

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE PATENT TRIAL AND APPEAL BOARD

---

Ericsson Inc.,

Petitioner,

v.

UNILOC 2017 LLC,

Patent Owner.

---

Case IPR2019-01550

Patent 7,016,676

---

**PATENT OWNER PRELIMINARY RESPONSE TO PETITION**

**TABLE OF CONTENTS**

I. INTRODUCTION .....1

II. RELATED PROCEEDINGS .....2

III. THE PETITION SHOULD BE DENIED UNDER THE BOARD’S DISCRETION.....5

IV. THE ’676 PATENT .....21

V. LEVEL OF ORDINARY SKILL IN THE ART .....26

VI. PETITIONER DOES NOT PROVE A REASONABLE LIKELIHOOD OF UNPATENTABILITY FOR ANY CHALLENGED CLAIM.....26

    A. Claim Construction—Performance of the “Renders” Portion of Claim 1 is Required.....27

    B. The Petition does not establish that Shellhammer teaches “wherein the control station ... renders the frequency band available for access by the stations working in accordance with the second radio interface standard if stations working in accordance with the first radio interface standard do not request access to the frequency band” as recited in Claims 1 and 2. (Ground 1).....29

    C. The Petition does not establish that Shellhammer in view of Haartsen renders Claim 8 obvious. (Ground 2).....33

    D. The Petition does not establish that Shellhammer in view of Panasik renders Claim 8 obvious. (Ground 3).....36

    E. Lansford Does Not Disclose “a control station which controls the alternate use of the frequency band” and which “renders the frequency band available for access by the stations working in accordance with the second radio interface standard if stations working in accordance with the first radio interface standard do not request access to the frequency band” (Claim 1) (Ground 4).....40

VII. CONCLUSION.....42

## **I. INTRODUCTION**

Pursuant to 35 U.S.C. §313 and 37 C.F.R. §42.107(a), Uniloc 2017 LLC (the “Patent Owner” or “Uniloc”) submits Uniloc’s Preliminary Response to the Petition for *Inter Partes* Review (“Pet.” or “Petition”) of United States Patent No. 7,016,676 (“the ‘676 Patent” or “Ex. 1001”) filed by Ericsson Inc. (“Petitioner” or “Ericsson”) in IPR2019-01550.

The Board should exercise its discretion to deny this burdensome, redundant, and inefficient Petition. Ericsson presents no justifiable reason for there to be six petitions filed against the ‘676 patent. Moreover, as will be developed below, Ericsson delayed in presenting its Petition. Rather than come before the Board and fully explain its delay, Ericsson resorted to trying to understate its prior knowledge of the references in this IPR, even going as far as to misrepresent when it learned of the lead reference in three of its four challenges. Under these facts, the Board would be well within its discretion to deny the petition and should do so.

Should the Board reach the merits, the Petition should be denied in its entirety as failing to meet the threshold burden of proving there is a reasonable likelihood that at least one challenged claim is unpatentable.

Uniloc addresses each ground and provides specific examples of how Petitioner failed to establish that it is more likely than not that it would prevail with

respect to at least one of the challenged '676 Patent claims. As a non-limiting example described in more detail below, the Petition fails the all-elements-rule by failing to address every feature of every challenged claim.

Accordingly, Uniloc respectfully requests that the Board decline institution of trial on claims 1, 2, and 8 of the '676 Patent.

## II. RELATED PROCEEDINGS

The following district court proceedings currently involve U.S. Pat. No. 7,016,676 ('676 patent):

Case Name	Case Number	Court	Filing Date
Uniloc 2017 LLC v. Microsoft Corporation	8-18-cv-02053	CACD	Nov 17, 2018
Uniloc 2017 LLC et al v. Google LLC	2-18-cv-00495	TXED	Nov. 17, 2018
Uniloc 2017 LLC v. Verizon Communications Inc. et al	2-18-cv-00513	TXED	Nov. 17, 2018
Uniloc 2017 LLC v. AT&T Services, Inc. et al	2-18-cv-00514	TXED	Nov. 17, 2018

The '676 patent is also the subject of six *inter partes* review proceedings:

Case Name	Case Number	Court	Filing Date
Google, LLC v. Uniloc 2017 LLC	IPR2019-01541	PTAB	Aug. 29, 2019
Ericsson Inc. et al v. Uniloc 2017 LLC	IPR2019-01550	PTAB	Aug. 29, 2019
Marvell Semiconductor, Inc. v. Uniloc 2017 LLC	IPR2019-01349	PTAB	July 22, 2019
Marvell Semiconductor, Inc. v. Uniloc 2017 LLC	IPR2019-01350	PTAB	July 22, 2019
Microsoft Corporation et al v. Uniloc 2017 LLC	IPR2019-01116	PTAB	May 29, 2019
Microsoft Corporation et al v. Uniloc 2017 LLC	IPR2019-01125	PTAB	May 29, 2019

Institution was denied in IPR2019-01125.

The challenges presented to the claims of the '676 patent in this and other *inter partes* review proceedings are set forth below:

Claim	Basis
1	Shellhammer (Ground 1 of this IPR)
1	Lansford (Ground 4 of this IPR)

Claim	Basis
1	Home RF (Ground 1 of IPR2019-01116)
1	Home RF in view of Home RF Tutorial (Ground 2 of IPR2019-01116)
1	Home RF in view of Home RF Liaison Report (Ground 3 of IPR2019-01116)
1	Lansford (Ground 4 of IPR2019-01116)
1	Sherman (Ground 1 of IPR2019-01349)
1	Shellhammer (Ground 3 of IPR2019-01349)
1	Gardner in view of Marth and Balachandran (Ground 1 of IPR2019-1541)
2	Shellhammer (Ground 1 of this IPR)
2	Lansford (Ground 4 of this IPR)
2	Home RF (Ground 1 of IPR2019-01116)
2	Home RF in view of Home RF Tutorial (Ground 2 of IPR2019-01116)
2	Home RF in view of Home RF Liaison Report (Ground 3 of IPR2019-01116)
2	Lansford (Ground 4 of IPR2019-01116)
2	Sherman (Ground 1 of IPR2019-01349)
2	Shellhammer (Ground 3 of IPR2019-01349)
2	Gardner in view of Marth and Balachandran (Ground 1 of IPR2019-1541)
3	Sherman (Ground 1 of IPR2019-01350)
3	Shellhammer (Ground 3 of IPR2019-01350)
4	Gardner in view of Marth and Balachandran (Ground 1 of IPR2019-1541)
5	Home RF (Ground 1 of IPR2019-01125)
5	Home RF in view of Tutorial and SWAP Spec (Ground 2 of IPR2019-

