) The “directed scanning beam signals” are focused transmissions made using beamforming techniques. (9:23-34)

Unlike Claims 1 and 19, which were surrendered in the prior Sprint IPR,⁴ Claims 28 and 29 are directed to the simultaneous transmission of multiple beamformed signals, in a single frame, to wireless devices located in different

⁴ General Access does not concede that all of the elements of Claims 1 and 19 are disclosed in the prior art. The prior Sprint IPR was conducted under the former “broadest reasonable construction” standard, which is no longer applicable.

sectors. Specifically, Claims 28 and 29 add a requirement that the base station also transmit (in addition to the first directed scanning beam signal required by Claims 1 and 19) “second downlink data traffic to substantially only wireless access devices within an other of said sectors using an other of said directed scanning beam signals,” and critically, that the second transmission be “*in said downlink portion of said TTD frame.*” (33:4-9) Ericsson has conceded in the Related Litigation that the correct meaning of this language is “*in the same downlink portion of the same TDD frame.*” Ex. 2019, Defs.’ Corrected P.R. 4-2 Disclosure, Ex. A at 4 (emphasis added).

In sum, Claims 28 and 29 require the use of a single, common TDD frame to coordinate multiple beamformed downlink transmissions to wireless devices in multiple sectors of the cell. Further, these Claims require that the transmissions be made in precisely “the *same downlink portion* of the same TDD frame.” *Id.* (emphasis added); *see also* Ex. 1009, IPR Final Written Decision at 23 (“Claim 28 requires the transmit circuitry to transmit second downlink data traffic in the same (said) downlink portion of the same (said) TDD frame recited in claim 1.”). As discussed in the ’931 Patent, “timing of the downlink and uplink portions of each TDD frame must be precisely aligned in order to avoid interference” (16:4-8) To address this issue, the invention “determines the length of the longest downlink transmission and ensures that none of the uplink transmissions begin, and none of

the base station receivers begin to receive, until after the longest downlink is completed.” (16:23-27)

As discussed below, none of the prior art references asserted by Ericsson disclose the limitations of Claims 28 and 29. Vornefeld disclosed the use of *separate TDD frames* for beamformed signals transmitted to different sectors. And the new art cited by Ericsson all separate their transmissions into *separate portions* of a common frame. The additional art also fails to address beamforming (Atsuta), uses conventional techniques expressly distinguished by the ’931 Patent (Youssefmir), and lacks any disclosure of a TDD frame (Goldburg). In short, Ericsson’s Petition fails to plug the gaps the Board and the Federal Circuit found in Sprint’s petition.

B. The Prior Sprint IPR

1. The PTAB Previously Held that Claims 28 and 29 Are Not Obvious in View of Vornefeld

In the prior Sprint IPR, the Board found that the critical limitation of Claims 28 and 29 was not disclosed in, or obvious in view of, the same Vornefeld reference at issue here. Specifically, the Board concluded that rather than using one common TDD frame to schedule all network communications, Vornefeld instead disclosed the use of *separate TDD frames for each beamformed transmission*. As the Board explained:

Petitioner has not met its burden to establish that claim 28 is anticipated by, or would have been obvious over, Vornefeld. Claim 28 requires the transmit path circuitry to transmit second downlink data traffic in the same (said) downlink portion of the same (said) TDD frame recited in claim 1. ***The block [from Figure 3 of Vornefeld] that Petitioner relies on for second downlink data traffic is depicted as a different (spatially separated) TDD frame that is simultaneously transmitted with the other frames. We agree with Patent Owner that Petitioner does not establish Vornefeld discloses using different beams in the same TDD frame*** (i.e., second downlink data traffic, transmitted in “said downlink portion of said TDD frame”) to transmit to devices within a different sector.

Ex. 1009, Sprint IPR Final Written Decision at 23 (emphasis added) (citations omitted).

Sprint was well aware of the art Ericsson now cites as supposedly disclosing the critical elements added by Claims 28 and 29. Indeed, Sprint’s expert in the prior IPR discussed at some length in his declaration the very reference advanced in Ground 2 of Ericsson’s Petition—U.S. Patent No. 6,154,661 (“Goldburg”).

Ex. 2020, Expert Declaration of James A. Proctor Jr. ¶¶ 76-80 (“Proctor Decl.”).

While Sprint’s expert pointed to Goldburg as disclosing many of the basic principles used by advanced antenna arrays to create beamformed signals, Sprint did not even contend that Goldburg disclosed or made obvious the critical element of Claims 28 and 29 that simultaneous beamformed downlink transmissions must be made in the same downlink portion of a single, common TDD frame. *See id.* As discussed further below, Goldburg does not include those limitations.

Ericsson suggests that in the prior IPR Sprint “had not relied on secondary references . . . to demonstrate the obviousness of claims 28 and 29.” Pet. at 1. But Sprint did assert secondary references in the prior IPR in an attempt to show that Claims 28 and 29 were obvious.⁵ And some of those references contained disclosures comparable to the ones now relied upon by Ericsson. For example, one of the secondary references Sprint asserted against Claims 28 and 29 was U.S. Patent No. 7,366,133 (“Ahy”). Sprint argued that Ahy disclosed the use of a TDD frame structure and that it would have been obvious to incorporate a TDD frame structure with the other elements of the claimed invention, similar to what Ericsson argues here with respect to Atsuta and Goldberg. Ex. 2020, Proctor Decl. ¶¶ 122-24, 153-54. Sprint’s expert also offered un rebutted testimony that U.S. Patent No. 6,005,854 disclosed a TDD frame with transmissions to users in multiple sectors in the same frame. *See id.* ¶¶ 83-85 (“The ’854 patent further discloses the TDD protocol utilizing a frame structure” that includes “up to thirty one concurrent orthogonally modulated traffic channels . . . within a DTS frame”). Thus, the very

⁵ In the prior IPR, Sprint asserted Vornefeld in combination with Anderson against Claims 28 and 29, as well as Newman in combination with Ahy. IPR Petition, IPR2017-01889, at 44, 51 (July 28, 2017) (Paper 1); Ex. 2020, Proctor Decl. ¶¶ 110, 112.

same thing that Ericsson now says it has newly discovered in Atsuta and Goldberg—transmissions to users in multiple sectors in the “same frame”—was already before the Board and the Federal Circuit in the prior Sprint IPR.

Where Sprint came up short in the prior IPR is precisely where Ericsson comes up short in this Petition. Like Sprint in the prior IPR, Ericsson has made no showing that any prior art references made it obvious to a person of ordinary skill in the art that multiple beamformed downlink transmissions to separate sectors of a cell must be made in the *same portion* of the same TDD frame. While Ericsson says in conclusory terms that Atsuta and Goldberg disclose this critical element, as shown below, even a cursory examination of those references reveals that they do not.

2. The Federal Circuit Affirmed the Board’s Finding that Claims 28 and 29 Are Not Obvious in View of Vornefeld

In its Petition, Ericsson fails to inform the Board that Sprint took an appeal from the final written decision in the prior IPR to the United States Court of Appeals for the Federal Circuit. In that appeal, the Federal Circuit affirmed the Board’s determination of the validity of Claims 28 and 29. The Federal Circuit specifically affirmed the Board’s conclusion that “Vornefeld discloses *multiple* spatially separated frames that are simultaneously transmitted in parallel—not a single frame with ‘second downlink data traffic,’ as required by claims 28 and 29.”

Sprint Spectrum L.P. v. General Access Sols., Ltd., 812 F. App'x. 999, 1006 (Fed. Cir. 2020) (emphasis in original).

C. The Asserted Prior Art

1. Atsuta

In Ground 1, Ericsson asserts Atsuta in combination with Vornefeld, and suggests that Atsuta supplies the elements of Claims 28 and 29 that the Board previously found not to be disclosed in Vornefeld—specifically that multiple beamformed downlink transmissions be made to wireless devices in different sectors in the same downlink portion of the same TDD frame.

