US011349200C1

(12) EX PARTE REEXAMINATION CERTIFICATE (12739th)

United States Patent

Puente Baliarda et al.

(10) Number: US 11,349,200 C1

(45) Certificate Issued: *Oct. 18, 2024

(54) MULTIPLE-BODY-CONFIGURATION MULTIMEDIA AND SMARTPHONE MULTIFUNCTION WIRELESS DEVICES

(71) Applicant: **Fractus, S.A.**, Barcelona (ES)

(72) Inventors: **Carles Puente Baliarda**, Barcelona (ES); **Josep Mumbru**, Asnières-sur-Seine (FR); **Jordi Ilario**, Barcelona (ES)

(73) Assignee: **FRACTUS, S.A.**, Barcelona (ES)

Reexamination Request:
No. 90/019,275, Oct. 12, 2023

Reexamination Certificate for:

Patent No.:	**11,349,200**
Issued:	**May 31, 2022**
Appl. No.:	**17/246,192**
Filed:	**Apr. 30, 2021**

(*) Notice: This patent is subject to a terminal disclaimer.

Related U.S. Application Data

(63) Continuation of application No. 16/832,820, filed on Mar. 27, 2020, now Pat. No. 11,031,677, which is a continuation of application No. 15/856,626, filed on Dec. 28, 2017, now Pat. No. 10,644,380, which is a continuation of application No. 14/738,090, filed on Jun. 12, 2015, now Pat. No. 9,899,727, which is a continuation of application No. 14/246,491, filed on Apr. 7, 2014, now Pat. No. 9,099,773, which is a continuation of application No. 11/614,429, filed on Dec. 21, 2006, now Pat. No. 8,738,103.

(60) Provisional application No. 60/856,410, filed on Nov. 3, 2006, provisional application No. 60/831,544, filed on Jul. 18, 2006.

(30) **Foreign Application Priority Data**

Jul. 18, 2006 (EP) 06117352

(51) **Int. Cl.**

H01Q 1/24	(2006.01)
H01Q 1/36	(2006.01)
H01Q 5/371	(2015.01)
H01Q 5/40	(2015.01)
H01Q 9/04	(2006.01)

(52) **U.S. Cl.**
CPC ***H01Q 1/243*** (2013.01); ***H01Q 1/36*** (2013.01); ***H01Q 5/371*** (2015.01); ***H01Q 5/40*** (2015.01); ***H01Q 9/0407*** (2013.01); ***H01Q 9/0421*** (2013.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

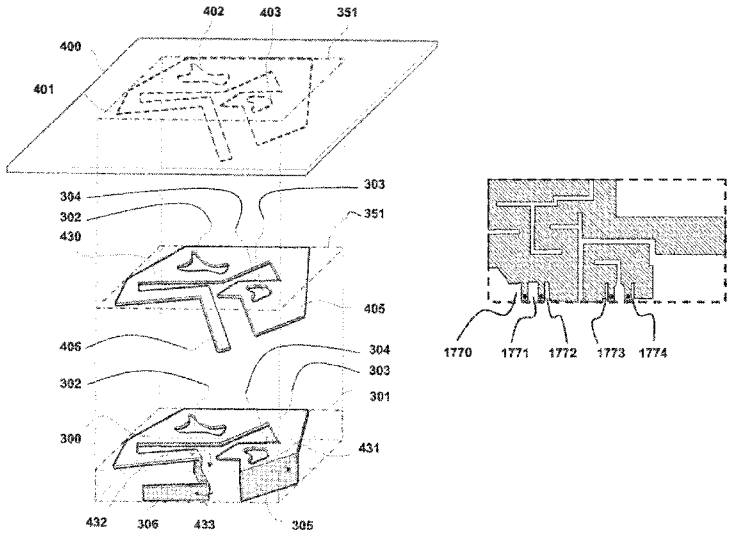
(56) **References Cited**

To view the complete listing of prior art documents cited during the proceeding for Reexamination Control Number 90/019,275, please refer to the USPTO's Patent Electronic System.

Primary Examiner — Kenneth Whittington

(57) **ABSTRACT**

A multifunction wireless device having at least one of multimedia functionality and smartphone functionality, the multifunction wireless device including an upper body and a lower body, the upper body and the lower body being adapted to move relative to each other in at least one of a clamshell, a slide, and a twist manner. The multifunction wireless device further includes an antenna system disposed within at least one of the upper body and the lower body and having a shape with a level of complexity of an antenna contour defined by complexity factors F_{21} having a value of at least 1.05 and not greater than 1.80 and F32 having a value of at least 1.10 and not greater than 1.90.



Geotab Exhibit 1047
Geotab v. Fractus

EX PARTE REEXAMINATION CERTIFICATE

NO AMENDMENTS HAVE BEEN MADE TO THE PATENT

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **11** and **12** is confirmed.

Claims **1-10** and **13-20** were not reexamined.

* * * * *

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/019,275	10/12/2023	11349200	SKAD002	7433

27896 7590 09/24/2024
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Gaithersburg, MD 20878

EXAMINER
WHITTINGTON, KENNETH

ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
09/24/2024	PAPER

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The time period for reply, if any, is set in the attached communication.

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EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/019,275* .

PATENT UNDER REEXAMINATION *11349200* .

ART UNIT *3992* .

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

Notice of Intent to Issue Ex Parte Reexamination Certificate	Control No. 90/019,275	Patent Under Reexamination 11349200	
	Examiner KENNETH WHITTINGTON	Art Unit 3992	AIA Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

1. ☑ Prosecution on the merits is (or remains) closed in this *ex parte* reexamination proceeding. This proceeding is subject to reopening at the initiative of the Office or upon petition. *Cf.* 37 CFR 1.313(a). A Certificate will be issued in view of
   (a) ☑ Patent owner's communication(s) filed: 14 August 2024.
   (b) ☐ Patent owner's failure to file an appropriate timely response to the Office action mailed: ____.
   (c) ☐ Patent owner's failure to timely file an Appeal Brief (37 CFR 41.31).
   (d) ☐ The decision on appeal by the ☐ Board of Patent Appeals and Interferences ☐ Court dated ____
   (e) ☐ Other: ____.
2. The Reexamination Certificate will indicate the following:
   (a) Change in the Specification: ☐ Yes ☐ No
   (b) Change in the Drawing(s): ☐ Yes ☐ No
   (c) Status of the Claim(s):
      (1) Patent claim(s) confirmed: 11-12.
      (2) Patent claim(s) amended (including dependent on amended claim(s)): ____
      (3) Patent claim(s) canceled: ____.
      (4) Newly presented claim(s) patentable: ____.
      (5) Newly presented canceled claims: ____.
      (6) Patent claim(s) ☐ previously ☐ currently disclaimed: ____
      (7) Patent claim(s) not subject to reexamination: 1-10 and 13-20.
3. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.
4. ☐ Note the attached statement of reasons for patentability and/or confirmation. Any comments considered necessary by patent owner regarding reasons for patentability and/or confirmation must be submitted promptly to avoid processing delays. Such submission(s) should be labeled: "Comments On Statement of Reasons for Patentability and/or Confirmation."
5. ☐ Note attached NOTICE OF REFERENCES CITED (PTO-892).
6. ☑ Note attached LIST OF REFERENCES CITED (PTO/SB/08 or PTO/SB/08 substitute).
7. ☐ The drawing correction request filed on ____ is: ☐approved ☐disapproved.
8. ☑ Acknowledgment is made of the priority claim under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☑ All b) ☐ Some* c) ☐None of the certified copies have
   ☐been received.
   ☐not been received.
   ☑been filed in Application No. 17/246192.
   ☐been filed in reexamination Control No. ____.
   ☐been received by the International Bureau in PCT Application No. ____.
   * Certified copies not received: ____.
9. ☐ Note attached Examiner's Amendment.
10. ☐ Note attached Interview Summary (PTO-474).
11. ☐ Other: ____.

All correspondence relating to this reexamination proceeding should be directed to the **Central Reexamination Unit** at the mail, FAX, or hand-carry addresses given at the end of this Office action.

/KENNETH WHITTINGTON/
Primary Examiner, Art Unit 3992

cc: Requester (if third party requester)

NOTICE OF INTENT OT ISSUE EX PARTE REEXAMINATION CERTIFICATE

This NIRC addresses claims 11 and 12 of United States Patent No. 11,349,200 to Carles Puente Baliarda et al., entitled MULTIPLE-BODY-CONFIGURATION MULTIMEDIA AND SMARTPHONE MULTIFUNCTION WIRELESS DEVICES (hereinafter the "200 Patent"). Claims 11 and 12 are confirmed.

I. BRIEF PROCEEDING HISTORY

A Request for ex parte reexamination was filed October 23, 2023 requesting reexamination of claims 11 and 12 of the 200 Patent (hereinafter the "**Request**").

Ex parte reexamination was ordered for claims 11 and 12 of the 200 Patent on January 10, 2024 (hereinafter the "**Order**").

On May 31, 2024, the Office issued a non-final Office action rejecting claims 11 and 12 as requested (hereinafter the "**2024 NF Action**").

On July 19, 2024, Examiners and Patent Owner's representatives conducted an interview to discuss the 2024 NF Action.

On August 14, 2024, Patent Owner filed a response to the 2024 NF Action (hereinafter the "**2024 Response**"). Therein, Patent Owner provided testimony in the form of an expert declaration by Dr. Hossein Hashemi, Ph.D. (hereinafter the "**Hashemi Declaration**") along with arguments for patentability over the rejections.

Furthermore, on August 14, 2024, Examiners find Patent Owner has filed a Terminal Disclaimer in the file history of the 200 Patent, i.e., U.S. Patent Application No.

17/246,192, to overcome the double patenting rejections provided in the 2024 NF Action (hereinafter the "**2024 Terminal Disclaimer**").

II. REFERENCES/DOCUMENTS CITED HEREIN

(a) U.S. Patent Application Publication No. 2004/0137950 to Thomas Bolin et al. published on July 15, 2004 (hereinafter "**Bolin**").

(b) United Kingdom Patent Application Publication No. GB2416625 to Richard Langley et al., published on February 1, 2006 (hereinafter "**Langley**").

(c) U.S. Patent Application Publication No. 2004/0051669 to Thomas Rutfors et al., published on March 18, 2004 (hereinafter "**Rutfors**").

(d) European Patent Application Publication No. EP1294049 to Jani Ollikainen et al., published on March 19, 2003 (hereinafter "**Ollikainen**").

III. ACKNOWLEDGEMENTS

The Request, the Order and the 2024 Response and all of their accompanying documents and evidence, and all other documents and evidence properly made of record in this proceeding have been fully considered in the Examiners' determinations and findings discussed below.

IV. PRIORITY

After careful review of the prosecution history of the 200 Patent, Examiners find that the 200 Patent resulted from U.S. Patent Application No. 17/246,192, filed April 30, 2021 (hereinafter the "192 Application"), which is a continuation from U.S. Patent

Application No. 16/832,820, filed March 27, 2020, now U.S. Patent No. 11,031,677, which is a continuation from U.S. Patent Application No. 15/856,626, filed December 28, 2017, now U.S. Patent No. 10,644,380, which is a continuation from U.S. Patent Application No. 14/738,090 filed June 12, 2015, now U.S. Patent No. 9,899,727, which is a continuation from U.S. Patent Application No. 14/246,491 filed on April 7, 2014, now U.S. Patent No. 9,099,773, which is a continuation from U.S. Patent Application No. 11/614,429, filed December 21, 2006, now U.S. Patent No. 8,738,103, which claims the benefit of U.S. Provisional Patent Application No. 60/856,410 filed on November 3, 2006 and U.S. Provisional Patent Application No. 60/831,544 filed on July 18, 2006. Based on a review of these prior patents and applications, Examiners find the earliest claimed priority date for the 200 Patent is July 18, 2006.