Claim	Basis
	01125)
5	Home RF in view of Haartsen (Ground 3 of IPR2019-01125)
5	Home RF in view of Home RF Tutorial and Haartsen (Ground 4 of IPR2019-01125)
5	Sherman in view of Trompower (Ground 2 of IPR2019-01349)
5	Shellhammer in view of Trompower (Ground 4 of IPR2019-01349)
5	Shellhammer in view of Panasik (Ground 5 of IPR2019-01349)
6	Sherman (Ground 1 of IPR2019-01350)
7	Shellhammer (Ground 3 of IPR2019-01350)
8	Shellhammer in combination with Haartsen (Ground 2 of this IPR)
8	Shellhammer in combination with Panasik (Ground 3 of this IPR)
8	Sherman in view of Trompower (Ground 2 of IPR2019-01350)
8	Shellhammer in view of Trompower (Ground 4 of IPR2019-01350)
8	Shellhammer in view of Panasik (Ground 5 of IPR2019-01350)
9	Sherman (Ground 1 of IPR2019-01350)
9	Shellhammer (Ground 3 of IPR2019-01350)
9	Gardner in view of Marth and Balachandran (Ground 1 of IPR2019-1541)

**III. THE PETITION SHOULD BE DENIED UNDER THE BOARD'S DISCRETION**

This Petition stands as a paragon of the burdens and inefficiencies presented when multiple petitions are filed to attack a single patent.

The '676 patent has only nine claims. Yet, six IPRs have been filed challenging the '676 patent, presenting an array of assertions against the individual claims, including multiple challenges against the same claims challenged in this Petition presented across four different petitions. Despite the Petition's arguments to the contrary, the facts show undue burden, inefficient overlap, and unexplained differences across the various petitions and challenges. The table above in the Related Proceedings section shows all of the IPR challenges levelled against the claims of the '676 patent (to date). The table below focuses on the claims challenged in this IPR (highlighted in yellow) to show the repeated attacks against these claims, including where the exact same grounds based on the exact same references were presented in other IPRs filed by other Petitioners (highlighted in orange).

Claim	Basis
1	Shellhammer (Ground 1 of this IPR)
1	Lansford (Ground 4 of this IPR)
1	Home RF (Ground 1 of IPR2019-01116)
1	Home RF in view of Home RF Tutorial (Ground 2 of IPR2019-01116)
1	Home RF in view of Home RF Liaison Report (Ground 3 of IPR2019-01116)
1	Lansford (Ground 4 of IPR2019-01116)



Claim	Basis
1	Sherman (Ground 1 of IPR2019-01349)
1	Shellhammer (Ground 3 of IPR2019-01349)
1	Gardner in view of Marth and Balachandran (Ground 1 of IPR2019-1541)
2	Shellhammer (Ground 1 of this IPR)
2	Lansford (Ground 4 of this IPR)
2	Home RF (Ground 1 of IPR2019-01116)
2	Home RF in view of Home RF Tutorial (Ground 2 of IPR2019-01116)
2	Home RF in view of Home RF Liaison Report (Ground 3 of IPR2019-01116)
2	Lansford (Ground 4 of IPR2019-01116)
2	Sherman (Ground 1 of IPR2019-01349)
2	Shellhammer (Ground 3 of IPR2019-01349)
2	Gardner in view of Marth and Balachandran (Ground 1 of IPR2019-1541)
8	Shellhammer in combination with Haartsen (Ground 2 of this IPR)
8	Shellhammer in combination with Panasik (Ground 3 of this IPR)
8	Sherman in view of Trompower (Ground 2 of IPR2019-01350)
8	Shellhammer in view of Trompower (Ground 4 of IPR2019-01350)
8	Shellhammer in view of Panasik (Ground 5 of IPR2019-01350)

The precedential decision in *General Plastic Industrial Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357 (PTAB Sep. 6, 2017) (Paper 19) identifies seven non-exclusive factors that bear on the issue of whether the Board should

invoke its discretion to deny institution under 35 U.S.C. § 314(a) and 37 C.F.R.

§ 42.108(a). These factors include:

1. whether the same petitioner previously filed a petition directed to the same claims of the same patent;
2. whether at the time of filing of the first petition the petitioner knew of the prior art asserted in the second petition or should have known of it;
3. whether at the time of filing of the second petition the petitioner already received the patent owner's preliminary response to the first petition or received the Board's decision on whether to institute review in the first petition;
4. the length of time that elapsed between the time the petitioner learned of the prior art asserted in the second petition and the filing of the second petition;
5. whether the petitioner provides adequate explanation for the time elapsed between the filings of multiple petitions directed to the same claims of the same patent;
6. the finite resources of the Board; and

7. the requirement under 35 U.S.C. § 316(a)(11) to issue a final determination not later than 1 year after the date on which the Director notices institution of review.

*See General Plastic*, IPR2016-01357, Paper 19, 9–10 (citations omitted). Moreover, the Board has statutory authority to use its discretion to manage multiple proceedings before the Board involving the same patent. 35 U.S.C. § 325(d).

Each of the *General Plastic* factors 1, 2, and 4-7 weigh in favor of exercising discretion to deny the Petition.

#### ***General Plastic Factor 1***

Regarding *General Plastic* factor 1, directed to whether a petitioner filed any previous petition directed to the same claims of the same patent, the table above shows that not only were the same claims challenged, the same references were also applied. And when all challenges against the '676 patent are considered, Ericsson's contention that its Petition presents "a different set of claims than has been challenged in any single pending petition" (Petition, p. 69) should ring hollow. Not only does Ericsson cite no authority to limit the *General Plastic* analysis to "a single" petition, Ericsson also cites no authority to contend that other IPRs filed by defendants in parallel district court litigation should not be

considered. Rather, the opposite is true. Given the overlap, Ericsson provides no explanation as to why it elected to file its own Petition rather than coordinating with the other defendants (or relying on the joinder process of 37 C.F.R. § 42.122(b) for the overlapping challenges). Ericsson makes no assertion that it tried, and failed, to coordinate with the other defendants.

For the one redundant ground that presents a different formulation of the previously used references (Ground 2: asserting Shellhammer in view of Haartsen against claim 8), Ericsson does not explain why this challenge is any different than other four challenges to claim 8. *See Medtronic, Inc. v. NuVasive, Inc.*, Case IPR2014-00487, Paper 8 at 6 (Sept. 11, 2014) (informative) (denying institution, explaining in part that “[w]hile Petitioner argues that the grounds are not redundant to those instituted on in the ’506 Proceeding, Petitioner does not provide any specific reasoning to support that argument, other than to state that the grounds are based on different prior art references.”); *see also Apple Inc. v. Corephotonics Ltd.*, IPR2018-01356, Paper 9 at 7-8 (Feb. 5, 2019) (finding that where a petitioner “merely argues that its Petition ‘is not redundant’” because the asserted reference was not raised in another petition this circumstance “weigh[s] in favor of exercising our discretion to deny institution ... on the basis of 35 U.S.C. § 314(a)”).