Entitled “TDMA Communicating Method and TDMA Receiving Apparatus,” Atsuta discloses a basic, conventional method for organizing *non-beamformed uplink communications* from wireless devices to base stations in cellular wireless networks. Contrary to the teachings of the '931 Patent, Atsuta teaches that uplink signals from each wireless device to the base station must be put in a separate portion of a frame, so they are each transmitted *in a separate time slot so they “do not overlap.”* Ex. 1005 at 3:67-4:1; 5:36-39; 5:62.

Atsuta does not even involve beamforming or address the subject of scheduling beamformed downlink transmissions. To the extent it is relevant at all, it teaches away from Claims 28 and 29. Whereas the object of Claims 28 and 29 is to allow for multiple simultaneous beamformed transmissions (which it achieves

by putting them all in the same downlink portion of the same TDD frame), Atsuta teaches that transmissions must be made sequentially, or one at a time, so they never overlap in time. *Id.* As explained below, the approach taught in Atsuta would thwart the very purpose of Claims 28 and 29.

2. Goldberg

In Ground 2, Ericsson asserts Goldberg in combination with Vornefeld, and suggests that Goldberg also supplies the additional elements of Claims 28 and 29 that the Board previously found were not disclosed in Vornefeld. But as explained below, Goldberg fares no better than Atsuta.

Entitled “Transmitting on the Downlink Using One or More Weight Vectors Determined to Achieve a Desired Radiation Pattern,” Goldberg teaches methods by which advanced antenna arrays with multiple antenna elements can “achieve a near omnidirectional pattern throughout its area of coverage.” Ex. 1006 at 1:11-13; 6:6-7. Goldberg does touch on smart antenna techniques (such as delay- and phase- weighting of transmissions from multiple antenna elements) similar to those used to create beamformed signals. However, Goldberg does not in any way address how such transmissions should be organized in a TDD network. No TDD frames or even basic TDD frame structures are shown. The terms “TDD” and “time division duplexing” are not even used in the references. Indeed, all embodiments of the invention disclosed in Goldberg use the GSM standard (which

is an FDD technology), and the reference purports to be agnostic as to which multiplexing scheme is employed. *Id.* at 6:58-65 (“[t]he invention is not limited to any particular multiplexing scheme”). Critically, Goldberg contains no disclosure of what is required by Claims 28 and 29—the transmission of multiple beamformed signals carrying different downlink data to wireless devices in different sectors of the cell, with the separate beamformed signals being transmitted in the same portion of the same TDD frame.

3. Youssefmir

In Ground 3, Ericsson asserts Atsuta in combination with Youssefmir as the primary reference instead of Vornefeld. Entitled “Cooperative Polling in a Wireless Data Communications System Having Smart Antenna Processing,” Youssefmir is much farther removed from Claims 28 and 29 than Vornefeld, as it teaches the use of a “Round Robin Polling” method of coordinating signals. Round robin polling is antithetical to the teachings of the ’931 Patent and is expressly discussed and rejected in the specification of the ’931 Patent. (28:24-34; 28:44-51) Just like the other art asserted by Ericsson, Youssefmir contains no disclosure of the critical elements added by Claims 28 and 29.

III. CLAIM CONSTRUCTION

No claim construction is necessary to deny institution because General Access’s arguments for denial do not hinge on any disputed issues of claim

interpretation. *See Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (“[C]laim terms need only be construed ‘to the extent necessary to resolve the controversy.’”) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

IV. ARGUMENT

Ericsson seeks to combine Vornefeld with either Atsuta (Ground 1) or Goldberg (Ground 2) and suggests that such combinations present an entirely different case than the prior Sprint IPR. Not so. In reality, Atsuta and Goldberg add nothing to Vornefeld. They plainly do not supply the critical elements of the invention added by Claims 28 and 29, and instead serve merely as a “fig leaf” for Ericsson to seek reconsideration of the Board’s prior determination that Vornefeld does not render Claims 28 and 29 obvious.

Ground 3 fails for the same reason. In Ground 3, Ericsson substitutes Youssefmir for Vornefeld as the primary reference. However, Ericsson again relies on Atsuta for the critical elements previously found to be missing from Vornefeld, but those elements are plainly not disclosed in either reference. Moreover, Youssefmir relies on a “round robin” approach that is expressly rejected by the ’931 Patent.

Grounds 4 and 5 fail for the same reasons as Grounds 1 and 2. While Ericsson attempts to add Tangemann and its disclosure of minisectors to the

combinations asserted in Grounds 1 and 2, Tangemann’s disclosure of minisectors does not cure any of the deficiencies in Ericsson’s prior art discussed herein.

A. Ericsson is Estopped from Challenging the ’931 Patent.

On April 30, 2016, Patent Owner accused Sprint’s LTE base stations of infringing the ’931 patent. (Ex. 2001 at 1.) (“Sprint Litigation”) Sprint was served with Patent Owner’s complaint on July 29, 2016. *See Sprint Spectrum L.P. v. General Access Solutions, Ltd.*, IPR2017-01889, Paper 1 at 3, n.1 (“Sprint IPR”). As a result, on July 28, 2017, Sprint challenged the claims at issue here—claims 28 and 29 of the ’931 Patent (the “Challenged Claims”) in the Sprint IPR. In that IPR, Sprint identified Patent Owner’s April 30, 2016 suit against it as a Related Matter under 37 C.F.R. § 42.8(b)(2). *Id.* at Paper 1 at 3. The Board issued its FWD in that IPR on March 7, 2019. *Id.* at Paper 43. Then, following an appeal and remand from the Federal Circuit, the Board issued a subsequent FWD in that IPR, confirming the patentability of the Challenged Claims, on January 29, 2021. *Id.* at Paper 61.

Under U.S.C. 35 § 315(e)(1), “[t]he petitioner in an inter partes review ... that results in a final written decision under section 318(a), *or the real party in interest or privy of the petitioner*, may not request or maintain a proceeding before the Office with respect to that claim on any ground that the petitioner raised or reasonably could have raised during that inter partes review.” (emphasis added). Petitioner Ericsson was the privy of Petitioner Sprint in the Sprint IPR that resulted

in a FWD. Thus, Ericsson is estopped from filing its current Petition, which raises grounds that the Sprint IPR raised or reasonably could have raised, as discussed in Section II.D., below.

The Board has already determined that Ericsson is a privy of Sprint with respect to allegations of infringement arising out of Sprint's use of Ericsson's LTE base stations, such as those in the Sprint Litigation. Specifically, Ericsson represented to both the Board and a District Court that "Ericsson's supply contract with Sprint contains detailed indemnification provisions, which specifically require Ericsson to indemnify Sprint from patent infringement claims arising out of Sprint's use of Ericsson's LTE base stations." (Ex. 2002 at 1.) As a result, the Board found that Ericsson "has a preexisting substantive legal relationship" with Sprint "regarding the base stations at issue in the District Court Litigation"—which are the LTE base stations that Ericsson provides to Sprint. *See Ericsson Inc. v. Regents of the University of Minnesota*, IPR2017-01186, Paper 58 at 7-10, 14 (PTAB June 19, 2020) ("*Regents*") The Board further relied on "Ericsson's supply contract with Sprint" for "Sprint's use of Ericsson's LTE stations" in finding that Ericsson "had the opportunity to control the defense of the District Court Defendants with respect to the base stations." *Id.* at 10-11, 14; *see* Ex. 2002 at 1. Consequently, the Board found that based on "the second and fourth *Taylor* categories," Ericsson "is in privity with the District Court Defendants"—including

Sprint. *Id.* at 14

Because the Sprint IPR—as in *Regents*—arises “from patent infringement claims arising out of Sprint’s use of Ericsson’s LTE base stations,” the “detailed indemnification provisions” in “Ericsson’s supply contract with Sprint” must make Ericsson a privy of Sprint’s in the Sprint IPR just as it was a privy with Sprint in the *Regents* litigation. (*See* Ex. 2002 at 1.) As such, Ericsson is now estopped from challenging claims 28 and 29 of the ’931 patent, which its privy, Sprint, already challenged to a FWD in the Sprint IPR. *See* Sprint IPR at Paper 61.