V. CLAIM INTERPRETATION

A. Lexicographic Definitions

After careful review of the original specification, the prosecution history, and unless expressly noted otherwise by the Examiners, the Examiners find that they are able to locate several lexicographic definitions (either express or implied) with the required clarity, deliberateness, and precision which are necessary to interpret the patent claims. See MPEP §2111.01 IV. Each such definition is as follows:

ground plane rectangle – "a ground plane rectangle is defined as being the minimum-sized rectangle that encompasses the ground plane of the antenna system included in the PCB of the MFWD 100 that comprises the feeding means responsible for the operation of the antenna system in its lowest frequency band. That is, the ground

plane rectangle is a rectangle whose edges are tangent to at least one point of the ground plane. See 200 Patent col. 14, lines 37-44.

antenna box – "[a]n antenna box for the MFWD 100 is herein defined as being the minimum-sized parallelepiped of square or rectangular faces that completely encloses the antenna volume of space and wherein each one of the faces of the minimum-sized parallelepiped is tangent to at least one point of the volume. Moreover, each possible pair of faces of the minimum-size parallelepiped shares an edge forming an inner angle of 90°." See 200 Patent col. 11, lines 35-42.

antenna rectangle – "an antenna rectangle is defined as being the orthogonal projection of the antenna box along the normal to the face with largest area of the antenna box." See 200 Patent col. 14, lines 21-24.

aspect ratio – "[t]he aspect ratio of the antenna rectangle is defined as the ratio between the width and the height of the antenna rectangle." See 200 Patent col. 14, lines 34-36.

antenna contour – "[t]he antenna contour of the antenna system is a set of joined and/or disjointed segments comprising: the perimeter of one or more antenna elements placed in the antenna rectangle, the perimeter of closed slots and/or closed apertures defined within the antenna elements, and/or the orthogonal projection onto the antenna rectangle of perimeters of antenna elements, or perimeters of or parts of antenna elements that are placed in the antenna box but not in the antenna rectangle." See 200 Patent col. 15, lines 16-26.

Complexity factor F21 -

$$F_{21} = -\frac{\log(N_2) - \log(N_1)}{\log(1/2)}$$

Complexity factor F32 -

$$F_{32} = -\frac{\log(N_3) - \log(N_2)}{\log(1/2)}$$

Wherein

N_1 – the number of cells of the grid G_1 that are at least partially inside the antenna rectangle and include at least a point of the antenna contour. See 200 Patent col. 19, lines12-17.

N_2 – the number of cells of the grid G_2 that are completely inside the antenna rectangle and include at least a point of the antenna contour. See 200 patent col. 19, lines 17-19 and col. 20, lines 5-8.

N_3– the number of cells of the grid G_3 that are completely inside the antenna rectangle and include at least a point of the antenna contour. See 200 Patent at col. 20, lines 8-11.

Wherein N1, N2 and N3 are determined using the following grids:

Grid G_2 – a grid of cells drawn over the antenna rectangle such that "the size of a cell and its aspect ratio (i.e., the ratio between the width and the height of the cells) are first chosen so that the antenna rectangle is perfectly tessellated with an odd number of columns and an odd number of rows." See 200 Patent col. 17, lines 28-32. "[C]olumns of cells are associated with the longer side of an antenna rectangle, while rows of cells are associated with a shorter side of the antenna rectangle." See 200 Patent col. 17, lines 33-36.

Grid G_1 – a grid of cells over the antenna rectangle and is "obtained by combining four (4) cells of the grid G_2." See 200 Patent col. 18, lines 12-13. Thus, the Grid G_1 is twice a scaling factor of Grid G_2, i.e., "[a] cell of grid size G_2 is half the size of a cell of grid G_1 (i.e., a ½ scaling factor or an octave of scale). See 200 Patent col. 17, lines 17-19.

Grid G_3 – a grid of cells over the antenna rectangle and is "obtained by subdividing each cell of grid G_2 into four cells, with each of the cells having a cell width (W_3) equal to one half (½) of the width of a cell of the second grid (W_2) (i.e., $W_3=½\times W_2$); and a cell height (H_3) equal to one half (½) of the height of a cell of the second grid (H_2) (i.e., $H_3=½\times H_2$). See 200 Patent col. 19, lines 62-67. Further "a cell of grid size G_3 is half the size of a cell of grid G_2, or one fourth the size of a cell of grid G_1 (i.e., a ¼ scaling factor or two octaves of scale)." See 200 Patent col. 17, lines 19-21.

B. 35 U.S.C. §112 (6th ¶)

The Examiners further find that because Patent claims 11 and 12 herein recite neither "step for" nor "means for," the claims fail Prong (A) as set forth in MPEP §2181 I. Because all examined claims fail Prong (A) as set forth in MPEP §2181 I., the Examiners conclude that all examined claims do not invoke 35 U.S.C. §112(f). See also *Ex parte Miyazaki*, 89 USPQ2d 1207, 1215-16 (B.P.A.I. 2008)(precedential)(where the Board did not invoke 35 U.S.C. §112(f) because "means for" was not recited and because applicant still possessed an opportunity to amend the claims).

C. Conclusion of Claim Interpretation

Because of the Examiners' findings above that Applicant is its own lexicographer, the Examiners find these definitions control. See MPEP §2111.01(IV). Examiners further find the no limitations in Patent Claims 11 and 12 invoke 35 U.S.C. §112 (6th ¶), and thus the remaining limitations that are not lexicographically defined will be given the broadest reasonable interpretation consistent with the specification since patentee has an opportunity to amend claims. See MPEP §2258(I)(G), MPEP §2111, MPEP §2111.01 and *In re Yamamoto et al.*, 222 USPQ 934 (Fed. Cir. 1984). Under a broadest reasonable interpretation, words of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification. See MPEP §2111.01(I). It is further noted it is improper to import claim limitations from the specification, i.e., a particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment. See MPEP §2111.01(II).

VI. WITHDRAWAL OF ART REJECTIONS

In the 2024 NF Action, claims 11 and 12 were treated as follows:

A. Claims 11 and 12 were rejected under pre-AIA 35 U.S.C. §103(a) as being unpatentable over Bolin in view of Langley.

B. Claims 11 and 12 were rejected under pre-AIA 35 U.S.C. §103(a) as being unpatentable over Bolin in view of Langley and Rutfors.

C. Claims 11 and 12 were rejected under pre-AIA 35 U.S.C. §103(a) as being unpatentable over Ollikainen in view of Langley and Bolin.

With regard to rejections A-C, Examiners find that the references cited above taken together disclose, albeit separately, the individual features of claims 11 and 12 of the 200 Patent. However, Examiners do not find that these references are combinable to arrive at the invention claimed in claim 11 and 12.

First for example, claims 11 and 12 recite "a ground plane and at least two antennas within the wireless device" and "a first antenna proximate to a first short side of a ground plane rectangle enclosing the ground plane, the first antenna being configured to support at least three frequency bands" wherein the first antenna has specific complexity values. In the 2024 NF Action, the proposed combination for each of rejections A-C was providing the antenna structures of Langley with the one or more references noted above such that the first and second antenna structure were positioned with respect to the ground plane, the first antenna having the Langley antenna structures. Upon review of Langley, Examiners do not find a requirement or disclosure in Langley related to use of the antenna disclosed therein related to a ground plane. Nevertheless, Patent Owner provided the testimony of Dr. Hashemi who stated simulations were made to operate the antenna structure of Langley in association with a ground plane. See Hashemi Declaration ¶¶0048-62. In the simulations, Dr. Hashemi testified that only two of the five frequency bands were preserved when the Langley antenna structure was used with a ground plane. See Hashemi Declaration ¶¶0063-0066. Thus, as stated by Dr. Hashemi, Langley was "designed to operate without a ground plane." See Hashemi Declaration ¶ 48. Based on this simulation and the lack of discussion of a ground plane in Langley, Examiners agree that the antenna structure was not designed for and would not operate with a ground plane. Further, even if the

Langley antenna was used with a ground plane, the combination would only operate over two frequencies. Therefore, Examiners find that the proposed combination of Langley to be used with a ground plane as proposed in rejections A-C would render Langley inoperable for its intended purposed and the proposed combination would not meet the limitations of claims 11 and 12, which require the first antenna to operate over at least three frequency bands.

Second, rejections A-C relied on a combination of Bolin and Langley such that the antenna structures of Langley were combined with the Bluetooth antenna of Bolin as the first and second antennas of claims 11 and 12, respectively. Thus, in combination, the first antenna, i.e., the Langley antenna, would operate over five frequency bands, one of which is Bluetooth frequency, and the second antenna, i.e., the Bolin antenna, would operate over the Bluetooth frequency. See Hashemi Declaration ¶0034 and ¶¶0042-0044. However, Examiners do not find that one having ordinary skill in the art would make such a combination, i.e., to provide an antenna system with two Bluetooth antennas. Such a combination would result in interference between the two antennas over the same frequency band and thus the antenna in either or both of Langley and Bolin would not operate as intended.

In view of these findings, Examiners do not find the references as cited in the Request and above are not combinable to arrive at the invention of claims 11 and 12 of the 200 Patent. Accordingly, the art rejections A-C as provided in the 2024 NF Action are withdrawn.

VII. WITHDRAWAL OF DOUBLE PATENTING REJECTIONS

In the 2024 NF Action, claims 11 and 12 were further treated as follows:

A. Claims 11 and 12 are rejected on the ground of non-statutory double patenting as being unpatentable over claim 8 of the 810 Patent in view of Langley.

B. Claims 11 and 12 are provisionally rejected on the ground of non-statutory double patenting as being unpatentable over claim 6 of the 523 Application, as amended on May 24, 2024, in view of Langley.

Upon review of the file history of the 200 Patent, Examiners find that Patent Owner has filed the 2024 Terminal Disclaimer to overcome double patenting rejections A and B above. The 2024 Terminal Disclaimer has been approved. Accordingly, double patenting rejections A and B are withdrawn.

VIII. ALLOWANCE/CONFIRMATION

Claims 11 and 12 are confirmed.

IX. RELATED PROCEEDINGS/LITIGATION

Examiners are currently aware of the following related proceedings and litigation affecting the 855 Patent.

(a) Inter Partes Review 2024-00088 (hereinafter "**IPR2024-00088**"). Petitioner Vivant, Inc. sought cancellation of claims 1-4, 6, 7, 9-13, 15 and 17-20 of the 200 Patent over prior art. Proceeding was terminated February 20, 2024 based on a Joint Motion to Terminate.

(b) Fractus, S.A. v. ADT LLC d/b/a ADT Security Services, 2:22-cv-00412 (E.D. Tex. 2022). Litigation filed October 21, 2022. Examiners are unaware of the current status of this litigation.

(c) Fractus, S.A. v. Vivint, Inc., 2:22-cv-00413 (E.D. Tex. 2022). Litigation filed October 21, 2022. Examiners are unaware of the current status of this litigation.

While the Examiners are aware of the above related proceedings and litigation involving the 200 Patent, the Patent Owner is reminded of the continuing responsibility under 37 C.F.R. §1.565(a) to apprise the Office of any litigation activity, or other prior or concurrent proceeding, throughout the course of this reexamination proceeding involving the 200 Patent. The third-party requester is also reminded of the ability to similarly apprise the Office of any such activity or proceeding throughout the course of this reexamination proceeding. See MPEP §§2207, 2282 and 2286.