Indeed, Ericsson goes so far as to argue that the overlap between its own challenges and those asserted in “earlier-filed petitions” are advantageous in that the overlap “would allow the Board to evaluate the petitions efficiently.” (Petition, p. 72). *General Plastic* factor 1 weighs in favor of exercising discretion to deny the Petition.

***General Plastic Factor 2***

Regarding *General Plastic* factor 2 relating to prior knowledge of the references, Ericsson admits that the references used in its Petition were all references brought to its attention by reviewing earlier IPRs filed by other parallel district court defendants. (Petition, p. 70). Thus, while Ericsson may boast that it “conducted its own searching” (Petition, p. 70), that searching yielded nothing new before the Board.

In fact, Ericsson has known of each of the references *well before* any petition against the '676 patent was first filed. Ericsson directly admits it knew of the Lansford, Panasik, and Haartsen references “before Microsoft’s petitions were filed.” The Board may presume from Ericsson’s failure to define “before” that Ericsson had prior knowledge of the references for a considerable time. For example, Haartsen was assigned to Ericsson as early as 2003. *See* Ex. 1008, item (73).

It can also be established that Ericsson incorrectly claimed that it learned of the Shellhammer reference only recently when, in fact, evidence conclusively proves Ericsson knew of the Shellhammer reference much earlier. On July 13, 2018, Ericsson submitted Shellhammer as an exhibit and included Shellhammer on an exhibit list in IPR2017-01661. *See* IPR2017-01661, Petitioner’s Updated Exhibit List, Paper 39 (July 13, 2018); IPR2017-01661, Ex. 1036 (submitted July 13, 2018) (U.S. Patent No. 7,039,358, the Shellhammer reference). Like this IPR, Ericsson was a petitioner in IPR2017-01661 and was represented by Mssrs. Lowes and Wilkins of Haynes and Boone. *See* IPR2017-01661 (Paper 3). Mr. Lowes certified service of the Shellhammer reference in IPR2017-01661. *See* IPR2017-01661, Reply at 28 (Mr. Lowes certifying service of Ex. 1036, “Documents served PETITIONER’S REPLY and Exhibits 1036, 1038-1040”). Nevertheless, Mr. Lowes, again acting on behalf of Ericsson in this IPR, made the representations that “Petitioner *only learned of the Shellhammer reference*, utilized in the present Petition for three of the four grounds, *by reviewing the Marvell petitions* after they were filed on July 22<sup>nd</sup> [i.e., July 22, 2019]” (Petition, p. 70); “the primary reference used in three of the four grounds, *Shellhammer, was not known to petitioner* when the earlier petitions were filed,” (Petition, p. 70); “at least with respect to the Shellhammer reference, at the time of filing of the earlier petitions,

*Petitioner did not know of the prior art* that is now being asserted in the present Petition” (Petition, p. 70); “Petitioner *first learned of the Shellhammer reference* by reading the petitions after they were filed by Marvell on July 22<sup>nd</sup>” (Petition, p. 71); “*Since learning of the Shellhammer reference* identified in Marvell petitions filed July 22<sup>nd</sup>, Petitioner has been considering the newly identified prior art utilized by Marvell and drafting the present Petition, *filed just over a month after learning of the reference*” (Petition, p. 71); “this Petition was filed *promptly after learning of the Shellhammer reference*” (Petition, p. 68); (emphasis added in each citation).

Each of Ericsson’s representations concerning the lack of prior knowledge is false and should have been found to be false by Ericsson “after an inquiry reasonable under the circumstances.” 37 C.F.R. § 11.18(b)(2); *see also* 37 C.F.R. § 11.18(b)(2)(iii) (requiring the “allegations and other factual contentions have evidentiary support.”); *compare* Petition, p. 70 (contending Ericsson “conducted its own searching”). As Ericsson’s discussion of General Plastic factors 2 (and 4 and 5 addressed below) largely relies on its misrepresentations, the Board is well-within its discretion to disregard all of Ericsson’s presentation concerning the *General Plastic* factors. *See Lambert v. Blackwell*, 387 F.3d 210, 256 (3d Cir. 2004) (“This concept is embodied in the common jury instruction known as the

‘*falsus in uno, falsus in omnibus*’ charge, which provides: ‘If you find that any witness testified falsely about any material fact, you may disregard all of his testimony, or you may accept such parts of it as you wish to accept and exclude such parts of it as you wish to exclude.’”).

*General Plastic* factor 2 weighs heavily in favor of exercising discretion to deny the Petition.<sup>1</sup>

#### ***General Plastic Factors 4 and 5***

Regarding *General Plastic* factors 4 and 5, regarding whether the length of time between when petitioner knew of the references and filed the petition was adequately explained, Ericsson argues the period of delay should begin on July 22, 2019. Pet., 71. But as noted above concerning factor 2, Ericsson knew of each of the references, including Shellhammer, well-before July 22, 2019, and well-before filing the first IPR against the ’676 patent. Thus, in trying to limit its explanation of the delay, Ericsson does not answer the relevant question of why it did not file its challenges earlier. The Board should not countenance a petitioner who fails to

---

<sup>1</sup>*General Plastic* factor 3 is neutral as no preliminary response or decision to institute was filed in a prior IPR prior to Ericsson’s filing.



acknowledge the full extent of its delay in seeking *inter partes* review based on references *that it already knew of*, much less explain the reason behind such delay.

Moreover, Ericsson does not account for what it did during the full period of delay, even the delay after reviewing the other petitions. The first petition Ericsson copied from was filed on May 29, 2019. The second and third petitions were filed on July 22, 2019. Thus, Ericsson had nothing more to do than copy the challenges. Instead, it decided to craft a new petition with its own spin on the references. *See TomTom, Inc. v. Blackbird Tech, LLC*, IPR2017-02025, Paper 7 at 15-17 (March 12, 2018).

In an attempt to understate its lack of diligence even further, Ericsson claims that its delay in asserting Lansford in Ground 4 of this IPR “is reasonable because Petitioner was not even part of the district court proceedings involving Verizon and AT&T until April 22 and 23, 2019, respectively, when Petitioner’s corresponding motions to intervene were granted.” (Petition, p. 71). These are the incorrect dates to consider when evaluating Ericsson’s delay in bringing the current challenge based on Lansford. First, Ericsson moved to intervene in the Verizon and AT&T cases on March 8, 2019 on the basis that it “sells base stations to [Verizon/AT&T] that implement the accused LTE-LAA feature.” Ex. 1019, 2; Ex. 1020, 2 (quoting Ericsson’s motions). Ericsson would have the Board believe that it could not

prepare and/or file its petition for IPR until the District Court ruled on its motions. This is incorrect, as Ericsson could have filed its Petition earlier, regardless of the outcome of its District Court motions, or even without moving to intervene. The date when the District Court granted its motions is irrelevant to the correct determination of Ericsson's delay.