B. Ericsson is Time-Barred from Challenging the ’931 Patent.

In addition to being estopped from bringing an IPR, Ericsson is also time-barred under § 315(b). As described above, Patent Owner sued Ericsson’s privy, Sprint, for infringing the ’931 patent in 2016. Thus, because Sprint is time-barred from bringing an additional IPR challenging the ’931 patent (in addition to being estopped from doing so based on the Sprint IPR), so is its privy, Ericsson.

Indeed, the Board previously denied an IPR Petition from Ericsson in *Regents* on the basis that it was “barred under § 315(b)” because Ericsson “filed the Petition more than one year after the date on which its privy [Sprint] was served with a complaint alleging infringement of the [LTE base station-related] patent.” *See Ericsson Inc.*, IPR2017-01186, Paper 58 at 7, 11, 15 (finding that Ericsson has agreements with Sprint “to supply them with the base stations that implement some

of the functionality identified in Patent Owner’s infringement allegations,” and “that preexisting relationship includes substantive legal obligations. Namely, the supply agreements include indemnification provisions” and “the indemnification provisions in [Ericsson’s] supply agreements with the District Court Defendants specifically address the issue of control” (citing Ericsson’s “supply agreement with Sprint”).)

Just as in *Regents*, Patent Owner has accused Sprint’s LTE base stations—again supplied by Ericsson—of infringing its patent. Because Ericsson has admitted that “Ericsson’s supply contract with Sprint contains detailed indemnification provisions, which specifically require Ericsson to indemnify Sprint from patent infringement claims arising out of Sprint’s use of Ericsson’s LTE base stations,” Ericsson must similarly be time-barred from filing an IPR in this matter. *See Ericsson Inc. v. Regents of the University of Minnesota*, IPR2017-01186, Ex. 2032 at 1 (PTAB June 19, 2020).

Although the Board has the discretion to permit a time-barred petitioner to join an IPR, “the existence of a time bar under 35 U.S.C. § 315(b) is one of several factors that may be considered when exercising discretion under 35 U.S.C. § 315(c),” and the Board “will do so only where fairness requires it and to avoid undue prejudice to a party.” (Consolidated Trial Practice Guide at 76-77.) Ericsson has provided no reason that fairness requires it to join a petition (1) more than seven years after its privy was sued for infringing the ’931 patent, (2) after that

same privy has already brought an IPR challenging the '931 patent that resulted in a FWD affirming the patentability of the Challenged Claims, and (3) after Ericsson's District Court case was dismissed with prejudice. (*See* Ex. 2003 at 1.) *See Code200 et al. v. Bright Data Ltd.*, IPR2021-01503, Paper 13 at 8 (PTAB Mar. 14, 2022) (denying joinder motion where “allowing joinder would offer Petitioner a second bite at asserting invalidity after the previous dismissal with prejudice of Petitioner's invalidity counterclaims in the District Court action.”).

C. Institution Should Be Denied on Ground 1 (Vornefeld + Atsuta) Because Atsuta Does Not Supply the Missing Elements of Claims 28 and 29

1. Atsuta Adds Nothing to Vornefeld

As discussed above, Claims 28 and 29 require that the base station transmit multiple beamformed signals, each of which carries separate downlink data directed to wireless devices in different sectors of the cell, and that the base station make those separate beamformed transmissions in the same downlink portion of the TDD frame.

Ericsson asserts that Atsuta supplies the limitations added by Claims 28 and 29 by disclosing “a base station that transmits downlink data to subscribers in different sectors within a single TDMA frame.” Pet. at 24. But that description is grossly misleading. Ericsson consistently ignores the actual requirement of Claims 28 and 29. For example, Claims 28 and 29 require that multiple beamformed

signals be transmitted to wireless access devices in different sectors in the *same portion of the same frame*, elements that Ericsson effectively concedes are absent from Atsuta. Ericsson also ignores the Board’s prior finding that Vornefeld failed to disclose “using different beams in the same TDD frame (i.e., second downlink data traffic, transmitted in “said downlink portion of said TDD frame”) to transmit to devices within a different sector.” Ex. 1009, Sprint IPR Final Written Decision at 23. Even a cursory examination of Atsuta makes clear that it does not teach the additional limitations added by Claims 28 and 29 and found to be missing from Vornefeld. Indeed, it does not even address the subject matter of the ’931 Patent.

2. Atsuta Does Not Involve Beamforming or Downlink Transmissions

Beamforming and organization of the downlink transmissions are at the heart of the ’931 Patent. The title of the ’931 Patent is “Wireless Access System Using Selectively Adaptable Beam Forming in TDD Frames and Method of Operation.” The abstract, specification, and claims of the ’931 Patent all address beamforming and TDD. Claims 28 and 29 specifically address the coordination of multiple beamformed signals in a TDD wireless network, in which each beamformed signal carries different downlink data to wireless devices in a different sector of the cell. Claims 28 and 29 require that wireless devices located in different sectors of the cell be sent different downlink data, on different

beamformed signals, transmitted in the same downlink portion of the same TDD frame.

Atsuta, by contrast, does not address beamforming in any way. It does not even address the use of an antenna array capable of beamforming. Nor does it speak to how multiple beamformed signals carrying downlink data should be organized or coordinated.

The word “beam” appears only once in Atsuta in its discussion of “conventional” base stations utilizing “a fan-shaped beam antenna for sectoring a service area.” Ex. 1005 at 1:13-18. Of course, conventional base station antennas at the time did not use beamforming. Atsuta does not address antennas capable of beamforming (e.g., including multiple elements with means for controlling their weights and/or phases). In context, Atsuta’s “fan-shaped beam antenna” is just a conventional antenna designed to transmit a typical fan-shaped beam. *See generally* Ex. 2021, Fan Beam, Britannica.com, <https://www.britannica.com/science/fan-beam> (defining “fan beam” and depicting conventional antennas capable of transmitting a fan-shaped beam).

In addition to using beamformed signals, Claims 28 and 29 of the ’931 Patent are expressly directed to the coordination of downlink transmissions (not uplink) from the base station to wireless devices on the network, which present unique interference problems due to the power generated by the base station

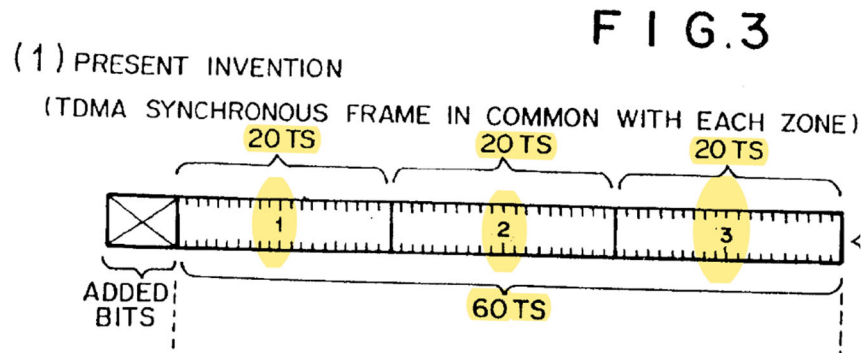
antenna. *See, e.g.*, (16:20-23) (“Thus, to prevent interference between antennas in different sectors of the same cell site, the present invention uses a highly accurate distributed timing architecture to align the start points of the downlink transmissions.”).⁶ Unlike the ’931 Patent, *Atsuta* is directed to the organization of ***uplink*** transmissions from the wireless devices to the base station (using conventional non-beamformed signals). *Atsuta* teaches that uplink transmissions from wireless devices (which *Atsuta* refers to as “subscriber stations”) to the base station should be separated in time so “the TDMA signals of the subscriber stations do not overlap.” Ex. 1005 at 3:4-5 To accomplish this, *Atsuta* teaches assigning a different uplink portion of a TDMA frame to each subscriber station. *Id.* at 7:45-49.