X. CONCLUDING REMARKS

All correspondence relating to this ex parte reexamination proceeding should be directed as follows:

By U.S. Postal Service Mail to:
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Commissioner for Patents
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Any inquiry concerning this communication or earlier communications from the Reexamination Legal Advisor or Examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

Signed:

/KENNETH WHITTINGTON/
Primary Examiner, Art Unit 3992

Conferees:

/Stephen J. Ralis/
Primary Examiner, Art Unit 3992

/H.B.P/
Hetul Patel
Supervisory Patent Examiner, Art Unit 3992

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90/019,275	11349200
	Examiner	**Art Unit**
	KENNETH WHITTINGTON	3992

CPC								
Symbol							**Type**	**Version**
H01Q	/	1	/	243			F	2013-01-01
H01Q	/	5	/	371			I	2015-01-15
H01Q	/	5	/	40			I	2015-01-15
H01Q	/	1	/	36			I	2013-01-01
H01Q	/	9	/	0407			I	2013-01-01
H01Q	/	9	/	0421			I	2013-01-01

CPC Combination Sets								
Symbol							**Type**	**Set**	**Ranking**	**Version**
	/		/							

Use images from artifact folder? ○ Yes ◉ No

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	2	
/KENNETH WHITTINGTON/ Primary Examiner, Art Unit 3992	10 September 2024	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	11	4,17H

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90/019,275	11349200
	Examiner	Art Unit
	KENNETH WHITTINGTON	3992

INTERNATIONAL CLASSIFICATION				
CLAIMED				
H01Q1/24	/	1	/	24
H01Q5/371	/	5	/	371
H01Q5/40	/	5	/	40
H01Q1/36	/	1	/	36
H01Q9/04	/	9	/	04

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS

CROSS REFERENCES(S)							
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)						

Use images from artifact folder? ○ Yes ◉ No

NONE (Assistant Examiner)	(Date)	Total Claims Allowed: 2	
/KENNETH WHITTINGTON/ Primary Examiner, Art Unit 3992 (Primary Examiner)	10 September 2024 (Date)	O.G. Print Claim(s) 11	O.G. Print Figure 4,17H

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90/019,275	11349200
	Examiner	Art Unit
	KENNETH WHITTINGTON	3992

☑ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original

Use images from artifact folder? ○ Yes ◉ No

NONE (Assistant Examiner) (Date)	Total Claims Allowed: 2	
/KENNETH WHITTINGTON/ Primary Examiner, Art Unit 3992 (Primary Examiner) 10 September 2024 (Date)	O.G. Print Claim(s) 11	O.G. Print Figure 4,17H

Reexamination

Application/Control No.	Applicant(s)/Patent Under Reexamination
90/019,275	11349200
Certificate Date	**Certificate Number**
	C1

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Christopher J. Coulson
SKADDEN, ARPS, SLATE, MEAGHER & FLOM, LLP
ONE MANHATTAN WEST
30TH FLOOR
NEW YORK, NEW YORK 10001

LITIGATION REVIEW ☐

KJW	10 September 2024
(examiner initials)	(date)
Case Name	Director Initials

Fractus, SA v. ADT, LLC, 2:22-cv-00412 (E.D. Texas 2022)
Fractus, SA v. Vivint, Inc., 2:22-cv-00413 (E.D. Texas 2022)

COPENDING OFFICE PROCEEDINGS

TYPE OF PROCEEDING	NUMBER
Inter Partes Review	IPR2024-00088 (petitioner Vivint, Inc.)

/KENNETH WHITTINGTON/
Primary Examiner, Art Unit 3992

Bibliographic Data

Application No:	90/019,275		
Foreign Priority claimed:	◉ Yes	○ No	
35 USC 119 (a-d) conditions met:	☑ Yes	☐ No	☐ Met After Allowance
Verified and Acknowledged:	/KENNETH WHITTINGTON/ Examiner's Signature		Initials
Title:	Multiple-Body-Configuration Multimedia and Smartphone Multifunction Wireless Devices		

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
10/12/2023	343	3992	SKAD002

RULE

APPLICANTS

INVENTORS

11349200, Barcelona, SPAIN

Josep MUMBRU, Asnières-sur-Seine, FRANCE

Jordi ILARIO, Barcelona, SPAIN

CONTINUING DATA

This application is a REX of 17246192 04/30/2021 PAT 11349200

17246192 is a CON of 16832820 03/27/2020 PAT 11031677

16832820 is a CON of 15856626 12/28/2017 PAT 10644380

15856626 is a CON of 14738090 06/12/2015 PAT 9899727

14738090 is a CON of 14246491 04/07/2014 PAT 9099773

14246491 is a CON of 11614429 12/21/2006 PAT 8738103

11614429 has PRO of 60856410 11/03/2006

11614429 has PRO of 60831544 07/18/2006 *

(*) Data provided by applicant is not consistent with PTO record

FOREIGN APPLICATIONS

EPO EP06117352 07/18/2006

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EDELL, SHAPIRO & FINNAN, LLC

9801 Washingtonian Blvd.

Suite 750
Gaithersburg, MD 20878
UNITED STATES

FILING FEE RECEIVED

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Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	90019275
Filing Date	2023-10-12
First Named Inventor	11349200
Art Unit	3992
Examiner Name	Kenneth WHITTINGTON
Attorney Docket Number	0690.0065L

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/K.W/	1	8738103	B2	2014-05-27	Puente Baliarda et al.	
/K.W/	2	6239765	B1	2001-05-29	Johnson et al.	
/K.W/	3	8994604	B2	2015-03-31	Puente Baliarda et al.	
/K.W/	4	6509882	B2	2003-01-21	McKivergan	

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/K.W/	1	20070238483	A1	2007-10-11	Boireau et al.	
/K.W/	2	20030189522	A1	2003-10-09	Zeilinger	

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/K.W/	3	20040125018	A1	2004-07-01	Ramasamy et al.

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] ¡	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
/K.W/	1	2416625	GB	A	2006-02-01	Langley et al.		☐

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
/K.W/	1	Inter Partes Review IPR2024-00087, EX.1002, Declaration of Dr. Manos Tentzeris, Oct. 24, 2023.	☐
/K.W/	2	US Pat. No. 8,738,103 prosecution file history excerpts.	☐
/K.W/	3	Inter partes review IPR2024-00087, EX. 1008 Cases 2:22-cv-00412-JRG and 2:22-cv-00413-JRG (EDTX), Expert Declaration of Stuart A Long, Oct. 5, 2023.	☐
/K.W/	4	Inter partes review IPR2024-00087, EX. 1009 Case 2:22-cv-00412-JRG (EDTX), Docket No. 041, Docket Control Order.	☐
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/K.W/	11	Inter Partes Review IPR2024-00089, EX. 1004: Case 2:22-cv-00412-JRG, Document 67: P.R. 4-3 Joint Claim Construction Statement.	☐
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/K.W/	15	Inter Partes Review IPR2024-00089, Petition for Inter Partes Review of U.S. Patent No. 8,994,604.	☐
/K.W/	16	Ex parte Reexamination No. 90/019,500, EX. 1010: (1 of 4) CV of Manos (Emmanouil) M Tentzeris Jan. 4, 2024.	☐

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/K.W/	21	Ex parte Reexamination No. 90/019,500, EX. 1012 Case 2:22-cv-412 (EDTX) Claim Construction Order, Feb. 25, 2024.	☐
/K.W/	22	Ex parte Reexamination No. 90/019,500, EX. 1007 prosecution file history for 8,378,103 (pp. 1-194).	☐
/K.W/	23	Ex parte Reexamination No. 90/019,500, EX. 1007 continuation of prosecution file history for 8,378,103 (pp. 195-324).	☐
/K.W/	24	Ex parte Reexamination No. 90/019,500, EX. 1002 Declaration of Manos M Tentzeris, PhD, April 30, 2024.	☐
/K.W/	25	Ex parte Reexamination No. 90/019,500, April 30, 2024 Request for Ex Parte Reexamination for US Pat No. 8,738,103.	☐
/K.W/	26	Ex parte Reexamination No. 90/019,500, EX. 1008, ETSI TS 136 104 V8.8.0 (2010-02) TECHNICAL SPECIFICATION, Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception (3GPP TS 36.104 version 8.8.0 Release 8).	☐
/K.W/	27	Ex parte Reexamination No. 90/019,500, EX. 1008, Rohde & Schwarz LTE Release 9, Technology Introduction White Paper, 1MA191.	☐

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Examiner Signature	/KENNETH WHITTINGTON/	Date Considered	09/10/2024

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Examiner Name	Kenneth WHITTINGTON
Attorney Docket Number	0690.0065L

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☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

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A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Mark J. DeBoy/	Date (YYYY-MM-DD)	2024-08-14
Name/Print	Mark J. BeBoy	Registration Number	66983

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	1	8738103	B2	2014-05-27	Puente Baliarda et al.	
	2	6239765	B1	2001-05-29	Johnson et al.	
	3	8994604	B2	2015-03-31	Puente Baliarda et al.	
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	1	20070238483	A1	2007-10-11	Boireau et al.	
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3	20040125018	A1	2004-07-01	Ramasamy et al.	

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	1	Inter Partes Review IPR2024-00087, EX.1002, Declaration of Dr. Manos Tentzeris, Oct. 24, 2023.	☐
	2	US Pat. No. 8,738,103 prosecution file history excerpts.	☐
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Examiner Signature	Date Considered

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☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Mark J. DeBoy/	Date (YYYY-MM-DD)	2024-08-14
Name/Print	Mark J. BeBoy	Registration Number	66983

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
90/019,275	**08/14/2024 04:41:18 PM Z ET**	**SKAD002**

Title of Invention

Multiple-Body-Configuration Multimedia and Smartphone Multifunction Wireless Devices

Application Information

APPLICATION TYPE	Utility / ex parte reexam	PATENT #	11349200
CONFIRMATION #	7433	FILED BY	MARK DEBOY
PATENT CENTER #	66786065	FILING DATE	10/12/2023
CUSTOMER #	27896	FIRST NAMED INVENTOR	- 11349200
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 40

DOCUMENT		PAGES	DESCRIPTION	SIZE (KB)
2024-08-14 -- 0690_0065L -- Statement of Related Proceedings_CLEAN.pdf		3	-	146 KB
2024-08-14 -- 0690_0065L -- Statement of Related Proceedings_CLEAN-RXNOCP.pdf	(1-2)	2	Notice of concurrent proceeding(s)	147 KB
2024-08-14 -- 0690_0065L -- Statement of Related Proceedings_CLEAN-RXC/SR.pdf	(3-3)	1	Reexam Certificate of Service	76 KB
IDSxml_CLEAN.pdf		3	-	128 KB
IDSxml_CLEAN-TRAN.LET.pdf	(1-2)	2	Transmittal Letter	126 KB

IDSxml_CLEAN-RXC/SR.pdf	(3-3)	1	Reexam Certificate of Service	89 KB
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UK Pat. Application No. GB2416625 A.pdf		28	Foreign Reference	1766 KB
Hashemi Expert Declaration --Final -- 8-14-2024_CLEAN.pdf		44	Reexam - Affidavit/Declaration/Exhibit Filed by 3rd Party	3938 KB
2024-08-14 -- 0690_0065L -- Final Response to Non-Final Office Action_CLEAN.pdf		41	-	1303 KB
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2024-08-14 -- 0690_0065L -- Final Response to Non-Final Office Action_CLEAN-RXC/SR.pdf	(41-41)	1	Reexam Certificate of Service	92 KB
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Digest

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

EXHIBIT 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Control No.	: 90/019,275	Patent	: 11,349,200
Filing Date	: October 12, 2023	Issue Date	: May 31, 2022
Confirmation No.	: 7433	Title:	: Multiple-Body-Configuration Multimedia and Smartphone Multifunction Wireless Devices
		TC/A.U.	: Central Reexamination Unit : 3992
		Examiner	: Kenneth WHITTINGTON
		Customer No.	: 27896
		Docket No.	: 0690.0065L

EXPERT DECLARATION OF HOSSEIN HASHEMI, Ph.D.

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I, Hossein Hashemi, Ph.D., do hereby declare as follows:

I. Introduction

1. I am currently Professor of Electrical Engineering at the University of Southern California.

2. I have been retained by Edell, Shapiro and Finnan, LLC (hereinafter "the Edell Firm"), to provide various opinions regarding U.S. Patent No. 11,349,200 ("the '200 Patent"). I understand that my declaration is being submitted in connection with a Patent Owner Response in an *ex parte* patent reexamination of the '200 Patent. Unless otherwise noted, the statements made herein are based on my personal knowledge.

3. I have been retained in this matter by the Edell Firm as a technical expert in the field of electrical engineering, particularly within the context of antenna design and operation in multifunction wireless devices. I am being compensated for my work in this matter at my usual and customary rate of $760.00 per hour. I have no personal or financial stake or interest in the outcome of the *ex parte* reexamination or any related action. My compensation in no way depends upon my testimony or the outcome of the *ex parte* reexamination.

4. I have been advised that the Edell Firm represents Fractus, S.A. (hereinafter "Patent Owner") in this matter and that Unified Patents (hereinafter "Requester") has requested the *ex parte* reexamination of the '200 Patent. I have no personal or financial stake or interest in Patent Owner, Requester, or the '200 Patent.

5. I reserve the right to supplement and/or amend my opinions in this declaration based on future positions taken by the Examiners at the United States Patent and Trademark Office ("the Office"), Requester or its experts, additional documents, testimony or other information provided by Requesters or its witnesses, any actions from the Office, or as otherwise necessary.

II. Qualifications

6. My qualifications for forming the opinions set forth in this expert report are summarized here.

7. I am currently a Professor of Electrical and Computer Engineering, a Ming-Hiseh Faculty Fellow, and a Co-Director of the Ming Hsieh Institute at the University of Southern California ("USC"). I received my Bachelor of Science degree in Electronics Engineering from Sharif University of Technology in 1997. I received my Master's degree in Electronics

Engineering from Sharif University of Technology in 1999. I received my Master's degree and Ph.D. in Electrical Engineering from the California Institute of Technology in 2001 and 2003 respectively.