Second, Ericsson fails to inform the Board when it was first notified of Uniloc's complaints against Verizon and AT&T, or when it decided to actively defend the accused products through intervention. Presumably, Ericsson did not file its motions to intervene on the very day it learned of these actions against its customers. Where a party seeks a favorable ruling from the adjudicator, such as the Board, but also fails to inform the adjudicator of certain prerequisite facts, no relief should be granted.

*General Plastic* factors 4 and 5 thus heavily weigh in favor of exercising discretion to deny the Petition.

***General Plastic Factors 6 and 7***

*General Plastic* factors 6 and 7 are directed to efficiency and the Board's resources and are informed by the Board's guidance in the July 2019 Trial Practice Guide Update:

Based on the Board's prior experience, one petition should be sufficient to challenge the claims of a patent in most situations. Two or more petitions filed against the same patent at or about the same time (e.g., before the first preliminary response by the patent owner) may place a substantial and unnecessary burden on the Board and the patent owner and could raise fairness, timing, and efficiency concerns. *See* 35 U.S.C. § 316(b). In addition, multiple petitions by a petitioner are not necessary in the vast majority of cases. To date, a substantial majority of patents have been challenged with a single petition.

Trial Practice Guide Update, 26 (July 2019); Consolidated Trial Practice Guide (November 2019), 59.

The unnecessary burdens identified by the Board are certainly presented here. And, in copying challenges from three different IPRs, Ericsson creates a complex logistical challenge to ensuring consistency across the various proceedings, to the extent petitioners would contend each has their own spin on the references.

Ericsson's delayed IPR prejudices Patent Owner, and even the other petitioners, by seeking to stand on the shoulders of the other defendant petitioners. Ericsson's omniscient review of the other petitioners' work and crafting of the

current Petition based on the buffet of theories and positions taken by the other defendants does not promote an efficient *inter partes* review system. Denial of institution for this Petition (and the two other petitions) is thus appropriate under the Board's discretionary authority in 35 U.S.C. § 314(a).

In claiming that these factors support institution, Ericsson essentially ignores this prejudice in allowing a petitioner to select what it believes are the choicest challenges made by others and then make Patent Owner respond to Petitioner and its expert's updated interpretation of those references and implicit critique of the other IPRs. Ericsson does not even explain how its Petition differs from the prior challenges and why it should be permitted to benefit from the review of the other petitions. *See TomTom, Inc. v. Blackbird Tech, LLC*, IPR2017-02025, Paper 7 at 15-17 (March 12, 2018) (noting that the Board is “mindful of the potential inequity of parties filing multiple petitions,” where Petitioner has “relie[d] on substantially similar references and analyses” and “[has] not shown sufficiently, how the [asserted] references are different enough to warrant institution”).

Moreover, given the delays in presenting its challenges, Ericsson has all but assured that any IPR in this case will have a different schedule than any other IPR

against the '676 patent. The Board has already instituted IPR2019-01116 and set a schedule in that proceeding.

For all these reasons, *General Plastic* factors 6 and 7, and factors 1, 2, 4, and 5 heavily weigh in favor of exercising discretion to deny the Petition. No factor supports Petitioner. Under these facts, not only would the Board be well-within its discretion to deny the Petition, the Board should also consider how denying institution would discourage petitioners from making representations concerning the *General Plastic* factors without reasonable diligence. Ericsson's Petition should be denied.

***Discretion Under § 325(d)***

The Petition's arguments as to the *Becton, Dickinson* factors include cursory assertions as to the cumulative nature of the challenges and faulty reasoning that highlights the case for denying institution based on the board's discretion.

Rather than review each of the factors pertaining to § 325(d), the Petition states that "one of Petitioner's prior art combinations (Shellhammer and Haartsen) was not raised in the pending petitions for any claim." (Petition, p. 74.) First, this argument acknowledges that the three other grounds presented in the Petition are based on the same references presented in prior petitions, and no distinctions are

explained as to these grounds.<sup>2</sup> In addition, contrary to Petitioner’s argument, 325(d) does not require the Board to consider the merits of a ground created simply by combining two references from prior petitions that were not previously combined. Petitioner provides no analysis as to the cumulative nature of the *Shellhammer/Haartsen* combination as compared to the previous *Shellhammer/Panasik* ground (based on the same primary reference) in IPR2019-01350. (See Petition, pp. 26–37, 74–75.) The Board should weigh Petitioner’s lack of explanation in these circumstances against institution. See *Medtronic, Inc. v. NuVasive, Inc.*, Case IPR2014-00487, slip op. at 6 (Paper 8) (Sept. 11, 2014) (informative) (denying institution, explaining in part that “[w]hile Petitioner argues that the grounds are not redundant to those instituted on in the ’506 Proceeding, Petitioner does not provide any specific reasoning to support that argument, other than to state that the grounds are based on different prior art references.”).

The Petition also incorrectly suggests that § 325(d) plays no role where previous Office proceedings are still pending, even if the present Petition raises the

---

<sup>2</sup> Although Patent Owner notes *infra* one aspect in which the Petition argues the ground based on Lansford differently, this does not preclude the Petition from being denied under § 325(d) considering the remaining similarities.

same art. (*See* Petition, pp. 75–76.) The cases cited by the Petition on this point relate to cases terminated in circumstances that are entirely hypothetical as they relate to the petitions filed challenging the '676 patent. Where Ericsson may seek other, more efficient ways of joining proceedings, it has not justified maintaining an additional proceeding only because it challenges a different combination of the same claims challenged in other proceedings. Institution should be denied based on the Board's discretion.

#### **IV. THE '676 PATENT**

The '676 patent is titled “Method, network and control station for the two-way alternate control of radio systems of different standards in the same frequency band.” The '676 patent issued March 21, 2006, from U.S. Patent Application No. 10/089,959 filed April 4, 2002, which was a National Stage Entry of PCT No. PCT/EP01/09258 filed August 8, 2001 and published as W002/13457, which in turn claims priority to German Application No. DE10039532.5 filed August 8, 2000.