Finally, and most importantly, even if one overlooks the fact that *Atsuta* has nothing to do with the coordination of beamformed downlink transmissions and instead addresses the organization of conventional uplink transmissions, *Atsuta* teaches the opposite of what is required by Claims 28 and 29 of the ’931 Patent.

⁶ Claims 28 and 29 do not speak specifically to the organization of the uplink transmissions, and the specification teaches that unlike downlink transmissions, uplink transmissions “may be limited to a single scanning beam per frame.” (28:66-67)

As explained above, Claims 28 and 29 require that multiple beamformed signals carrying different downlink data to wireless devices in separate sectors of the cell be made in the same portion of the same TDD frame. Atsuta, by contrast, repeatedly and consistently teaches that each subscriber within a sector must be allocated a separate portion of the frame so that the transmissions from each subscriber station “do not overlap.” *See* Ex. 1005 at 3:67-4:1 (“time slots are assigned to the divided zones so that the time slots do not overlap”); 5:36-39 (according to the present invention, 20 TS . . . are assigned to each fan shaped zone in such a manner that time slots of individual fan-shaped divided zones do not overlap”); 5:62 (“time slots do not overlap”); 7:49-50 (Claim 1, requiring that “the TDMA signals of the subscriber stations do not overlap”); 8:20-21 (Claim 3, requiring that the signals be organized “so as not to overlap”); 8:60-61 (Claim 5, requiring that the signals be organized “so as not to overlap”).

Figure 3 of Atsuta illustrates how uplink transmissions from wireless devices in different sectors are separated into different 20 millisecond portions of the 60 millisecond frame. As shown below, transmissions from wireless devices in each “zone” are assigned a separate and distinct portion of the frame labeled 1, 2 and 3.



Indeed, Ericsson concedes that Atsuta “assigns different timeslots within a single [uplink] frame to subscribers in different sectors.”⁷ Pet. at 27. Thus, there can be no dispute that Atsuta assigns different portions of a frame to each transmission, and that it does not disclose multiple simultaneous transmissions in the same portion of the frame.

3. Atsuta Does Not Disclose the Elements Missing from Vornefeld

Ericsson attempts to rely on Atsuta by making the superficial argument that it discloses multiple transmissions “within a *single TDMA frame*.” Pet. at 24. (emphasis added). But in doing so, Ericsson ignores the actual language of Claims 28 and 29—which expressly require not only that multiple downlink transmissions be organized in a “single frame,” but that they be *beamformed* signals transmitted

⁷ Ericsson erroneously refers to these as “downlink” timeslots. But Atsuta is actually directed to uplink transmissions (and the receipt of uplink transmissions by the base station).

in “the *[same] downlink portion* of the [same] TDD frame.” It is obviously not enough for Ericsson to argue that Atsuta shows multiple transmissions in a “single frame,” but Ericsson doesn’t even assert that it can show that Atsuta discloses what is actually required by Claims 28 and 29.

Ericsson’s oversimplification of Claims 28 and 29 highlights how Atsuta fails to add anything beyond what has already been considered in the examination and prior IPR of the ’931 Patent. The ’931 Patent cites multiple references disclosing multiple transmissions to different wireless devices within the same frame—the very concept that Ericsson alleges is added by Atsuta. For example, a treatise published in 1996 and “incorporated by reference” into the ’931 Patent (6:23-31), included the following depiction of a TDMA frame with different slots (Slots 1 through N) allocated to different wireless devices within the same frame:

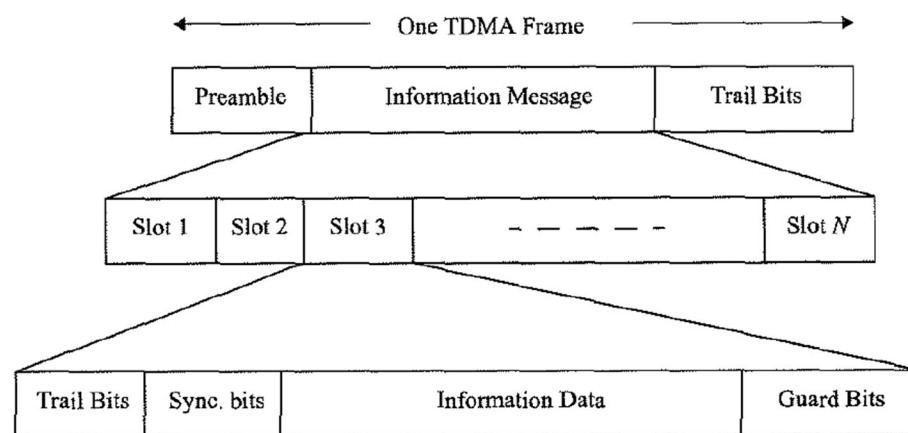


Figure 8.4
TDMA frame structure.

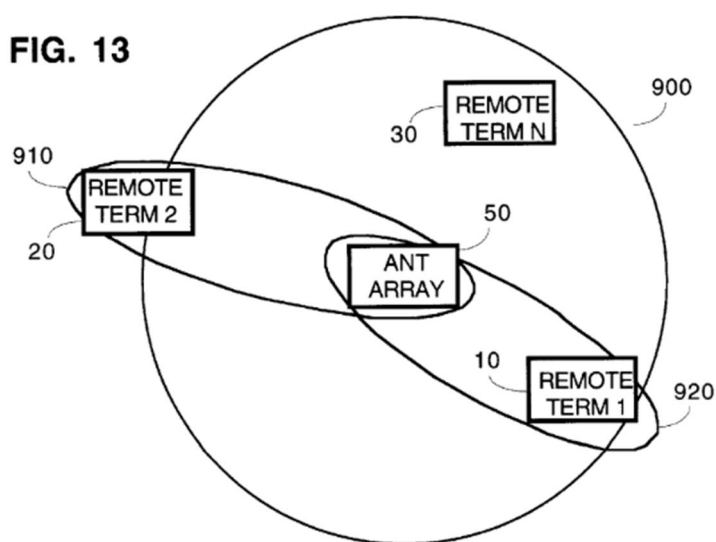
Theodore Rappaport, *Wireless Communications, Principles and Practice*, at 402 (1996) (“Rappaport”; Ex. 2022); *id.* at 437 (noting that “GSM TDMA system

uses a 270.833 kbps data rate to support 8 users per frame,” while the “U.S. Digital Cellular TDMA systems . . . support[s] 3 users per frame”).

Figure 8.4 of Rappaport shows precisely the same thing as Figure 3 in Atsuta: time slots assigned to multiple users in the same TDMA frame. Ericsson’s purportedly “new” art is anything but; it is duplicative of art referenced and incorporated into the specification of the ’931 Patent. *See also* Bernard Sklar, *Digital Communications Fundamentals and Applications*, at 484 (1988) (“Sklar”; Ex. 2023) (incorporated by reference into the ’931 Patent and noting that, in systems using TDMA, “[e]ach frame is further partitioned into assignable user time slots”); *id.* at 486 (discussing a frame with 4 slots, where “each slot is preassigned to users A, B, C, and D, respectively”). This art was before the Examiner who issued the ’931 Patent. It was also before the Board and the Federal Circuit when they rejected the Sprint IPR.