8. From 1997 to 1999 I was a radiofrequency integrated circuit design engineer at Keresem Communications Research. I became an Assistant Professor of Electrical Engineering at the USC in October 2003 and remained in that position until May of 2009. From November 2007 to May 2009, I also occupied the Gordon S. Marshall Early Career Chair at USC. In May 2009 I became an Associate Professor of Electrical Engineering at USC and remained in that position until my promotion to Professor in December 2014, a title I have held since then.

9. I have over 25 years of industry and academic experience. In particular, I have experience with antennas and electromagnetic technologies including designing, simulating, taping out, and measuring complex electromagnetic structures spanning frequency ranges of 100 MHz – 170 GHz, as well as infrared frequencies (1550nm wavelength), and demonstrating numerous phased arrays (multi-antenna systems) spanning radiofrequency to infrared frequencies.

10. I have been privileged to receive a number of awards and honors throughout my career. These include:

- Fellow, Optica 2023
- Fellow, Institute of Electrical and Electronics Engineers (IEEE) - 2019
- Winner, Nokia Bell Labs Prize - 2016
- Outstanding Young Engineer Award of the IEEE Microwave Theory and Techniques Society (MTT-S) - 2015
- Distinguished Lecturer, IEEE Solid State Circuits Society 2013 – 2014
- Distinguished Scholar for "Outstanding Achievement in Advancement of Engineering", Association of Professors and Scholars of Iranian Heritage -2011
- Inaugural Winner, Maseeh Entrepreneurship Prize Competition, USC - 2011
- NSF CAREER Award - 2009
- USC Viterbi School of Engineering Junior Faculty Research Award - 2008

- DARPA Young Faculty Award - 2008
- Lewis Winner Award for Outstanding Paper, IEEE International Solid-State Circuits Symposium (ISSCC) - 2007
- Best Paper Award, IEEE Journal of Solid-State Circuits - 2004
- Charles Lee Powell Foundation Research Award - 2004
- Young Scholar Award, Association of Professors and Scholars of Iranian Heritage - 2003
- Graduate Fellowship Award, Intel Foundation - 2002
- Outstanding Student Designer Award, Analog Devices - 2001
- Outstanding Accomplishment Award, von Brimer foundation - 2000
- Engineering and Applied Science Division Fellowship, California Institute of Technology - 1999
- Ranked first in Ph.D. EE qualifying exam, California Institute of Technology - 2000
- Ninth place out of 300,000 in national qualifying exam for undergraduate studies – 1993

11. I have co-authored two books and over 125 peer reviewed journal and conference papers. I have also spoken at numerous invited workshops, talks and short courses. Many of these relate directly or indirectly to antennas, antenna arrays and various modes of wireless communication and electronics design.

12. I am the named inventor on 15 United States Patents, including patents related to antenna technology, including U.S. Patent Nos. 10,615,949 (Hybrid-based cancellation in presence of antenna mismatch) and 8,203,484 (Path-sharing transceiver architecture for antenna arrays).

III. Legal Standards

13. While I am not an attorney, I am been informed by counsel of certain legal principles I should apply in reaching my opinions in this matter. Also, as an inventor, expert witness and otherwise in the course of my work, I have experience studying and analyzing patents and patent claims from the perspective of a person of ordinary skill in the art (POSITA or "skilled artisan").

A. Claim Construction

14. I understand that claim terms are to be interpreted from the point of view of a person of ordinary skill in the art (also referred to herein as the "skilled artisan") at the time the application

leading to the patent was filed. I further understand that claim terms are generally to be given their ordinary meaning, considered in light of the claim language, patent specification, and prosecution history. I further understand that a patentee may act as its own lexicographer and depart from the ordinary and customary meaning by defining a term with reasonable clarity, deliberateness, and precision, but that there is a presumption that a claim term carries its ordinary and customary meaning.

B. Person of Ordinary Skill in the Art

15. I understand that a person of ordinary skill in the art is a hypothetical person who is presumed to have known the relevant art at the time of the invention. He or she is a person of ordinary creativity who understands the scientific and engineering principles applicable to the pertinent art. I am familiar with the knowledge and capabilities of one of ordinary skill in the art in the field of the '200 Patent at the time of the effective filing date of the patent: July 18, 2006.

16. I understand that whether a patent claim would have been obvious is determined through the point of view of a person of ordinary skill in the art at the time of the invention. I have applied this standard in my analysis.

C. Validity

17. I understand that to invalidate a claim, the Office must show that a claim is anticipated or obvious based on a preponderance of the evidence. I understand that a "preponderance" means "more likely than not." I understand that general and conclusory assertions, without underlying factual evidence, may not support a conclusion that something is "more likely than not." Rather, the preponderance of the evidence standard requires that a reasonable finder of fact be convinced that the existence of a specific material fact is more probable than the non-existence of that fact. The preponderance of the evidence standard does not support speculation regarding specific facts and is instead focused on whether the evidence more likely than not demonstrates the existence or non-existence of specific material facts. Here, I understand that the Office has presented three grounds of rejection alleging that the claims at issue are obvious, each applying a combination of two or more references.

18. I also understand that, in performing a proper unpatentability analysis, an expert must do more than simply provide quotes from the evidentiary record along with conclusory allegations of unpatentability. To the contrary, an expert's conclusions regarding unpatentability

must be supported by actual analysis and reasoning set forth in the expert declaration, such that the theoretical and factual foundation for the expert's conclusions can be properly evaluated.

19. I understand that a patent claim may be found unpatentable as obvious under 35 U.S.C. § 103 only if the Office establishes by a preponderance of the evidence that, as of the priority date, the subject matter of the claim, considered as a whole, would have been obvious to a person having ordinary skill in the field of the technology (the "art") to which the claimed subject matter belongs.

20. I understand that the analysis of whether a claim is obvious depends on a number of necessary factual inquiries, for example, (1) the scope and content of the prior art; (2) the differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness.

21. I understand that the claimed invention must be considered as a whole in analyzing obviousness or nonobviousness. In determining the differences between the prior art and the claims, the question under the obviousness inquiry is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. Relatedly, I understand rejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. In other words, to make a proper determination of obviousness under 35 U.S.C. 103, the Office must provide some supporting rationale to explain why the difference(s) between the prior art and the claimed invention would have been obvious to one of ordinary skill in the art.

22. I have also been informed that some examples of rationales that may support a conclusion of obviousness include:

a) Combining prior art elements according to known methods to yield predictable results;

b) Simply substituting one known element for another to obtain predictable results;

c) Using known techniques to improve similar devices (or product) in the same way (*e.g.*, obvious design choices);

d) Applying a known technique to a known device (or product) ready for improvement to yield predictable results;

e) Choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success—in other words, whether something is "obvious to try";

f) Using work in one field of endeavor to prompt variations of that work for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art; and

g) Arriving at a claimed invention as a result of some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings.

23. I have also been informed that other rationales to support a conclusion of obviousness may be relied upon, for instance, that common sense (where substantiated) may be a reason to combine or modify prior art to achieve the claimed invention.

24. I understand that one indicator of nonobviousness is when prior art "teaches away" from combining certain known elements. For example, a prior art reference teaches away from the patent's particular combination if it leads in a different direction or discourages that combination, recommends steps that would not likely lead to the patent's result, or otherwise indicates that a seemingly inoperative device would be produced.

25. I understand that an obviousness determination also requires that a person of ordinary skill in the art would have had a reasonable expectation of success in making any modifications to the cited references.

26. I further understand that certain objective indicia can be important evidence regarding whether a patent is obvious or nonobvious, including the existence of a long-felt but unsolved need, unexpected results, commercial success, copying, and industry acceptance or praise. Evidence of such objective indicia must be considered when present. It is generally an error to reach a conclusion on obviousness before considering the evidence of secondary considerations, and then evaluating the latter solely in terms of whether it may fill any gaps in the initial conclusion on obviousness. On the other hand, such evidence is not a requirement for patentability, and the absence of such evidence is a neutral factor in the analysis of obviousness or nonobviousness.

27. I also understand that a prior art reference must be enabled to anticipate a patent. That is, I understand that the prior art reference's description must be such that a person of ordinary skill in the field of the invention can practice the subject matter based on the reference without undue experimentation.

28. Finally, I understand that the obviousness analysis cannot be based on "hindsight. The skilled artisan my view prior art at the time the invention was made and without using the disclosure of the subject patent as a guide.

IV. Background

A. Person of Ordinary Skill in the Art

29. I understand that the Requester's expert has offered the following opinion regarding the Person of Ordinary Skill in the Art:

> In my opinion, a POSITA would be a person having, as of July 18, 2006: (1) an undergraduate degree in electrical engineering or closely related field, or similar advanced post-graduate education in this area; or (2) three years of experience in electrical engineering; and also 2 years of experience in antenna and wireless device design and development. Such a person of ordinary skill in the art would have been capable of understanding the '200 Patent and the prior art references discussed herein. It is from this lens that I offer my opinions below.

Declaration of Manos Tentzeris (Exhibit 1009) at ¶ 32.

30. For purposes of this declaration, I adopt for sake of argument the level of ordinary skill in the art proposed by Requester's expert.

B. Overview of the '200 Patent

31. The '200 Patent is entitled "Multiple-Body-Configuration Multimedia and Smartphone Multifunction Wireless Device," and was filed on April 30, 2021, and issuing on May 31, 2022. '200 Patent at Title Page. The '200 Patent issued from United States Patent Application No. 17/246,192, and claims priority to European Patent No. 06117352, filed on July 18, 2006. '200 Patent at Title Page.

32. As indicated in claim 11, the relevant invention of the '200 Patent is directed to "a wireless device" that includes "an antenna system." The recited parts of the antenna system are a ground plane, a first antenna, and a second antenna. '200 Patent at claim 11. It is my understanding that claim 11 recites structural and operational requirements for the antenna system that allow for antennas constructed according to the claimed invention to provide multiband operation with reduced-sized antenna structures. '200 Patent, throughout. Based on my review of the claims, specification and prosecution history for the '200 Patent, I understand that the claims recite novel

features of the first antenna, such as the recited F21 and F32 complexity factors, as well as a novel arrangement of the first and second antennas relative to the ground plane. These features of the claims are, to an extent, beyond the scope of the opinions I present in this declaration. My opinions herein are directed, instead, to errors in how the grounds of rejection propose combining the cited references.

C. Overview of the Cited Art

33. The grounds of rejection set forth in the Office Action rely on four references – U.S. Patent Application Publication No. 2004/0137950 to Thomas Bolin et al. published on July 15, 2004 (hereinafter "Bolin"), United Kingdom Patent Application Publication No. GB2416625 to Richard Langley et al., published on February 1, 2006 (hereinafter "Langley"), U.S. Patent Application Publication No. 2004/0051669 to Thomas Rutfors et al., published on March 18, 2004 (hereinafter "Rutfors"), and European Patent Application Publication No. EP1294049 to Jani Ollikainen et al., published on March 19, 2003 (hereinafter "Ollikainen"). I provide my understanding of each of these references below.

1. Bolin

34. Bolin includes a main antenna 2 and a Bluetooth antenna 3. The main antenna 2 includes a DCS part 5 that is resonant at the DCS frequency band, a GSM part 4 that is resonant at the GSM frequency band, and a parasitic PCS part 6 that serves as a PCS antenna and as an isolating element between the main antenna 2 and the Bluetooth antenna 3. Bolin at Abstract, ¶¶ [0019]-[0023]. The main antenna 2 is a built-in patch antenna comprising DCS part 5, GSM part 4, and parasitic PCS part 6, while Bluetooth antenna 3 is a Planar Inverted-F antenna (PIFA). Bolin at ¶¶ [0020]-[0023]. Each of these types of antennas requires a ground plane to operate efficiently.

35. PCS part 6 is described as a parasitic element, meaning it is a radiating element that does not have its own feed but is parasitically excited due to coupling from directly excited radiators, such as GSM part 4 and DCS part 5.