The inventors of the '676 patent observed that, at the time of the invention, a radio system for wireless transmission of information was allowed to use transmission power only in accordance with standards by the national regulation authority. The national regulation authority determined on what frequencies with

what transmission power and in accordance with what radio interface standard a radio system is allowed to transmit. There was also provided so-called ISM frequency bands (Industrial Scientific Medical) where radio systems transmitted in the same frequency band but in accordance with different radio interface standards. '676 patent, column 1, lines 10-23. And in the event of interference, methods were standardized for an active switching to another frequency within the permitted frequency band, for controlling transmission power, and for the adaptive coding and modulation to reduce interference. However, despite operating in the same frequency band, different radio systems have different Medium Access Controls (MAC), and despite the utilization of methods such as Transmitter Power Control (TPC) and Dynamic Frequency Selection (DFS), those methods did not make optimum use of spreading radio channels over the stations which operate under different radio standards. '676 patent, column 1, line 24 to column 2, line 10.

According to the '676 Patent, there is provided a method, a wireless network and a control station which make efficient use of radio transmission channels possible by an interface control protocol method for a radio system, which system comprises at least a frequency band provided for the alternate use of a first and a second radio interface standard, the radio system comprising stations which operate in accordance with a first radio interface standard and/or a second radio



interface standard, respectively, a control station being provided which controls the alternate use of the frequency band. This is based on the idea of providing a comprehensive standard exchange of implicit or explicit control information in systems that have the same radio transmission methods but different radio transmission protocols. This makes simple and efficient use possible of a radio channel via a plurality of radio interface standards. '676 patent, column 2, lines 14-28.

A first number of stations preferably forms a wireless local area network in accordance with a first radio interface standard and a second number of stations forms a wireless network in accordance with a second radio interface standard. The control station is preferably a station that operates in accordance with both the first and the second radio interface standard. The control station can utilize the common radio channel more effectively when the demand for transmission capability in accordance with the first and second radio standard varies. The control station may release the common frequency band for access by stations operating under the second radio interface if stations operating in accordance with the first radio interface standard do not request access to the frequency band. The control station controls the alternate access by the first wireless network and the second wireless network to the common frequency band. The control station receives requests for

capacity from various stations and assigns capacity accordingly. The release of the common frequency band for the second radio interface standard may be effected, for example, by explicitly sending control information to the stations of the second radio interface standard. As another example, control can be effected in that the control station determines the respective duration in which the stations operating in accordance with the second radio interface standard can utilize the common frequency band. '676 patent, column 2, line 36 to column 4, line 26.

The '676 Patent issued with five independent claims, namely claims 1, 6, 7, 8, and 9. The text of challenged claims 1, 2, and 8 is copied herein for the convenience of the Board:

1. An interface-control protocol method for a radio system which has at least one common frequency band that is provided for alternate use by a first and a second radio interface standard, the radio system comprising:

stations which operate in accordance with a first radio interface standard and/or a second radio interface standard, and

a control station which controls the alternate use of the frequency band,

wherein the control station controls the access to the common frequency band for stations working in accordance with the first radio interface standard and

renders the frequency band available for access by the stations working in accordance with the second radio interface standard if stations working in accordance with the first radio interface standard do not request access to the frequency band.

2. The method as claimed in claim 1, herein the control station determines the respective duration in which the stations working in accordance with the second radio interface standard are allowed to utilize the frequency band.

8. An interface-control protocol method for a radio system which has at least one common frequency band that is provided for alternate use by a first and a second radio interface standard, the radio system comprising:

stations which operate in accordance with a first radio interface standard and/or a second radio interface standard, and

a control station which controls the alternate use of the frequency band,

wherein the control station, in addition to functions in accordance with the second radio interface standard, also carries out functions which cause radio systems in accordance with the second radio interface standard to

interpret the radio channel as interfered and to seize another radio channel for its own operation.

#### **V. LEVEL OF ORDINARY SKILL IN THE ART**

Ericsson's formulation (Petition, p. 10) of the level of ordinary skill in the art is one many petitioners have proposed across the various petitions challenging the '676 patent. Rather than attempt to synthesize and reconcile these different expressions at this stage of the proceeding, for purposes of this Preliminary Response only, Patent Owner does not dispute Petitioner's definition of a POSITA. Moreover, Patent Owner does not provide its own definition because Petitioner has not met its burden of showing that the cited references render any of the disputed claims of the '676 patent obvious.

#### **VI. PETITIONER DOES NOT PROVE A REASONABLE LIKELIHOOD OF UNPATENTABILITY FOR ANY CHALLENGED CLAIM**

Petitioner has failed to establish that it is more likely than not that it would prevail with respect to at least one of the challenged '676 Patent claims. By not addressing additional arguments, Patent Owner in no way concedes that any argument by Petitioner is correct.

Petitioner has the burden of proof to establish entitlement to relief. 37 C.F.R. § 42.108(c). Because the Petition only presents a theory of obviousness,

Petitioner must demonstrate a reasonable likelihood that at least one of the challenged patent claims would have been obvious in view of the references cited in the Petition. Petitioner “must specify where each element of the claim is found in the prior art patents or printed publications relied upon.” 37 C.F.R. § 42.104(b)(4). The Board should reject the Petition because Petitioner fails to meet this burden for any of the grounds.

The Petition presents the following grounds of purported unpatentability:

Ground	References	35 U.S.C. §	Challenged Claim(s)
1	Shellhammer	103	1-2
2	Shellhammer in view of Haartsen	103	8
3	Shellhammer in view of Panasik	103	8
4	Lansford	103	1-2

**A. Claim Construction—Performance of the “Renders” Portion of Claim 1 is Required**

At this preliminary stage, Patent Owner submits that the Board need not construe any claim term in a particular manner in order to arrive at the conclusion that the Petition is substantively deficient. *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (“need only be construed to the extent necessary to resolve the controversy”). Nevertheless, a construction applied in the Institution Decision in IPR2019- 01116, Paper 8, is addressed below.

The Board in IPR2019-01116 construed the final “wherein” clause of claim 1 to require two steps. Institution Decision, IPR2019-01116, Paper 8 at 16-17 (“we read the wherein clause of claim 1 as setting forth two steps, both carried out by the control station”). The Board, however, found the “renders” portion of claim 1 to be conditional and that “the associated action need not be performed,” relying on *Ex parte Schulhauser*, Appeal No. 2013–007847 (PTAB April 28, 2016) (precedential).

The Board erred when finding the “renders” portion of claim 1 need not be performed. First, the Board erred in finding *Ex parte Schulhauser* to be “binding authority.” *Schulhauser* was precedential as to the meaning of a condition under the broadest reasonable interpretation standard. *Schulhauser*, at 5-6. Under the *Phillips* standard, *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc), *Ex parte Schulhauser* is not binding. Also, the Board erred under the *Phillips* standard because reading the “renders” portion in a manner that does not require performance creates inconsistencies with the language of the claim and the specification. Claim 1 is directed to “alternate” control of a frequency band. Claim 1, for example, recites a “common frequency band that is *provided for alternate use* by a first and a second radio interface standard” and “a control station which *controls the alternate use* of the frequency band.” (emphasis added).