Additional prior art discussing transmissions to users in multiple sectors in the same frame was cited by Sprint in the prior IPR. In its Petition, Sprint noted that “[w]hile cellular communications systems in use at the time of the invention were primarily FDD based, TDD based cellular systems had gained significant attention in the research and commercial communities before the invention of the ’931 patent.” Ex. 1014, Sprint Pet. at 48. Sprint’s supporting declaration identified prior art patents disclosing a variety of TDD frame structures, including

one that its expert described as including “portions transmitted with directed beams” to “remote terminals” located in multiple sectors in the same frame. *See* Ex. 2020, Proctor Decl. ¶¶ 83-85. Sprint’s expert included the following figure from the prior art to illustrate its transmissions to spatially separated remote terminals in the same frame:



Id. ¶ 85. *See also id.* ¶ 84 (quoting, from the same reference, that “[p]referably there are up to thirty one concurrent orthogonally modulated traffic channels . . . within a DTS frame”). Notably, Patent Owner did not rebut this evidence in the Sprint IPR. *Atsuta* thus adds nothing to the prior art already considered and rejected by the Board and the Federal Circuit.

Atsuta’s requirement that each uplink transmission be allocated a different time slot also teaches away from Claims 28 and 29’s requirement of multiple

transmissions during the *same portion* of the same TDD frame. This fundamental difference between the Challenged Claims and Atsuta cannot be overstated.

Claims 28 and 29 of the '931 Patent require that multiple beamformed signals be transmitted *at precisely the same time*, and does so by putting them in the same portion of the same TDD frame. As explained above, Atsuta teaches the opposite—dividing transmissions into different time slots so that *they never overlap in time*. (“A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.”) (internal citations omitted).

Ericsson makes no effort to explain why a person of ordinary skill in the art would understand to transmit multiple beamformed downlink transmissions in the same portion of the same TDD frame from a prior art reference teaching that conventional uplink transmissions should always be transmitted in different time slots so they never overlap. *Cf. Ricoh Co., Ltd. v. Quanta Computer Inc.*, 550 F.3d 1325, 1332 (Fed. Cir. 2008) Ericsson cannot attempt to make such a showing because it simply makes no sense.

Even if a person of ordinary skill changed Vornefeld by combining it with Atsuta, the resulting combination would fail to meet the limitations of the

Challenged Claims. Atsuta's sequential transmissions in different time slots are not in the same portion of the same TDD frame, as required by Claims 28 and 29.

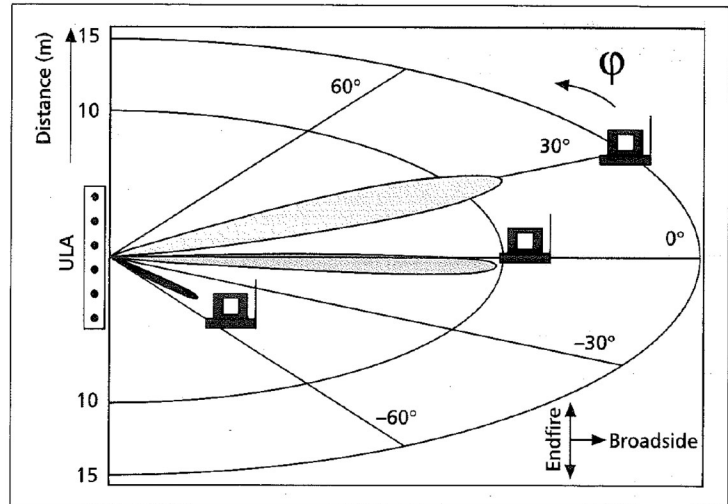
Ericsson fails to engage honestly with the Atsuta reference. Ericsson instead mischaracterizes the Atsuta reference in the hopes that the Board will institute on a duplicative and futile petition that presents nothing more than the prior Sprint IPR already rejected by the Board and the Federal Circuit.

4. A Person of Ordinary Skill in the Art Would Not Combine Atsuta with Vornefeld Because It Would Thwart the Intended Purpose of Vornefeld

Even if the combination of Vornefeld and Atsuta would satisfy the limitations of Claims 28 and 29 (it does not), Ericsson has not—and cannot—show that a person of ordinary skill in the art would make that combination. In its Petition, Ericsson makes only conclusory statements to the effect that a person of ordinary skill in the art would be motivated to combine Atsuta with Vornefeld. Pet. at 26-27, 29. But Ericsson fails to address the fact that Atsuta addresses different issues in a different context. Specifically, Ericsson fails to provide any reason why a person of ordinary skill in the art would look to a patent that deals with conventional non-beamformed uplink transmissions to figure out how to coordinate beamformed downlink transmissions. Ericsson does not grapple with these issues, because there are no good answers.

A person of ordinary skill would not seek to combine Atsuta with Vornefeld because such a combination would thwart the very purpose of Vornefeld. Like Claims 28 and 29 of the '931 Patent, the system disclosed in Vornefeld was

intended to allow for the simultaneous transmission of beamformed signals to different wireless devices. Ex. 1004 at 53 (emphasis added) (“Depending on the number of antenna elements and the applied algorithm, array



■ Figure 2. Simultaneous transmission using directive beams.

antennas are able to *simultaneously* direct several beams to different positions conveying individual user signals.”). Indeed, Figure 2 of Vornefeld shows that its system uses “simultaneous transmission using directive beams.”

As discussed above, a critical difference between Vornefeld and Claims 28 and 29 is that Vornefeld taught the use of separate TDD frames for each beamformed signal rather than transmitting all of the beamformed signals in the same portion of the same TDD frame. But they both seek to allow for simultaneous transmission of multiple beamformed signals.

Atsuta, on the other hand, consistently teaches that signals should be transmitted sequentially in time, with each signal assigned a different portion of a

TDD frame so they “do not overlap.” *See, e.g.*, Ex. 1005 at 3:1-5 (“A subscriber station is adapted for transmitting TDMA signals with time slots of a common TDMA synchronous frame in such a manner that the TDMA signals of the subscriber stations do not overlap.”); *Id.* at 7:46-50 (“transmitting, from the subscriber stations, TDMA signals with time slots of a common TDMA synchronous frame by each of the subscriber stations in the outdoor units in such a manner that the TDMA signals of the subscriber stations do not overlap.”). A person of skill in the art seeking to develop a TDD communications protocol allowing for the *simultaneous* transmission of multiple downlink beamformed signals would not turn to a patent teaching the *sequential* transmission of signals so they never overlap in time. *See Plas-Pak Indus., Inc. v. Sulzer Mixpac AG*, 600 F. App’x 755, 758 (Fed. Cir. 2015) (affirming the Board’s finding that an invention was nonobvious where a person of ordinary skill would not have been motivated to pursue the combination because it would “ “change the basic principles under which the prior art was designed to operate, or . . . render the prior art inoperable for its intended purpose.”) (citations and quotations omitted); *see also In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984).

D. Institution Should Be Denied on Ground 2 (Vornefeld + Goldberg) Because Goldberg Does Not Include the Missing Limitations of Claims 28 and 29

1. Goldberg Adds Nothing to Vornefeld

As with Atsuta, Ericsson argues that Goldberg discloses transmission “to subscribers in different regions using one frame as part of the TDMA protocol.” Pet. at 42. Here too, Ericsson overstates the disclosures of Goldberg and oversimplifies the limitations added by Claims 28 and 29 that the Board and the Federal Circuit previously found to be absent from Vornefeld.