36. It is my understanding that Bolin structures its antenna system in this way to solve a problem in the art, specifically, the problem of trying to fit a Bluetooth antenna in the housing of a mobile telephone in which much of the available space is already taken up with the mobile telephone's cellular antenna and other components:

> A basic problem of today is to be able to put one or several very small antennas on e.g. a mobile telephone. Main emphasis is put on size, but a good electrical performance is also important." Now when Bluetooth™ applications have become a World Standard, an additional frequency band must be covered in future mobile telephones. It is very hard to include this in an already existing antenna, most commonly a built-in antenna. Another way is to include a new antenna to handle Bluetooth™ communication. Usually the available space is very small-in fact, too small in reality. The antennas will often have to be located very close to each other, since generally, the best position is at the top of the telephone.

Bolin at ¶ [0002].

37. I understand that Bolin reduces the size of the antenna system 1 by using the PCS part 6 as a high impedance block that allows the Bluetooth antenna 3 to be placed in close proximity to the main antenna 2. Bolin at ¶ [0006].

38. I understand that this use of the PCS part 6 as a high impedance block is the primary and intended purpose of the entire Bolin reference as it is described as "the object of the invention" (Bolin at ¶ [0006]), which the reference explains as follows:

> The main antenna 2 comprises a dual band PIFA antenna with a GMS part 4 and a DCS part 5. In addition, the main antenna 2 comprises a parasitic PCS part 6. The main antenna 2 and the Bluetooth™ PIFA antenna 3 are printed on the same flexible substrate (not shown in the drawings) and constitute a common flex film.
>
> The metal trace of the parasitic PCS part 6 is located between the main antenna 2 and the Bluetooth™ antenna 3. It is resonant at PCS 1900 MHz, about 1/4 wavelength, and will function as a high impedance blocking between the main antenna 2 and the Bluetooth™ antenna 3.
>
> By arranging the antennas in this manner, it is possible to reduce the overall size of the antenna system compared to if the parasitic element was not present. As can be understood, moving the antennas further apart, which would be necessary in the absence of the parasitic element, would increase the isolation between the main antenna and the Bluetooth™ antenna.

Bolin at ¶¶ [0022]-[0024].

39. Accordingly, it is my understanding that PCS part 6 essentially serves to block coupling between Bluetooth antenna 3 and the main antenna 2 in Bolin.

40. Based on FIG. 8 from Bolin, a scale drawing of the disclosed antenna, I understand that Bolin was able to achieve a small antenna for the time, which was approximately 35 mm wide.

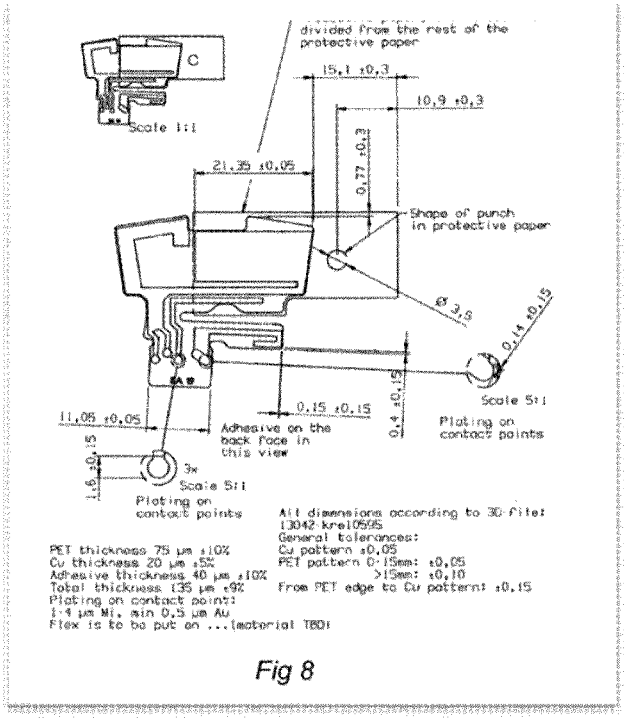


Fig 8

41. I understand from the disclosures in Bolin that absent the presence of parasitic PCS part 6, it would not be possible to include the main antenna 2 and the Bluetooth antenna 3 in the same housing. Specifically, I understand Bolin as teaching that the available space in the wireless devices of the time had very little available space for antennas, which was too small to house primary and Bluetooth antennas absent Bolin's use of the PCS part 6 as a high impedance block. As noted in Bolin, the "available space is very small – in fact, too small in reality" to fit both antennas with sufficient isolation for them to operate correctly. Bolin at ¶ [0002]. Therefore, it is my opinion that if the PCS part 6 were to be removed, the Bluetooth antenna 3 would have to be separated from main antenna 2, resulting in a substantially larger antenna.

2. Langley

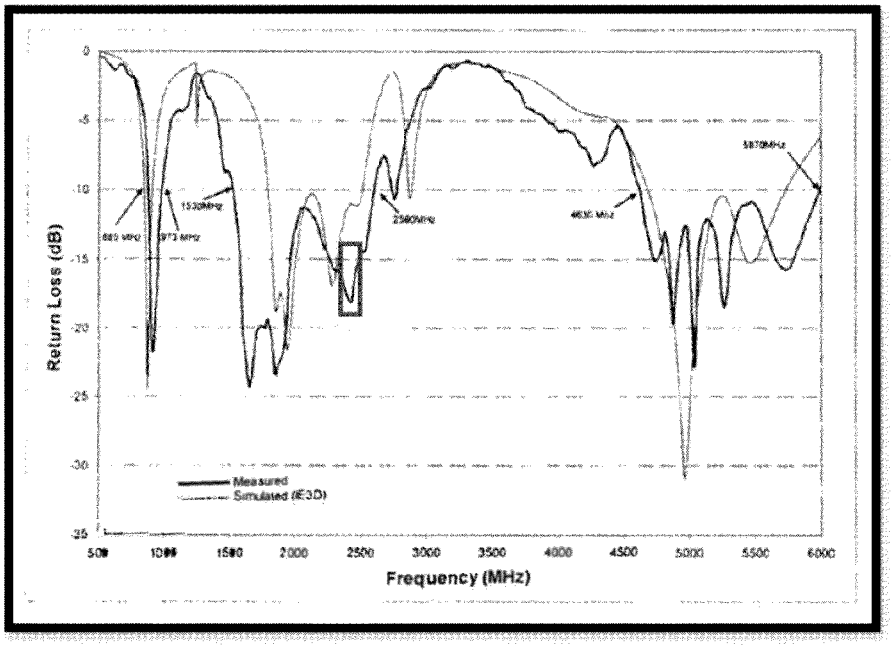
42. Langley discloses a multi-band antenna that operates at five frequency bands, including the Bluetooth frequency band. Langley at 2:24-26, 4:29-32, 8:8-13.

43. The frequencies of operation of the Langley antenna are illustrated in the tables from the reference, which I have reproduced and annotated below. The Langley antenna, like Bolin, provides operation at the Bluetooth frequency band.

System	Frequency Band
GSM 900	890 – 960 MHz
DCS1800	1710 – 1880 MHz
DECT	1900 MHz
UMTS	1920 – 2170 MHz
Bluetooth	2400 – 2483.5 MHz
Hiperlan 1/2	5150 – 5725 MHz

Frequency band (MHz)	Bandwidth	System covered
885 – 973	88 MHz	GSM900
1530 – 2590	1060 MHz	DCS1800 UMTS Bluetooth DECT
4630 – 5970	1340 MHz	Hiperlan 1 Hiperlan 2

44. Operation at the Bluetooth frequency band is also illustrated in the return loss graph of FIG. 4 of Langley (which I have annotated below), and FIGs. 9a-c illustrate the radiation pattern for the Bluetooth frequency band.



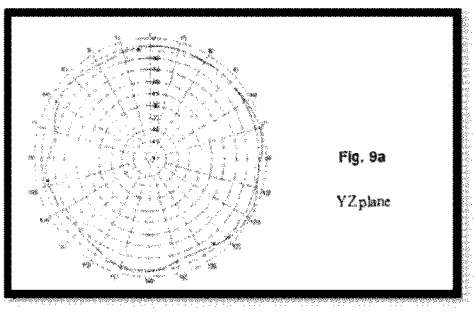


Fig. 9a

YZ plane

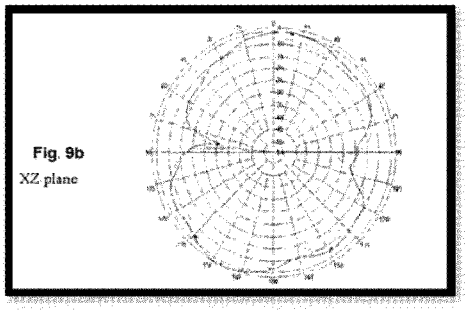


Fig. 9b

XZ plane

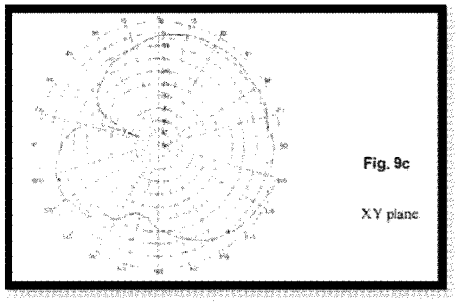


Fig. 9c

XY plane

45. Unlike Bolin, however, this Bluetooth operation is not implemented through a separate antenna, but is instead, an integral part of the Langley antenna. *See, e.g.,* Langley at 9:21-31.

46. Also relevant to the present proceeding is the size of the Langley antenna. Reproduced below is FIG. 2 of Langley, a scale drawing of the disclosed antenna that shows it is substantially larger than, for example, the Bolin antenna.

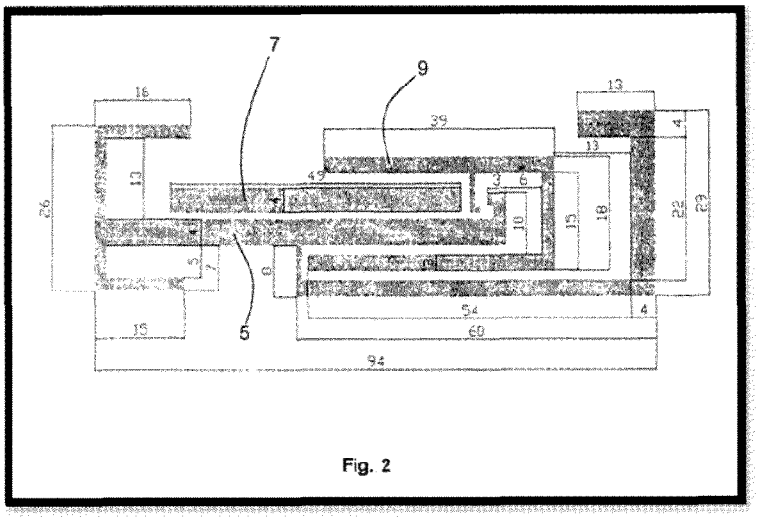


Fig. 2

47. Where the Bolin antenna is approximately 35 mm wide, the Langley antenna is approximately two and a half times as wide, measuring 94 mm in width.

48. Of particular importance to the opinions I present herein, the skilled artisan would understand that Langley is designed to operate *without* a ground plane. Specifically, given the substantial size of Langley's antenna 1, and the absence of any discussion of a ground plane in the reference, the skilled artisan would understand that Langley operates as a dipole-like antenna that is designed to operate without a ground plane. The absence of a ground plane on Langley's substrate is confirmed by Langley noting that its radiating elements may be reproduced on both sides of the substrate to improve antenna performance. Langley at 4:13-20.

49. However, to ensure the accuracy of my opinions, I reviewed the initial parameters and results of the following simulations of the Langley antenna, *with and without a ground plane,* which confirm that it was designed to operate *without* a ground plane.