And, as noted above, the specification discloses additional detail regarding the alternate control. But, if the rendering portion of claim 1 does not need to be performed, then claim 1 would not involve any alternate control at all, it would only require “access to the common frequency band for stations working in accordance with the first radio interface standard.” Thus, the “renders” portion of claim 1 cannot be disregarded as the control called for by this portion is required to be performed. A POSITA would interpret it as requiring rendering “the frequency band available for access by the stations working in accordance with the second radio interface,” with the understanding that the control station can only do so when “stations working in accordance with the first radio interface standard do not request access to the frequency band.” When provided with that meaning, the claim is consistent with the specification and remainder of the claim concerning the provision of alternate control.

**B. The Petition does not establish that Shellhammer teaches “wherein the control station ... renders the frequency band available for access by the stations working in accordance with the second radio interface standard if stations working in accordance with the first radio interface standard do not request access to the frequency band” as recited in Claims 1 and 2. (Ground 1)**

The Petition fails to establish *prima facie* obviousness of at least the following recitation: “wherein the control station ... renders the frequency band

available for access by the stations working in accordance with the second radio interface standard if stations working in accordance with the first radio interface standard do not request access to the frequency band” as recited in independent claim 1. In particular, the Patent Owner respectfully submits that Shellhammer does not teach or suggest any control station that renders a frequency band available for access by the stations associated with a second radio interface standard when other stations associated with a first radio interface do not request access to the frequency band as would be required to render claim 1 obvious.

The Petition asserts that Shellhammer teaches the afore-cited portion of claim 1. (Petition, p. 17-19). In particular, the Petition points to Figure 3 of Shellhammer and its associated description in an attempt to prove this assertion. Figure 3 is re-produced herein for purposes of further discussion:

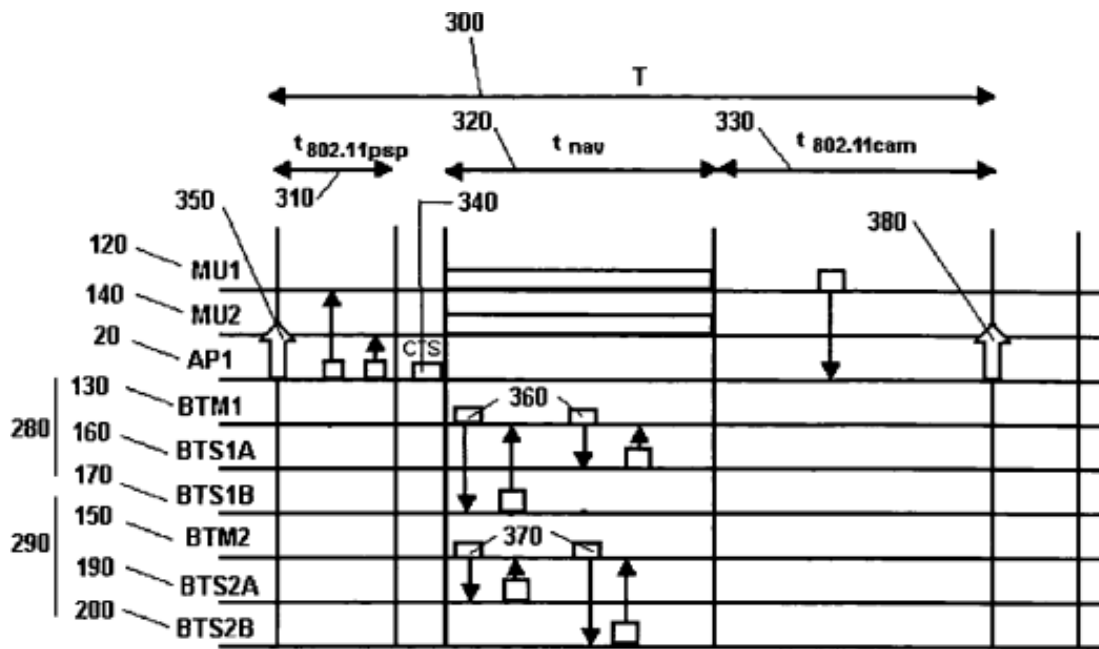


FIG. 3



As shown, Figure 3 illustrates a schematic diagram showing various action taken by a mobile unit (control station) to communicate with stations working in accordance with a first radio interface standard (e.g., 802.11) and other stations working in accordance with a second radio interface standard (e.g., Bluetooth). (Shellhammer, column 5, lines 48-51). The schematic diagram shows a repeating time period (T) that may be divided into three time intervals, namely a 802.11 power saving (PSP) mode indicated by  $t_{802.11PSP}$ , a Bluetooth communications mode as indicated by  $t_{NAV}$ , and a 802.11 communications active mode (CAM) as indicated by  $t_{802.11CAM}$ . (Shellhammer, column 8, lines 54-59). In general, the 802.11 power saving  $t_{802.11PSP}$  and 802.11 active communications mode  $t_{802.11CAM}$  represent time intervals allocated for use with devices working in accordance with the 802.11 radio interface standard, while the Bluetooth communications mode  $t_{NAV}$  time interval is allocated for use with devices working in accordance with the Bluetooth radio interface standard.

In asserting that Shellhammer teaches the afore-cited limitation of Claim 1, the Petition refers to the testimony of Fisher (Ex. 1003) who asserts that if no 802.11 stations (including the AP) request access to the frequency band during the  $t_{802.11PSP}$  time interval, for example by contending for the medium, then there would

be no transmissions, and it would have been obvious for the AP to send the CTS signal, thereby rendering the frequency band available for access by Bluetooth stations. (Petition, p. 23-25). But this assertion, even if correct, would not teach the afore-cited limitation of Claim 1.

Shellhammer teaches, and is limited to teaching, that the Bluetooth communications interval  $t_{NAV}$  always follows the 802.11 power saving (PSP) interval  $t_{802.11PSP}$ . The teachings of Shellhammer make no provisions for selectively including the Bluetooth communications interval  $t_{NAV}$  after the 802.11 power saving (PSP) interval  $t_{802.11PSP}$  only in the event that no 802.11 stations are not requesting access to the frequency band medium. That is, it does not matter whether the 802.11 stations are, or are not, requesting access to the frequency band at any given point in time, the mobile unit (control station) of Shellhammer will activate the Bluetooth communications interval  $t_{NAV}$  following the 802.11 power saving (PSP) interval  $t_{802.11PSP}$ . Although Shellhammer does teach that the duration of time intervals (e.g., 802.11 power saving (PSP) interval  $t_{802.11PSP}$ , Bluetooth communications interval  $t_{NAV}$ , and 802.11 communications active mode (CAM) interval  $t_{802.11CAM}$ ) may depend on traffic characteristics and application needs (e.g., time critical services) (Shellhammer, column 8, lines 59-62), Shellhammer never teaches that either of the 802.11 power saving (PSP) interval  $t_{802.11PSP}$  or Bluetooth

communications interval  $t_{NAV}$ , would, or would not be used, based upon the existence or non-existence of requests present at the other time interval.