Goldberg provides no disclosure of TDD or any particular TDD frame structure. The reference does not even contain the terms “TDD” or “time division duplexing.”⁸ To the contrary, Goldberg focuses exclusively on the GSM standard,

⁸ Ericsson improperly conflates time division multiple access (“TDMA”) with time division duplexing (“TDD”). See Pet. at 40 (“Like Vornefeld, Goldberg (sp) is also directed to TDMA frame-based communications...”). The fact that Goldberg discloses TDMA does not imply that it is utilizing a TDD frame structure. To the contrary, as explained in a treatise expressly incorporated by reference into the ’931 Patent, (6:23-31), TDMA is a more general term and TDMA systems use “**either** FDD or TDD,” which are “called TDMA/FDD or TDMA/TDD access systems.” Ex. 2022, Rappaport at 397. Goldberg discloses only a TDMA/FDD system.

which uses an FDD multiplexing scheme. Ex. 1006 at 6:58-61 (“In the particular embodiment disclosed, the communication station is part of a base station which operates using a variant of the GSM air interface.”); *id.* at 9:50-10:2 (“The preferred embodiment described will be for a cellular system which uses SDMA and a variant of the GSM protocol . . . In GSM, frequency channels (called “carriers”) are separated by 200 kHz.”). As Goldberg explains, “GSM uses *frequency division duplexing*, which means that downlink and uplink communications between a BS and a MS occur at different frequencies.” (emphasis added). The closest Goldberg comes to TDD is to assert that “[t]he invention is not limited to any particular multiplexing scheme or air interface standard.” *Id.* at 6:61-62.

Just like Atsuta, Goldberg fails to teach the transmission of multiple beamformed downlink transmissions in the same portion of the same TDD frame. Faced with this same gap in Goldberg, Ericsson once again resorts to ignoring the actual claim language. Specifically, Ericsson argues that Goldberg discloses “using one frame” for multiple downlink transmissions. *See* Pet. at 42. But Claims 28 and 29 require more. They expressly require that the multiple beamformed downlink signals be transmitted to users located in different sectors “in said downlink portion of said *TTD frame*.” Goldberg fails to grapple with the unique

challenges associated with beamforming to multiple users, located in multiple sectors, in the same TDD frame.

Moreover, like Atsuta, Goldberg merely discloses features that were present in the art previously considered in the examination of the '931 Patent.

Transmitting multiple signals to multiple users in a single frame is basic to TDD systems and was plainly disclosed in art cited and incorporated into the specification of the '931 Patent for background on TDD. *See, e.g.*, Ex. 2022, Rappaport at 402; Ex. 2023, Sklar at 484. It was also disclosed in references cited by Sprint in the prior IPR. *See* Ex. 2020, Proctor Decl. ¶¶ 73-91. Like Atsuta, Goldberg adds nothing to what was previously before the original examiner, the Board in the prior IPR, and the Federal Circuit.

2. A Person of Ordinary Skill in the Art Would Not Combine Goldberg with Vornefeld

As discussed above, a principal object of Vornefeld (like Claims 28 and 29) is to allow for the simultaneous transmission of multiple beamformed signals to different sectors of the cell using a common frequency. Even by Ericsson's own account, Goldberg teaches the use of separate time slots for each downlink beam, and thus would not achieve the purpose of allowing for multiple simultaneous beams. Pet. at 41-42 ("Goldberg describes eight timeslots, where one timeslot is reserved for common broadcast information (remaining slots are used to transmit directionally to specific subscribers). This aligns with Vornefeld's teachings of

using multiple timeslots for different users.”).⁹ Adding Goldberg to Vornefeld would thus thwart, not further, one of the principal objects of Vornefeld and of the Challenged Claims.

Moreover, a person of ordinary skill in the art seeking to develop a protocol for the transmission of multiple simultaneous beamformed signals in a TDD wireless network would not turn to a patent directed to an FDD multiplexing scheme. FDD is an older approach to multiplexing generally better suited to voice communications. TDD networks, by contrast, are generally superior for asymmetrical data transmission. As the '931 Patent explains: “A great advantage of TDD operation is the ability to dynamically allocate the portions of a frame allocated between the downlink and the uplink. This results in an increased efficiency of operation relative to frequency division duplex (FDD) techniques. TDD operations typically may achieve a forty to sixty percent advantage in spectral efficiency over FDD operations under typical conditions.” (14:10-17) Moreover, the primary thrust of Goldberg is “to achieve a near omnidirectional

⁹ In this statement, Ericsson appears to misapprehend the disclosures of Vornefeld. Vornefeld teaches that it is desirable to simultaneously transmit multiple beamformed signals. Vornefeld, however, teaches the use of separate TDD frames for each beamformed signal rather than transmitting them in the same TDD frame.

pattern throughout [the antenna's] area of coverage.” Ex. 1006 at 1:12-13. It would make no sense for a person of ordinary skill in the art seeking to develop an efficient protocol for beamforming in a TDD network to turn to a patent focused on omnidirectional broadcasting in FDD.

E. Institution Should Be Denied on Ground 3 (Youssefmir + Atsuta) Because Youssefmir Teaches a Method the '931 Patent Expressly Rejects

1. Youssefmir Teaches a Fundamentally Different Approach to the Coordination of Beamforming That Was Rejected by the '931 Patent

Entitled “Cooperative Polling in a Wireless Data Communication System, Having Smart Antenna Processing,” Youssefmir discloses a system in which wireless devices are first sent and must respond to polling messages. The information received from those polling messages is subsequently used to mitigate interference with downlink data transmissions. Ex. 1007 at 2:66-3:18. First, the base station sends “a first poll . . . to a first user terminal.” *Id.* at 2:66-3:2. The base station then “receives a first uplink response signal from the first user terminal.” *Id.* at 3:2-3. The “base station also receives one or more other uplink response signals from one or more other remote user terminals.” *Id.* at 3:5-6. Then, “using the first and other received uplink response signals, the base station “transmits downlink data to the first user terminal using a downlink smart antenna.” *Id.* at 3:9-18. The base station thus uses the information it obtains from

the initial poll to determine how it will transmit to each of the user terminals. *See id.*; *see also id.* at Claim 16, 30:63-65 (the base station determines “the set of downlink weighting parameters from the set of uplink weighting parameters”).

The '931 Patent discusses and wholly rejects the approach taught by Youssefmir. It acknowledges such an approach was known in the prior art but explains that “round robin polling” works only when there is an “equal distribution of subscribers.” (28:26-29) The '931 Patent further explains that in a commercial wireless cellular network, “uniform distribution is not guaranteed and wireless access network **100** may use a large number of beams to cover a sector.” (28:29-31) In these circumstances, “[t]he revisit time to any specific beam may result in subscribers falling out of synchronization.” (28:31-33) For these and other reasons, the '931 Patent rejects the use of round robin polling in favor of “a full-sector coverage broadcast beam and use of spread spectrum” at the start of a TDD frame for the transmission of synchronization and acquisition information. (28:34-36) The '931 Patent explains that its approach is superior to the use of round robin polling as taught in Youssefmir:

By introducing spread spectrum and a broadcast beam operating on the Start of Frame (SOF) field of every frame, the present invention provides improved performance for acquisition and synchronization as opposed to either equal duration round robin polling per scan beam or dynamic weighted polling per scan beam based on the throughput cell.

Id. at 28:44-51.

Ericsson completely ignores this fundamental difference between Youssefmir and the '931 Patent, and how the specification expressly distinguishes the present invention from systems like Youssefmir. As with its discussion of the other references, Ericsson simply ignores reality and pretends that Youssefmir is something other than what it is. Tellingly, the word “poll” does not appear in Ericsson’s Petition, even though it is part of the title of Youssefmir and is mentioned dozens of times throughout the patent. Rather than engaging in an honest discussion of the reference, Ericsson just hopes the Board will overlook that the '931 Patent expressly disparages the fundamentally different approach taught in Youssefmir.

Because Youssefmir employs sequential polling of wireless devices, it does not satisfy the “broadcast beam signal” limitations of independent Claims 1 and 19. Specifically, it does not transmit a “broadcast beam signal” to “more than one of said sectors” at “the start of a TDD frame.” In an attempt to meet this limitation, Ericsson points to a “signaling segment” and certain “frame markers” shown in

Figures 5A-C of Youssefmir. Pet. at 57-58. However, nothing in Youssefmir suggests that these transmissions are directed to more than one sector of the cell.¹⁰

Perhaps more importantly, there is no disclosure in Youssefmir of beamformed signals being sent in the same portion of the same TDD frame. To the contrary, like the other newly asserted prior art references advanced by Ericsson, Youssefmir expressly teaches transmitting to each wireless device sequentially, one by one. As Youssefmir explains it, “[e]ach active user terminal is assigned an uplink and downlink transfer period.” Ex. 1007 at 24:27-28. Thus, just like all of the other prior art cited by Ericsson, Youssefmir fails to disclose the same critical elements added by Claims 28 and 29 that the Board and the Federal Circuit previously found to be missing from Vornefeld.