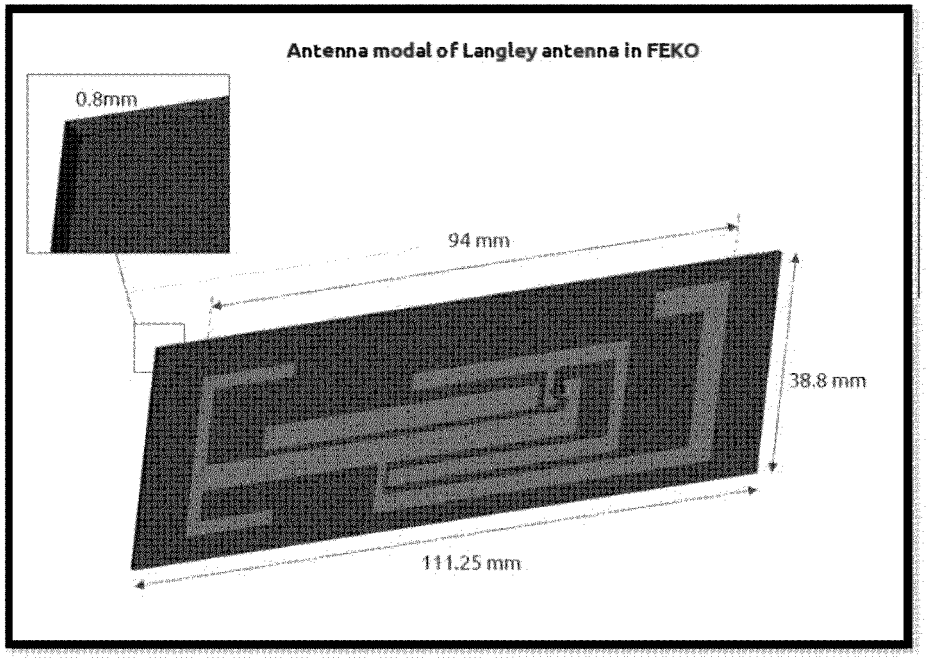
50. The simulations provided below were performed using a software application known as Altair FEKO ("FEKO"). FEKO is a comprehensive computational electromagnetics (CEM) software tool. It is used for the simulation and analysis of electromagnetic (EM) fields, primarily in the design and optimization of antennas, microwave circuits, radars, and other EM-related applications.

51. In general, FEKO works according to the following steps:

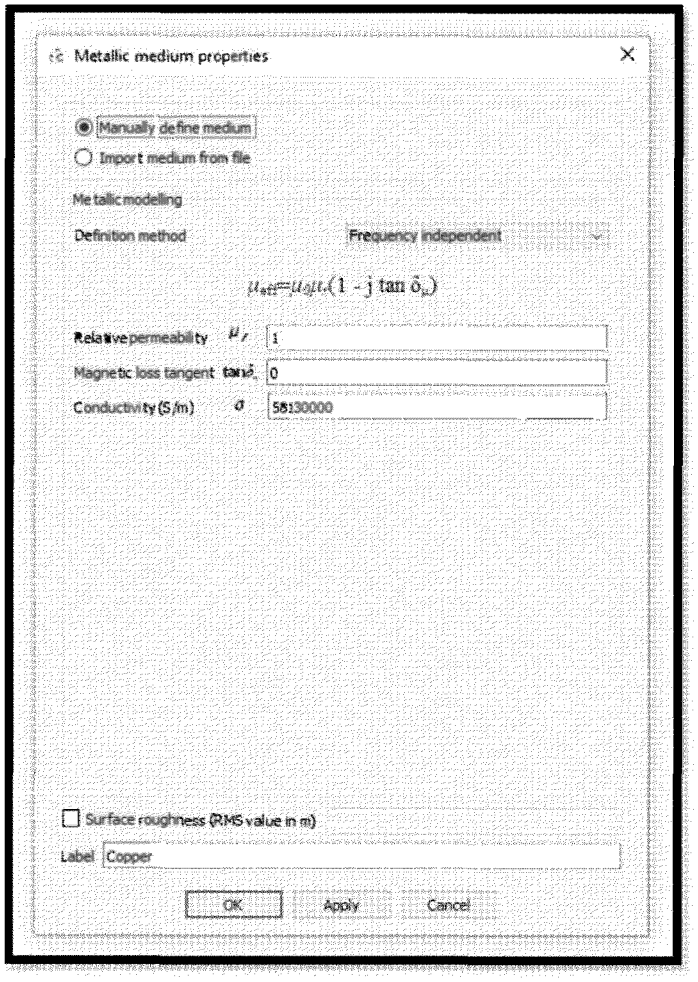
- Geometry Creation: The first step in using FEKO is creating or importing a 3D model of the object or system to be analyzed. This could be an antenna, a vehicle, a building, or any other structure interacting with electromagnetic waves.
- Material Definition: Next, users define the materials involved in the simulation, specifying properties like permittivity, permeability, and conductivity. These properties influence how electromagnetic waves interact with the object.
- Port creation: Users define the ports used to feed the antenna.
- Frequency range definition: Users define the frequency range over which the antenna will be simulated.
- Mesh Generation: The model is discretized into a mesh of smaller elements (triangles, tetrahedra, etc.), which is necessary for numerical computation. The finer the mesh, the more accurate the simulation, but it also requires more computational resources.

- Solver Selection: Feko offers several numerical methods to solve the electromagnetic problem, and users can select the most appropriate one based on the nature of the problem.
- Simulation Execution: Once the setup is complete, FEKO performs the calculations using the selected solvers. It computes the electromagnetic fields, currents, and other quantities of interest across the mesh elements.
- Field Visualization: After the simulation, FEKO provides tools to visualize the results. This includes 3D plots of electromagnetic fields, current distributions, radiation patterns, and other relevant metrics. Users can analyze key parameters such as antenna gain, impedance, radar cross-section (RCS), scattering parameters (S-parameters), antenna radiation efficiency, etc. This helps in understanding the behavior of the design under different conditions.

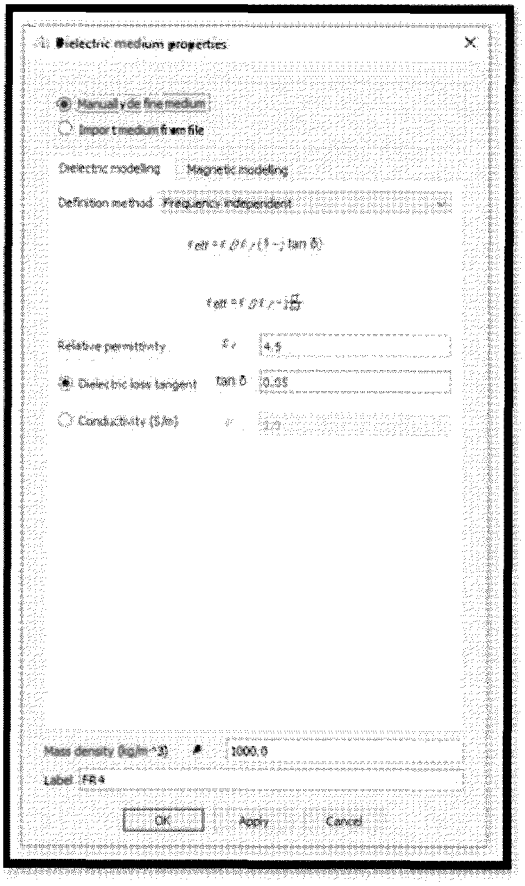
52. The initial simulations provided below are of the Langley antenna 1 without a ground plane. The dimensions of the three conductive elements of the simulated Langley antenna (in orange) are extracted from Fig. 2 of Langley. The dimensions of the simulated dielectric substrate (in green) are estimated (111.25 mm x 38.8 mm) from Fig. 1 of Langley considering the dimensions of the antenna in Fig.2.



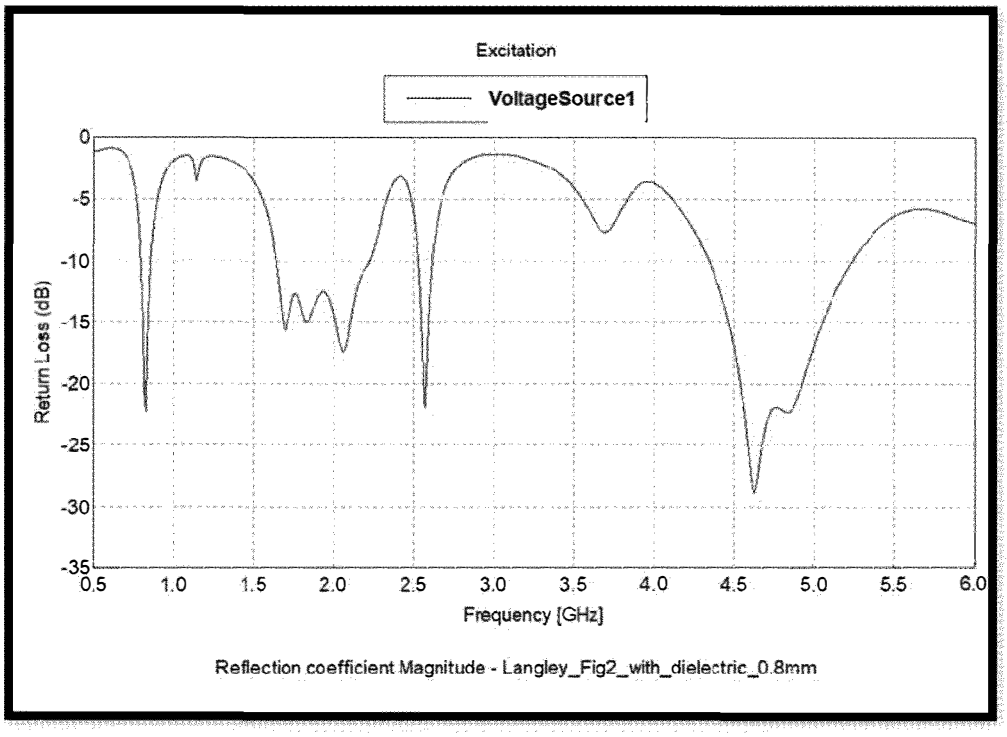
53. Langley indicates that its radiating elements are formed from copper traces. Langley at 6:21-31. For the conductivity of the antenna (in orange), the simulations used the conductivity of copper (σ = 58130000 S/m) which is a predefined medium in FEKO libraries.

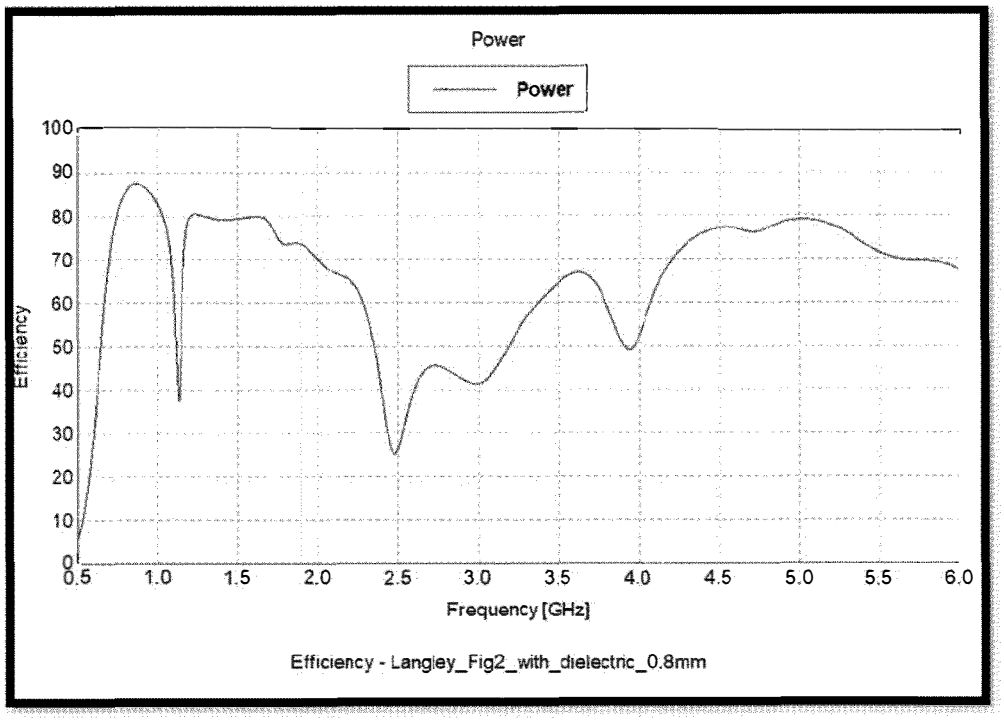


54. Langley discloses that its printed circuit board substrate is formed from 0.8 mm thick FR-4 material, a woven fiberglass and flame-retardant epoxy resin. Therefore, the relative permittivity (ε_r=4.5) and the loss tangent (tan δ = 0.05) of the simulated dielectric substrate in the frequency range of operation of the antenna are settled according to typical values for this material, as known to the skilled artisan. *See, e.g.,* https://www.researchgate.net/figure/Dielectric-Constant-and-Loss-Tangent-Values-of-FR-4-and-BV-Substrate_tbl2_318573849 (last accessed August 11, 2024).