Thus, the teachings of Shellhammer cannot be construed to teach or suggest “wherein the control station ... renders the frequency band available for access by the stations working in accordance with the second radio interface standard if stations working in accordance with the first radio interface standard do not request access to the frequency band” as recited in independent claim 1

Accordingly, Petitioner has failed to carry its burden of establishing that it is more likely than not that Shellhammer teaches “wherein the control station ... renders the frequency band available for access by the stations working in accordance with the second radio interface standard if stations working in accordance with the first radio interface standard do not request access to the frequency band” as would be required in order to render claim 1 obvious. As claim 2 depends from claim 1, Shellhammer also does not render claim 2 obvious for the same reasons.

**C. The Petition does not establish that Shellhammer in view of Haartsen renders Claim 8 obvious. (Ground 2)**

The Petition fails to establish *prima facie* obviousness of Claim 8 over Shellhammer in view of Haartsen. In particular, the Petition fails to establish *prima*

*facie* obviousness of at least the following recitation: “the control station also carries out functions which cause radio systems in accordance with the first radio interface standard to interpret the radio channel as interfered and to seize another radio channel for its own operation” as recited in independent claim 8.

Petitioner admits Shellhammer does not include such functionality (see Petition, p. 28 (“Shellhammer ... does not consider the potential for interference at various hopping channels and how to avoid such a problem”)) and, instead, relies on Haartsen. But Haartsen does not teach a control station that causes other stations “to interpret the radio channel as interfered and to seize another radio channel for its own operation.” Rather, the radio stations decide whether a radio channel is interfered without Haartsen’s controller (or Shellhammer’s) causing them to. Thus, even if it were proper to combine Shellhammer and Haartsen, which Patent Owner does not concede, such a combination would not satisfy all elements of claim 8.

Haartsen describes a technique of “skipping of certain hops in a hop sequence without having to change the hop sequence generator.” Haartsen, column 7, lines 63-65. Accordingly, Haartsen, like Shellhammer, uses a defined hop sequence, which could be provided by a controller. Haartsen, column 10, line 6. (“In conventional FH systems, the sequences are pre-stored.”). Where

Petitioner admits Shellhammer “does not consider the potential for interference at various hopping channels” (Petition, p. 28), Haartsen’s radio stations monitor the channels for interference. Using “a post-processing operation,” Haartsen dynamically replaces “certain pre-defined hop carriers with other hop carriers.” *See* Haartsen, column 10, lines 51-55 Fig. 6. The replaced hop carriers are provided as “the set of hop carriers, S, to be avoided.” Haartsen, column 11, lines 11-14.

Critically, and fatally to Petitioner’s theory, Haartsen teaches that “[b]oth the transmitter and receiver preferably have the same input parameters to this selection operation, so that at any moment in time, the same hop will be selected and the radios will remain in synchrony.” Haartsen, column 11, lines 14-17. Thus, Haartsen discloses that each station measures channel interference and decides which channels to place in its set S of hop carriers to be avoided. *See* Petition, p. 37 (“the set of hop channels to be avoided ‘S’ is determined based on whether a channel has been detected as having ‘a substantial amount of interference.’”). Accordingly, Petitioner completely missed claim 8’s requirement that the control station “cause radio systems in accordance with the second radio interface standard to interpret the radio channel as interfered,” as, under Petitioner’s theory, the radio stations themselves measure the interference and define their respective set S of

hop carriers to be avoided. Thus, Petitioner has not shown a reasonable likelihood of success for its challenge of claim 8 based on Shellhammer and Haartsen.

**D. The Petition does not establish that Shellhammer in view of Panasik renders Claim 8 obvious. (Ground 3)**

The Petition fails to establish *prima facie* obviousness of Claim 8 over Shellhammer in view of Panasik. In particular, the Petition fails to establish *prima facie* obviousness of at least the following recitation: “the control station also carries out functions which cause radio systems in accordance with the first radio interface standard to interpret the radio channel as interfered and to seize another radio channel for its own operation” as recited in independent claim 8. In particular, the Patent Owner respectfully submits that neither Shellhammer nor Panasik teaches or suggests the afore-cited recitation as asserted by the Petition as would be required to render claim 8 obvious.

The Petition asserts that Shellhammer or Panasik teaches the afore-cited recitation of claim 8. (Petition, p. 38-40, 46-51). In particular, Petitioner relies on Shellhammer’s disclosure of frequency hopping, and asserts without factual support from Shellhammer that such frequency hopping “causes the control station (AP) causes 802.11 radio systems to seize another radio channel as a result of interpreting the radio channel as interfered.” Petition, p. 46; *but see* Petition, p. 28

(“Shellhammer ... does not consider the potential for interference at various hopping channels and how to avoid such a problem”). Alternatively, the Petition asserts that Panasik teaches scanning a plurality of frequency channels, detecting whether a signal exists on the channel, and recording information corresponding to each channel on which a signal is detected. (Petition, p. 46-51). The Petition further asserts that Panasik teaches forming a frequency hopping sequence from the recorded information. (*Id.*). While not acquiescing to these assertions, Patent Owner respectfully submits that Panasik does not teach for each radio channel, interpreting that radio channel as interfered, and seizing another radio channel for its own operation as explicitly recited in claim 8.

Panasik is directed to a method for determining a frequency hopping sequence for a newly-entering network. (Panasik, Abstract). The frequency hopping sequence is generated prior to operation by the network by scanning each of a plurality of frequency channels comprising a frequency hopping protocol to determine whether a signal exists on each channel, and recording information corresponding to each channel on which a signal is detected. (Panasik, column 6, lines 14-21).

The frequency hopping sequence generating method commences by determining a new hopping sequence to be used for intercommunications on a

network. (Panasik, column 6, line 66 – column 7, line 3). Panasik specifically teaches that the new hopping sequence is generated for a newly-entering network that is new with respect to any incumbent that already may be communicating along the frequency band to be used by the newly-entering network. (Panasik, column 7, lines 3-8). That is, the new frequency hopping occurs at network start-up, such as when a first transceiver of the newly-entering network is turned on or is otherwise initialized. (Panasik, column 7, lines 8-13).