¹⁰ Relatedly, Ericsson concedes that, “Youssefmir does not explicitly state that the different downlink slots D1, D2 would be allocated to user terminals *in different sectors*.” Pet. at 51 (emphasis added). Ericsson attempts to fill that gap with Atsuta, arguing that “such a frame structure was already taught by Atsuta.” *Id.* But as shown above, Atsuta teaches no such thing. Atsuta does not address beamformed downlink signals at all. Atsuta instead deals with conventional uplink transmissions.

F. Institution of Grounds 4 and 5 Should Be Denied Because Ericsson Does Not Have a Reasonable Likelihood of Success

In Grounds 4 and 5, Ericsson adds the Tangemann reference to Grounds 1 (Vornefeld + Atsuta) and 2 (Vornefeld + Goldberg). Ericsson uses Tangemann for its disclosure of “minisectors.” But none of the deficiencies in Ericsson’s asserted prior art discussed above turn on the precise definition of the term “sector” or require that it be viewed as a portion of the cell smaller than the coverage area of an antenna. Ericsson thus cannot show a reasonable likelihood that it would prevail on Grounds 4 and 5 for the very same reasons as Grounds 1 and 2.

G. The Board Should Exercise Its Discretionary Authority to Deny Institution Under Section 325(d) and *General Plastic*

1. The Board Should Deny Institution Under 35 U.S.C. § 325(d)

The Board and the Federal Circuit have already conducted *inter partes* review of Claims 28 and 29 of the ’931 Patent based on the Vornefeld reference and confirmed the patentability of the claims. As shown above, while Ericsson now cites additional prior art references, those new references add nothing of significance to Vornefeld and the other prior art references previously considered by the Board and the Federal Circuit.

Despite the clear overlap between Sprint’s petition and this Petition, Ericsson never addresses the *Becton* factors to explain why institution should be granted. This is a telling omission that should result in a discretionary denial of the

Petition. *See Vital Connect, Inc. v. Bardy Diagnostics, Inc.*, IPR2023-00381, at 19 (PTAB July 11, 2023) (Paper 7) (“Having considered the record, we agree with Patent Owner that Petitioner has failed to demonstrate that the Office erred in its evaluation of the cited art as required by *Advanced Bionics* . . . It is unclear to us why Petitioner did not allege an error and/or substantively address § 325(d) in its Petition . . .”).

Section 325(d) provides that: “In determining whether to institute or order a proceeding under this chapter . . . the Director may take into account whether, and reject the petition or request because, the same or substantially the same prior art or arguments previously were presented to the Office.” The Board uses the following non-exclusive factors to guide its decision under § 325(d):

- (1) the similarities and material differences between the asserted art and the prior art involved during examination;
- (2) the cumulative nature of the asserted art and the prior art evaluated during examination;
- (3) the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection;
- (4) the extent of the overlap between the arguments made during examination and the manner in which Petitioner relies on the prior art or Patent Owner distinguishes the prior art;
- (5) whether Petitioner has pointed out sufficiently how the Examiner erred in its evaluation of the asserted prior art; and
- (6) the extent to which additional evidence and facts presented in the Petition warrant reconsideration of the prior art or arguments.

Becton, Dickinson & Co. v. B. Braun Melsungen AG, IPR2017-01586 (PTAB Dec. 15, 2017) (Paper 8) (precedential in relevant part). Although *Becton, Dickinson* framed its factors in terms of “examination,” *Advanced Bionics* clarified and added that discretionary denials and the factors apply to: “examination of the underlying patent application, reexamination of the challenged patent, a reissue application for the challenged patent, and *AIA post-grant proceedings involving the challenged patent.*” *Advanced Bionics LLC v. Med-EL Elektromedizinische Geräte GMBH*, IPR2019-01469, at 8 (PTAB Feb. 13, 2020) (Paper 6) (precedential) (emphasis added).

Ericsson details none of these factors in the Petition. They *all* weigh in favor of denial, including the first and second factors.¹¹ First, the similarities

¹¹ *Advanced Bionics* set forth a two-part framework when evaluating the *Becton* factors: 1) whether the same or substantially the same art or argument were previously presented to the Office (*Becton* factors 1-2, 4); and 2) If “yes” to either condition, whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims (*Becton* factors 3, 5-6). For this reason, General Access will present the *Becton* factors under the *Advanced Bionics* framework.

between the art asserted in the Sprint IPR versus the art Ericsson relies on here starts and really ends with Vornefeld. Like Sprint, Ericsson relies extensively on Vornefeld for purposes of its Petition and four of the five grounds for institution:

	<u>Sprint IPR</u>	<u>Ericsson IPR</u>
Ground 1	§ 102 Vornefeld	§ 103 Vornefeld + Atsuta
Ground 2	§ 103 Vornefeld + Ahy	§ 103 Vornefeld + Goldberg
Ground 3	§ 103 Vornefeld + Andersson	§ 103 Youssefmir + Atsuta
Ground 4	§ 103 Vornefeld + Andersson + Ahy	§ 103 Vornefeld + Atsuta + Tangemann
Ground 5	§ 103 Newman + Andersson + Ahy	§ 103 Vornefeld + Goldberg + Tangemann

The Board and the Federal Circuit thoroughly considered Vornefeld. Ericsson purports to add new art disclosing the use of a “single frame.” But none of that art actually discloses the requirement of Claims 28 and 29 that multiple beamformed transmissions carrying different downlink data to wireless devices in separate sectors of a cell *be transmitted in the same downlink portion of the same TDD frame*. Again, Atsuta does not even involve beamformed transmissions or deal with transmitting multiple beamformed downlink signals to different sectors of the cell. It instead addresses conventional, non-beamformed uplink transmissions and organizes them in the opposite way (by assigning them different

time slots so they do not overlap). Atsuta simply does not speak to the issues addressed by the invention claimed in Claims 28 and 29.

Goldburg is no better. Goldburg contains no disclosure of TDD frames or TDD multiplexing schemes. Like Atsuta, it does not disclose that multiple downlink beamformed signals in a TDD network should be transmitted in the same portion of the same TDD frame. Nor does it even grapple with the issue. Moreover, Sprint specifically relied on Goldburg as part of its expert declaration in the prior IPR to show the state of the art. In accord with the second *Becton* factor, the art Ericsson relies upon is simply cumulative of what was already before the Board.

The fourth factor (overlap between the petitioner's arguments and those made during the previous petition) is striking. In four of the six asserted Grounds, Ericsson relies on the same primary reference (Vornefeld). And in two of those Grounds, it relies on a reference (Goldburg) that was previously used to show the state of the art. Given the fact that the newly cited references plainly do not disclose the requirements previously found to be missing from Vornefeld, that art should be treated as cumulative of the references previously considered by the Board and the Federal Circuit.

Looking at *Becton* factors three, five and six (the second part of the *Advanced Bionics* framework), how the Board and the Federal Circuit erred in its

previous analysis, Ericsson defaults. Ericsson points to no error in the Board's prior analysis. Ericsson does not even mention that the Federal Circuit affirmed the Board's findings as to Claims 28 and 29.

Ericsson has offered the Board no basis to revisit its prior determination that Vornefeld does not render Claims 28 and 29 obvious. This weighs heavily against institution:

[W]hen a prior art reference presented in a petition was already considered substantively by the Examiner, the petitioner has the initial burden to identify such errors made by the examiner with respect to that prior art reference. Any factual finding made by the examiner and not contested by the petitioner may be treated as undisputed fact for the purposes of evaluating petitioner's assertions concerning examiner error under Section 325(d).