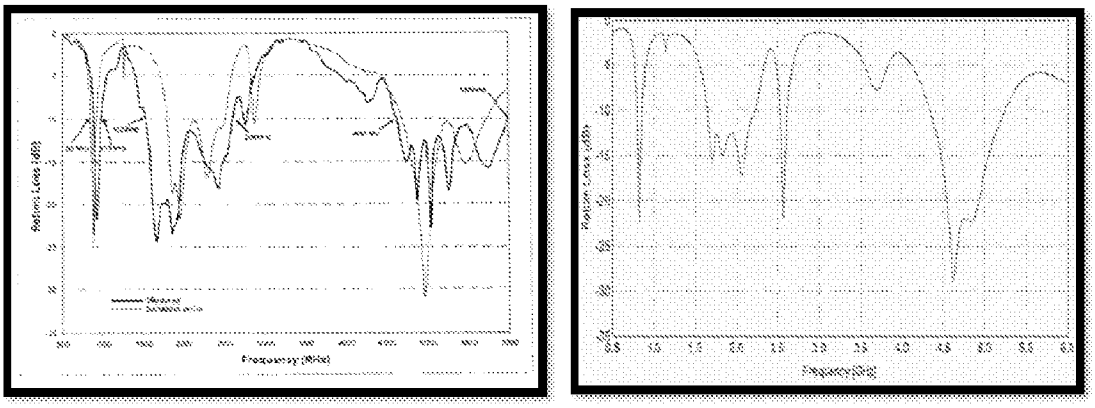


55. The simulations were performed, resulting in the following graphs of return loss (in dB) and antenna radiation efficiency (in %). The radiation efficiency of an antenna is defined as the ratio of the power radiated by an antenna to the power fed to the excitation port of the antenna.


Excitation
VoltageSource1
Return Loss (dB)
0
-5
-10
-15
-20
-25
-30
-35
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
Frequency [GHz]
Reflection coefficient Magnitude - Langley_Fig2_with_dielectric_0.8mm


Power
Power
Efficiency
100
90
80
70
60
50
40
30
20
10
0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
Frequency [GHz]
Efficiency - Langley_Fig2_with_dielectric_0.8mm

56. Based on my review of these simulations, it is my opinion that the Langley antenna 1 is designed to operate without a ground plane. Below is the return loss simulation of the Langley antenna 1 provided in the reference (left figure) side-by-side with the return loss simulation provided above (right figure) scaled to match those of the Langley reference. As readily seen in these graphs, the simulations provided herein substantially match those provided in the reference.



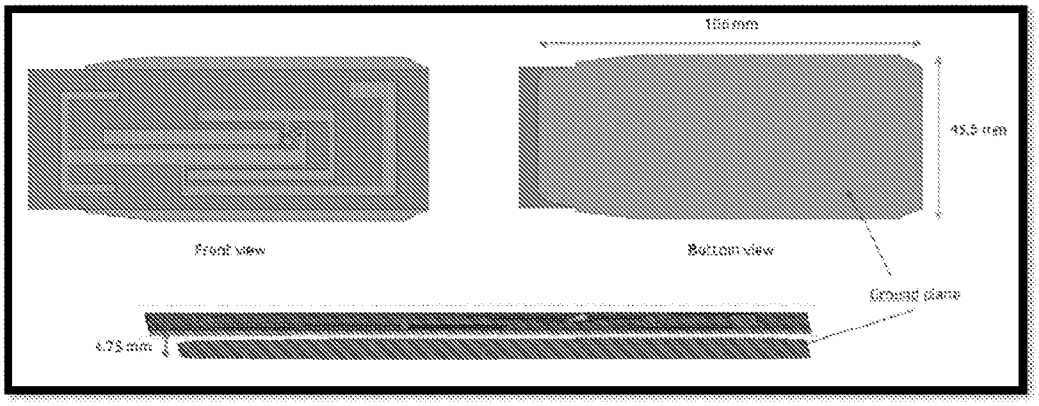
57. As illustrated above, the resonant frequencies in the simulations provided herein of Langley's antenna 1 without a ground plane substantially match those indicated in the Langley reference, with resonant frequencies appearing around 700-800 MHz, 1700-2100 MHz, 2500 MHz and 4500-5200 MHz in both plots.

58. To confirm that Langley was designed to operate *without* a ground plane, I also reviewed the simulations provided below of the Langley antenna 1 *with a ground plane*. As will be seen in the simulations, when provided over a ground plane, the Langley antenna 1 operates differently from how it is described in the reference with substantially degraded performance.

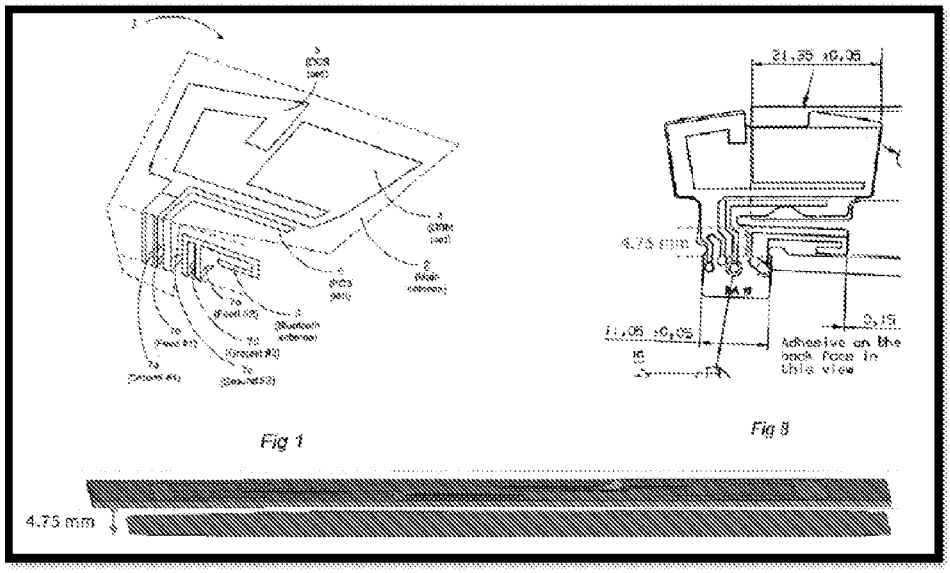
59. In order to simulate Langley with a ground plane, and the ground plane of Bolin in particular, simulations were performed using the shape and dimensions of the ground plane of the Nokia 3310 mobile phone. This phone was selected because Bolin does not disclose any specific size for the ground plane and the Nokia 3310 is a representative device from the time of invention of Bolin that was extremely popular at the time. *See, e.g.,* https://en.wikipedia.org/wiki/Nokia_3310 (last accessed August 11, 2024). For completeness, I note that the Nokia 3310 would include, in addition to the ground plane, additional elements that would likely negatively affect the electromagnetic performance of the Langley antenna. These

additional elements have, nevertheless, been omitted from the simulations to provide a "best case scenario" for the Langley antenna 1.

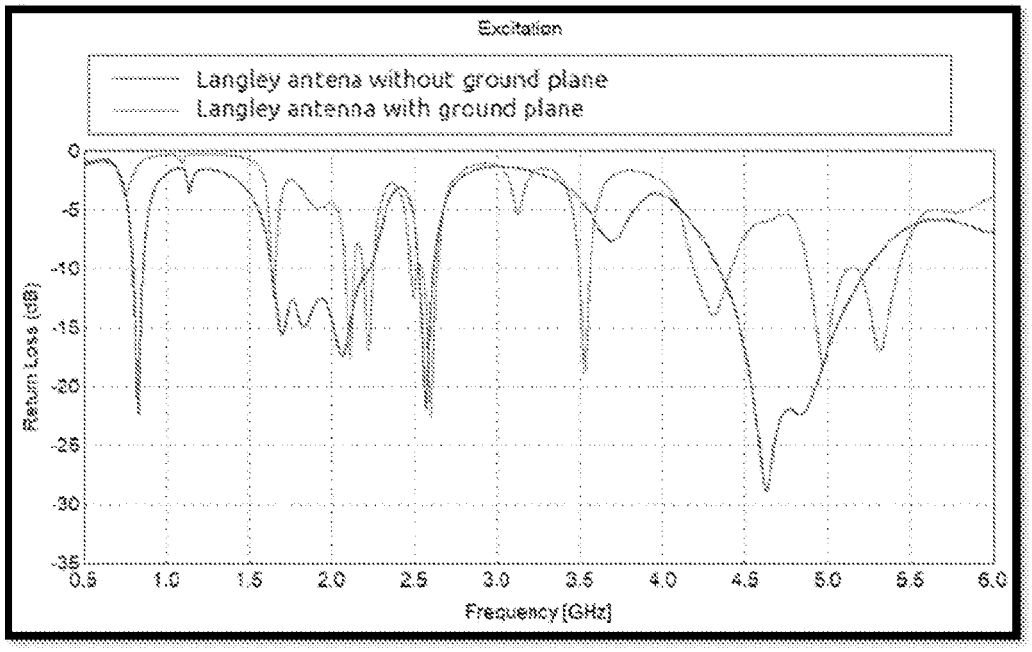
60. The dimensions of the simulated dielectric substrate (in green) are estimated from Fig. 1 of Langley considering the dimensions of the antenna. The thickness (0.8 mm), the relative permittivity (ε_r=4.5), and the loss tangent (tan δ = 0.05) of the simulated dielectric substrate (in green) are settled according to the teachings of Langley. *See* Langley at 6:21-31.



61. A 4.75 mm separation distance between Langley's antenna and the ground plane from Bolin was used in the simulations. In the schematic perspective view of the antennas in Bolin when mounted (Fig. 1), it is detailed where the main antenna 2, including the PCS part 6, is folded (dashed red lines). The distance between those two folding regions (dashed red lines) is considered as the separation distance between the antenna and the ground plane. Therefore, the 4.75 mm value is obtained from the unfolded antennas in Bolin (Fig. 8) by measuring the distance between the dashed red lines, which represent the two folding regions displayed in Fig. 1.



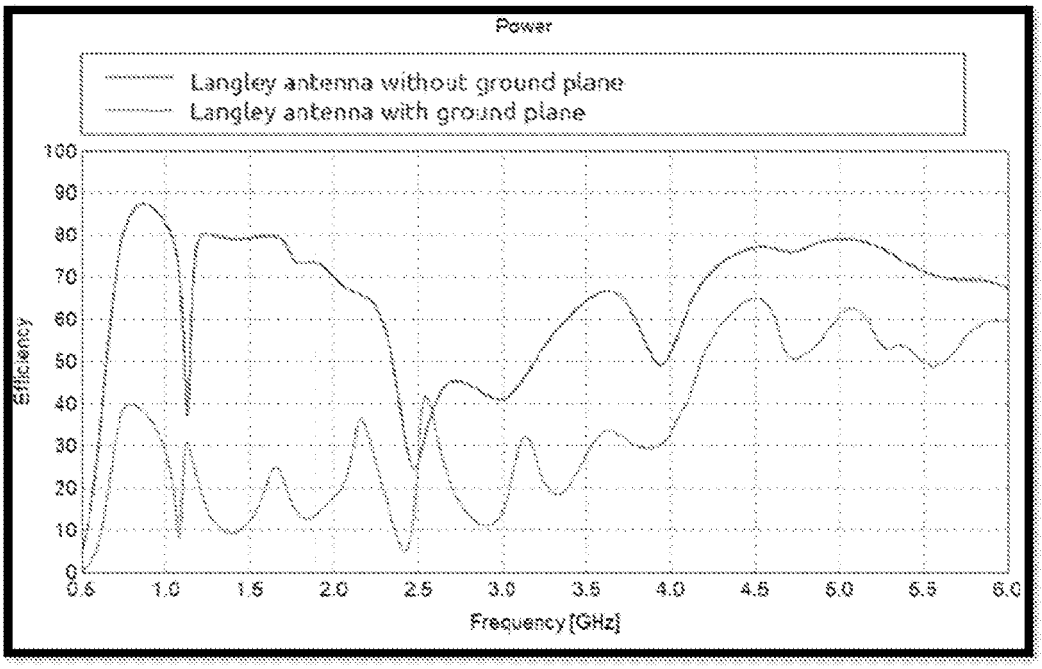
62. Provided below are the results of the simulation of return loss *with a ground plane* overlayed with the results *without a ground plane*.