The new frequency hopping sequence is generated by analyzing each channel along the newly-entering network to determine if there is an existing signal in that channel. (Panasik, lines 14-30). The results of the analysis are recorded for each channel. (Panasik, column 8, lines 14-67). Upon completion of analyzing each channel, the new hopping sequence is determined for the newly-entering network given the pre-recorded information. (Panasik, column 9, lines 33-35). Once the new hopping sequence has been generated, it is used in the network. (Panasik, column 11, lines 45-49).

The frequency hopping sequence technique, nevertheless, cannot be construed to teach or suggest the afore-cited recitation above. For example, the frequency hopping sequence technique of Panasik uses recorded measurement values for selecting one or more channels with which to use for the frequency



hopping sequence at a later point in time. This functionality is substantially different than one that, for each radio channel, determines whether interference exists, and seizing another different radio channel for its own operation based upon the determined interference as explicitly recited in claim 8.

This difference in functionality may yield substantially different results to the network's operation. For example, the frequency hopping sequence technique would need to be repeated each time other radio devices enter within the range of the radio system, or when the subject radio system is moved to another environment where radio interference pattern may differ substantially. That is, other foreign radio devices being moved to be within range of the subject radio system and/or movement of the subject radio system to a new environment where other different interfering devices may exist would often necessitate generation of a new frequency hopping sequence. This is a problem that is rendered moot by the radio system functioning according to the recitations of claim 8 in which each radio channel is interpreted to be interfered, and if so, another radio channel selected for use such that the interference is obviated. Thus, Panasik cannot be construed to teach the afore-cited recitation.

Given the facts presented above, the teachings of Shellhammer, Panasik, or any combination thereof cannot be construed to teach or suggest “the control

station also carries out functions which cause radio systems in accordance with the first radio interface standard to interpret the radio channel as interfered and to seize another radio channel for its own operation” as explicitly recited in claim 8.

Accordingly, Petitioner has failed to carry its burden of establishing that it is more likely than not that Shellhammer in view of Panasik teaches “the control station also carries out functions which cause radio systems in accordance with the first radio interface standard to interpret the radio channel as interfered and to seize another radio channel for its own operation” as would be required in order to render Claim 8 obvious.

**E. Lansford Does Not Disclose “a control station which controls the alternate use of the frequency band” and which “renders the frequency band available for access by the stations working in accordance with the second radio interface standard if stations working in accordance with the first radio interface standard do not request access to the frequency band” (Claim 1) (Ground 4)**

As noted above, the Board has already considered Lansford and instituted an IPR in view of Lansford. IPR2019-01116, Paper 8. Rather than repeat the positions presented in Patent Owner’s POPR in that proceeding (IPR2019-01116, Paper 7), Patent Owner focuses on the functionality that Board found absent in Lansford but found immaterial based on the reasoning of *Ex parte Schulhauser*.

Lansford describes a system of three devices – Device A, Device B, and Device C, and the Petition assigns the stations of the first radio interface standard and second radio interface standard as such:

- **Device A** is referred to as the controller;
- **Device C** is a Bluetooth device, and the Petition points to Device C as “a **first** radio interface standard ‘station’”;
- **Device B** is a HomeRF device, and the Petition points to Device B as “a **second** radio interface standard ‘station’”.

*See* Pet. 57, 60-63.

Like the prior petitioner in IPR2019-01116, Petitioner’s assertions rely on Fig. 4 of Lansford. But Petitioner’s theory is different than the prior petitioner’s theory. Where the prior petitioner in IPR2019-01116 relied on step 420 of Fig. 4 to satisfy this limitation, Petitioner relies on the data flow from step 410 to step 425, omitting step 420. Petition, p. 63. The omission of step 420 reinforces that the Board can deny the Petition based on its discretion to deny inefficient petitions as well as on the merits, notwithstanding its earlier institution based on Lansford.

Petitioner’s attempted reliance on the process flow from steps 405, to 410, to 425 fails because in that process flow, there is no control of the device in accordance with the first radio interface standard. The flow from steps 405, 410, to 425 addresses how Lansford’s controller deals with a Bluetooth device, for

example, “detected in the wireless network” (Lansford, column 6, lines 6-10), and the controller decides *not* to exercise control over it. Lansford, column 6, lines 31-46 (“If communication is not desired, or communication is not possible or convenient,” the controller continues to control the second device). Thus, a POSITA would recognize step 410 to reflect the controller’s decision to ignore the first, e.g., Bluetooth device, rather than control it. Accordingly, Petitioner’s theory fails to show that a control station controls alternate use of the frequency band, and claims 1 and 2 are not obvious in view of Lansford.

## **VII. CONCLUSION**

For the foregoing reasons, Uniloc respectfully requests that the Petition be denied in its entirety.<sup>3</sup>

---

<sup>3</sup> Patent Owner does not concede, and specifically denies, that there is any legitimacy to any arguments in the Petition that are not specifically addressed herein.

IPR2019-01550  
U.S. Patent No. 7,016,676

Dated: December 19, 2019

Respectfully submitted,

/ Ryan Loveless /

Ryan Loveless

ryan@etheridgelaw.com

Reg. No. 51,970

*Counsel for Patent Owner*

**CERTIFICATE OF COMPLIANCE**

Pursuant to 37 C.F.R. § 42.24(d), we certify that this Preliminary Response to Petition complies with the type-volume limitation of 37 C.F.R. § 42.24(b)(1) because it contains fewer than the limit of 14,000 words, as determined by the word- processing program used to prepare the brief, excluding the parts of the brief exempted by 37 C.F.R. § 42.24(a)(1).

Dated: December 19, 2019

Respectfully submitted,

/ Ryan Loveless /  
Ryan Loveless  
ryan@etheridgelaw.com  
Reg. No. 51,970  
*Counsel for Patent Owner*

**CERTIFICATE OF SERVICE**

Pursuant to 37 C.F.R. §§ 42.6(e), we certify that we served an electronic copy of the foregoing PATENT OWNER'S PRELIMINARY RESPONSE TO PETITION, along with any accompanying exhibits filed via the PTAB E2E system, to Petitioner's counsel at the following addresses identified in the Petitioner's consent to electronic service:

Lead Counsel  
J. Andrew Lowes  
andrew.lowes.ipr@haynesboone.com

Back-up Counsel  
Clint Wilkins  
clint.wilkins.ipr@haynesboone.com  
Samuel Drezdson  
samuel.drezdson.ipr@haynesboone.com

Dated: December 19, 2019

Respectfully submitted,

/ Ryan Loveless /  
Ryan Loveless  
ryan@etheridgelaw.com  
Reg. No. 51,970  
*Counsel for Patent Owner*