Neil Ziegmann, N.P.Z., Inc. v. Carlis G. Stephens, IPR2015-01860, at 10 (PTAB Sept. 6, 2017) (Paper 13) (expanded panel) (citations omitted).

Finally, regarding the fifth and sixth factors (error, and new evidence or facts that might warrant reconsideration), Petitioner offers no details or new evidence. Ericsson cannot reflexively argue that the combination of Vornefeld and Atsuta, or Vornefeld and Goldberg "was not considered," as if that satisfies its obligation to explain how the Board and the Federal Circuit erred in the prior proceeding. The Petition here presents a situation similar to the one leading to the Board's recent decision to deny institution in *Sony*, where the petitioner relied heavily on the same primary reference (in that case *Lee*), while purportedly citing

new art (Obata) for purposes of teaching an “accumulation buffer.” As the Board explained:

As to *Becton, Dickinson* Factor (e), i.e., whether petitioner has pointed out sufficiently how the Examiner erred in its evaluation of the asserted prior art, Sony was provided the opportunity to provide explanation, but Sony was silent in this regard. Sony relies entirely on its argument that the combination of Lee and Obata was not considered, but the Petition relies heavily on Lee. In particular, Obata is relied on for simply teaching an “accumulation buffer,” but buffers to accumulate values prior to rendering were known in the art as shown in Lee. Accordingly, *Becton, Dickinson* Factor (e) favors exercising our discretion to deny institution.

With regard to *Becton, Dickinson* Factor (f), Sony has not submitted further explanation as to how any additional evidence and facts presented in the Petition warrant reconsideration of Lee. Accordingly, *Becton, Dickinson* Factor (f) favors exercising our discretion to deny institution.

Thus, we are not persuaded that Petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims of the ’488 patent.

Sony Interactive Entertainment LLC v. Terminal Reality, Inc., IPR2020-00710, at 12 (PTAB Oct. 13, 2020) (Paper 15) (citations omitted).

Application of the *Becton* factors, in accord with the *Advanced Bionics* framework, demonstrates the Board should exercise its discretion and deny institution under 35 U.S.C. § 325(d).

2. Denial of Institution Is Also Supported by *General Plastic*

The Board has clarified that discretionary factors must be considered before determining a joinder motion. *Apple Inc. v. Uniloc 2017 LLC*, IPR2020-00854,

Paper 9 at 5 (PTAB Oct. 28, 2020) (precedential) (“before determining whether to join . . . even though the Petition is a ‘me-too petition,’ we first determine whether application of the General Plastic factors warrants the exercise of discretion to deny the Petition under §314(a).”); *see also Gen. Plastic Indus. Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 at 15-19 (PTAB Sept. 6, 2017) (precedential) (precedential). The *General Plastic* factors weigh in favor of exercising discretion to deny the petition and joinder. Discretionary denial is appropriate here given the substantial relationship between Ericsson and Sprint.

In *General Plastic Co. Ltd. v. Canon Kabushiki Kaisha* the Board enumerated seven non-exhaustive factors the Board may consider when exercising its discretion to institute an IPR. *Id.* at 16-17 (citation omitted). Those factors relevant here, discussed below, weigh against institution.

First Factor: Relationship Between Petitioners: In *Valve Corp. v. Elec. Scripting Prods., Inc.*, the Board explained that “application of the *General Plastic* factors is not limited solely to instances where multiple petitions are filed by the same petitioner. Rather, when different petitioners challenge the same patent, we consider any relationship between those petitioners when weighing the *General Plastic* factors.” IPR2019-00062, Paper 11 at 9 (PTAB Apr. 2, 2019) (precedential). As explained in Section II.B., above, the Board has already held that Ericsson is a privy of Sprint with respect to its supplied LTE base stations at

issue here. The Board should reach the same conclusion in this matter.

To the extent that the Board determines that Ericsson is not a privy of Sprint, the Board should then consider whether Ericsson nonetheless has a “substantial relationship” with Sprint. *See* Changes Under Consideration to Discretionary Institution Practices, Petition Word-Count Limits, and Settlement Practices for America Invents Act Trial Proceedings Before the Patent Trial and Appeal Board, 88 Fed. Reg. 24503, 24507 (proposed Apr. 21, 2023) (“[T]he USPTO is considering adopting a ‘substantial relationship’ test to evaluate whether certain entities are sufficiently related to a party in an AIA proceeding such that discretionary denial is warranted...”). As an indemnitor with financial responsibility for Sprint’s infringement, Ericsson clearly has a substantial interest in the outcome of these proceedings. That overlapping interest weighs heavily in favor of discretionary denial.

Second Factor: The First Petitioner Should Have Known of the Prior Art:

As shown below, both Sprint and Ericsson’s IPRs rely heavily on Vornefeld, which the Board and the Federal Circuit already considered.

	<u>Sprint IPR</u>	<u>Ericsson IPR</u>
Ground 1	§ 102 Vornefeld	§ 103 Vornefeld + Atsuta
Ground 2	§ 103 Vornefeld + Ahy	§ 103 Vornefeld + Goldberg
Ground 3	§ 103 Vornefeld + Andersson	§ 103 Youssefmir + Atsuta

Ground 4	§ 103 Vornefeld + Andersson + Ahy	§ 103 Vornefeld + Atsuta + Tangemann
Ground 5	§ 103 Newman + Andersson + Ahy	§ 103 Vornefeld + Goldburg + Tangemann

And while Ericsson purports to add new art disclosing the use of a “single frame,” that art is (1) still dependent on Vornefeld and (2) cumulative of the art Sprint relied on in the previous IPR. Regardless, Sprint and Ericsson knew or should have known of the “new” art at the time of the original petition in the Sprint IPR.

Third, Fourth, and Fifth Factors: Timing: In *RPX Corp. v. Applications in Internet Time, LLC*, the Board found that the later-filed petitions challenged “the same claims of the same patents,” and were “filed by a party with a significant relationship to the original petitioner.” IPR2015-01750, at 38-39 (PTAB Oct. 2, 2020) (Paper 128) (precedential). The Board also determined that “the new petitioner “had the benefit of reviewing the original petitions and original Patent Owner preliminary responses.” *Id.* at 39.

The same is true here. Petitioner had the benefit of reviewing not only the original petition in the Sprint IPR and Patent Owner’s preliminary response, but also the Board and the Federal Circuit’s decisions before filing its petition. This Petition is plainly crafted as an effort to overcome the specific deficiencies identified by the Board and the Federal Circuit. It is precisely this sort of redo that these factors are intended to prevent.

Sixth and Seventh Factors: The Board's Resources and Timing: With deference and respect, the Board's finite resources should not be expended re-reviewing strikingly similar challenges by related parties to claims previously upheld by both the Board and the Federal Circuit. These factors also weigh against institution.

V. CONCLUSION

For the foregoing reasons, General Access respectfully submits that the Board should deny institution.

Dated: April 25, 2024

Respectfully submitted,

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CERTIFICATE OF WORD COUNT

Under the provisions of 37 C.F.R. § 42.24(d), the undersigned hereby certifies that the Microsoft Office word count for the foregoing Patent Owner's Preliminary Response Under 35 U.S.C. § 313 and 37 C.F.R. § 42.107, excluding the table of contents, table of authorities, claim listing, certificate of word count, and certificate of service, totals 12,610 words, which is less than the 14,000 words allowed under 37 C.F.R. § 42.24(b)(1).

Dated: April 25, 2024

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), I certify that I caused to be served on the counsel for Petitioner a true and correct copy of the foregoing Patent Owner's Preliminary Response Under 35 U.S.C. § 313 and 37 C.F.R. § 42.107, by electronic means on April 25, 2024 at the following addresses of record:

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