63. These results show substantially different operation with and without a ground plane. Only the Bluetooth (~2500 MHz) and Hiperlan (5150-5725 MHz) frequency bands are substantially preserved with similar performance characteristics for the return loss, as illustrated in the graph of return loss provided above. The GSM900, DCS1800 and DECT frequency bands are lost when the Langley antenna is operated over a ground plane, and operation in the UMTS frequency band is limited to a small section of the band (2080-2130 MHz). These simulations confirm that Langley's antenna 1 was designed to operate without a ground plane.

64. The radiation efficiency of the antenna with and without a ground plane further confirms that the Langley antenna 1 was designed to operate *without a ground plane*.

65. Provided below are the results of the simulation of radiation efficiency *with a ground plane* overlayed with the results *without a ground plane.*



66. As illustrated above, the radiation efficiency for the Langley antenna 1 drops precipitously when the antenna is arranged over a ground plane, especially in the regions of the frequency spectrum associated with the GSM 900, DCS 1800, DECT, UMTS and Bluetooth frequency bands.

3. Rutfors

67. Rutfors is generally directed to:

> An antenna arrangement for a portable radio communication device, comprising a first (1) and a second (2) antenna element, and a conductive shield (4) connectable to a ground plane device (3), said first (1) and second (2) antenna elements are located on opposite sides of the shield (4), wherein said first (1) and second (2) antenna elements are of different types.

Rutfors at Abstract.

68. It is therefore my understanding that, like Bolin but unlike Langley, Rutfors' antenna is designed to operate in conjunction with a ground plane.

69. Rutfors is also similar to Bolin in that it is directed to providing "an antenna arrangement that offers improved isolation, i.e. decreased coupling, between antennas in a portable

radio communication device, such as a mobile telephone." Rutfors at ¶ [0005]. It is the shield 4 in the Rutfors antenna structure that provides this isolation:

> With a shield between internal antennas in a portable radio communication device the coupling between the antennas is reduced and therewith it is possible to place the antennas close to each other. Further, with internal antennas of different types, such as meander antenna and PIFA, the coupling between the antennas are less than with two antennas of the same type, such as PIFA and PIFA. Thus two antennas of different types and separated by a shield can be positioned closer together than two of the same type separated by a shield, still providing the same amount of isolation.

Rutfors at ¶ [0010].

70. It is, therefore, my opinion that Rutfors would suggest to the skilled artisan that it is only through the inclusion of an isolating structure, such as Rutfors' shield 4 or Bolin's parasitic PCS part 6, that two antennas can be arranged close together in order to reduce the size of an antenna structure.

4. Ollikainen

71. Ollikainen discloses an antenna system 1 that includes "a first radiating element 10, a second radiating element 20 and a third radiating element 30." Ollikainen at ¶ [0016]. The first radiating element "is a short-circuited patch having a first resonance frequency," and the second radiating element "is a short-circuited patch having a second resonance frequency" that shares a feed line 14 with the first radiating element. Ollikainen at ¶ [0016]. The third radiating element resonates at a third resonant frequency and is physically separated from the first and second radiating elements. The third radiating element is also a short-circuited patch. Ollikainen at ¶ [0016]. As all three radiating elements of the Ollikainen device are short-circuited patch antennas, the antenna system 1 includes a ground plane 5. Ollikainen at ¶ [0016]. Like many of the other references relied upon in the Office Action, Ollikainen recognizes the importance "of small antennas for mobile phones." Ollikainen at ¶ [0002].

V. A POSITA would not have Found the Challenged Claims Invalid Based on the Cited Art

72. It is my understanding that claims 11 and 12 of the '200 Patent have been rejected under the following three grounds of rejection:

1) Claims 11 and 12 were rejected as being obvious over Bolin in view of Langley.
2) Claims 11 and 12 were rejected as being obvious over Bolin in view of Langley and Rutfors.
3) Claims 11 and 12 were rejected as being obvious over Ollikainen in view of Langley and Bolin.

73. I also understand that claims 11 and 12 were rejected under obviousness-type double patenting grounds. However, I was not asked to provide my opinion with respect to the double patenting grounds at this time.

A. Summary of Opinions

74. It is my opinion that the above listed grounds of rejection are in error. Specifically, it is my opinion that a person of ordinary skill in the art (or skilled artisan) would not have combined the references as proposed in the Office Action. I believe that the reasons the skilled artisan would not have combined the references as proposed fall into the following four categories, which generally apply to each of the three grounds of rejection:

1. The grounds of rejection are based on a flawed understanding of Langley's antenna that undermines the proposed combinations of references;
2. The Bolin and Langley antennas operate according to different principles, as do the Langley and Ollikainen antennas, rendering the proposed combinations non-obvious;
3. Langley's antenna does not fit in the antenna systems with which it is combined, making a "simple substitution" or "merely replacing" Bolin's or Ollikainen's main antenna with Langley's antenna infeasible; and
4. Omitting the PCS part 6 of Bolin's antenna from the rejections' combinations renders the combinations unsuitable for their intended purposes.

75. The opinions I provide below are organized according to these four errors in the rejections. I first address the rejection based on the combination of Bolin and Langley, showing why the skilled artisan would not have combined the references as proposed. I then provide my opinion explaining how the same reasoning applies to the combinations of Bolin, Langley and Rutfors and finally Ollikainen, Langley and Bolin. To the extent my opinions differ with respect to the additional grounds of rejection, I explain my opinion at the end of each section.

B. The Grounds of Rejection are Based on a Flawed Understanding of the Langley Reference that Undermines the Proposed Combination of References

76. It is my opinion that the rejections combining Langley and Bolin are based on a flawed understanding of the operation of the Langley antenna 1. Based on my reading of the Office Action, it appears that the Examiners' understanding is that the Langley antenna 1 does *not* operate at the Bluetooth frequency band. Office Action at 26. This understanding is incorrect. As I explain above, the Langley antenna 1 does operate at the Bluetooth frequency band. It is further my understanding that the Examiners use this incorrect interpretation of Langley to justify the combination of Langley with the other references. *See, e.g.*, Office Action 26. It is my opinion that the skilled artisan would not combine Bolin and Langley as proposed by the Examiners due, in part, to the antenna 1 in Langley already providing Bluetooth operation.

77. Specifically, the skilled artisan would not have preserved the Bolin Bluetooth antenna 3 in the same structure as the Langley antenna 1 due to the teachings in the references of reducing the size of the antenna system. Second, including a redundant Bluetooth antenna in the combined structure would result in interference between the two antennas, interference that Bolin teaches should be avoided.

78. It is my opinion that the skilled artisan would understand that the intended purpose of the Bolin invention is to be able to reduce the size of the antenna system used in a portable communication device, such as a mobile phone:

> [0002] **A basic problem of today is to be able to put one or several very small antennas on e.g. a mobile telephone.** Main emphasis is put on size, but a good electrical performance is also important. Now when Bluetooth™ applications have become a world standard, an additional frequency band must be covered in future mobile telephones. It is very hard to include this in an already existing antenna, most commonly a built-in antenna. Another way is to include a new antenna to handle Bluetooth™ communication. Usually the available space is very small—in fact, too small in reality. The antennas will often have to be located very close to each other, since generally, the best position is at the top of the telephone.
>
> [0021] **A significant advantage with the antenna system according to the present invention is the size reduction** that obtained by placing the antennas close together as well as the folding of the antenna patterns.
>
> [0024] **By arranging the antennas in this manner, it is possible to reduce the overall size of the antenna system compared to if the parasitic element was not present.** As can be

> understood, moving the antennas further apart, which would be necessary in the absence of the parasitic element, would increase the isolation between the main antenna and the Bluetooth™ antenna.

Bolin at ¶¶ [0002], [0021], [0024] (emphasis added).

79. Bolin is so concerned with reducing the size of its antenna that it identifies the width of the antenna traces as a consideration that must be addressed when balancing performance with the need for a small sized antenna:

> The actual width of the feed traces is a tradeoff between size and performance. By widening the feed traces, a better performance would be achieved. However, wider feed traces result in an increased size of the antenna system.

Bolin at ¶ [0025].

80. Langley similarly identifies the "need for a compact and efficient multi-band antenna." Langley at 2:21-22. Unsurprisingly, Ollikainen and Rutfors also recognize the need for antenna size reduction. *E.g.,* Ollikainen at ¶¶ [0002]-[0005]; *e.g.,* Rutfors at ¶¶ [0002], [0017].

81. Given these clear teachings in the cited art of the need to ***reduce*** the overall size of the antenna system, it is my opinion that the skilled artisan would not, based on the teachings of all the cited references, add to the size of the Langley antenna system by preserving the Bolin Bluetooth antenna 3 in the combined system, especially because Bolin identifies no additional operation or benefits that it would provide beyond the Bluetooth operation already provided by the antenna 1 in Langley.

82. Because the cited art fails to identify any benefits to the Bolin antenna beyond what is already provide by the antenna 1 in Langley, it is my opinion that the skilled artisan would avoid the combination of the Langley Bluetooth operation with an additional Bluetooth antenna from Bolin due to the interference that may result. Antennas in the same device that operate at the same or adjacent frequency bands can cause In-Device Coexistence (IDC) interference. *See, e.g.,* https://www.microwavejournal.com/articles/26609-in-device-coexistence-interference (last accessed August 11, 2024). The traditional way of avoiding such interference would be to provide greater physical separation between the elements. *See, e.g., id.* It is my opinion that the skilled artisan would not retain an unnecessary source of IDC interference, which provides no additional

operation, and that increases the size of the antenna system – such a combination runs contrary to the teachings of the cited references and the knowledge of the skilled artisan.

83. Accordingly, it is my opinion that it would not have been obvious to the skilled artisan at the time of invention to combine the Langley antenna 1, which already operates at the Bluetooth frequency band, with Bolin's antenna system 1 while retaining Bolin's Bluetooth antenna 3 in the combined system.

84. It is further my opinion that the reasoning provided above regarding the combination of Langley with Bolin would also apply to the combination of Langley with Bolin and Rutfors, and would apply with greater force to the combination of Langley with Ollikainen and Bolin. It is my understanding that Rutfors was included in the combination of references for the sole purpose of including a reference with an explicit disclosure of a ground plane. Office Action at 17. Rutfors does nothing to suggest to the skilled artisan that the antenna 1 in Langley should be combined with the antenna system of Bolin.

85. Regarding the combination of Bolin with Ollikainen and Langley, it is my opinion that the reasoning provided above also applies to this combination of references. It is also my opinion that the Examiners' flawed interpretation of Langley further undermines the Ollikainen/Langley/Bolin combination. It is my understanding that, in this rejection, the inclusion of the Bolin Bluetooth antenna into the Ollikainen/Langley combination was justified because it would allegedly provide "operat[tion] over Bluetooth, ***which is lacking in the combination of Ollikainen and Langley***, while providing ***a size reduction in the arrangement***." Office Action at 26 (emphasis added). Adding the Bolin Bluetooth antenna 3 to the Ollikainen/Langley combination does not address a lack of Bluetooth operation (Langley already operates at the Bluetooth frequency band) and it would increase, not reduce, the size of the antenna arrangement.

Given the reasoning above, it is my opinion that it would not have been obvious to the skilled artisan at the time of invention to combine the references as proposed in each of the grounds of rejection.

C. The Bolin and Langley Antennas Operate According to Different Principles Rendering the Proposed Combination Non-Obvious

86. It is my understanding that the primary rationale for combining the Langley antenna 1 with Bolin's antenna system 1 is that doing so would be a "simple substitution" in which the

skilled artisan would substitute the antenna pattern of Langley for the antenna pattern in Bolin with no further modifications to the operation or structure of Bolin's wireless device:

> Examiners find it would have been obvious at the time the invention was made to use the first antenna of Langley as the first antenna in the wireless device of Bolin. **This combination would simply imply using the other structures of Bolin shown in FIG. 1 of Bolin, but merely replacing the first antenna (item 2) with the first antenna shown in FIGS. 2 and 3 of Langley**. … Examiners find this combination is merely the **simple substitution** of one known element for another to obtain predictable results. … Examiners find that one having ordinary skill in the art could have substituted the antenna pattern of Langley for the antenna pattern in Bolin as such swould **merely be replacing the antenna pattern 2 of Bolin above with the antenna pattern shown in FIGS. 2 and 3 of Langley on the defined antenna rectangle, while retaining the other structures and operation of the wireless device of Bolin**.

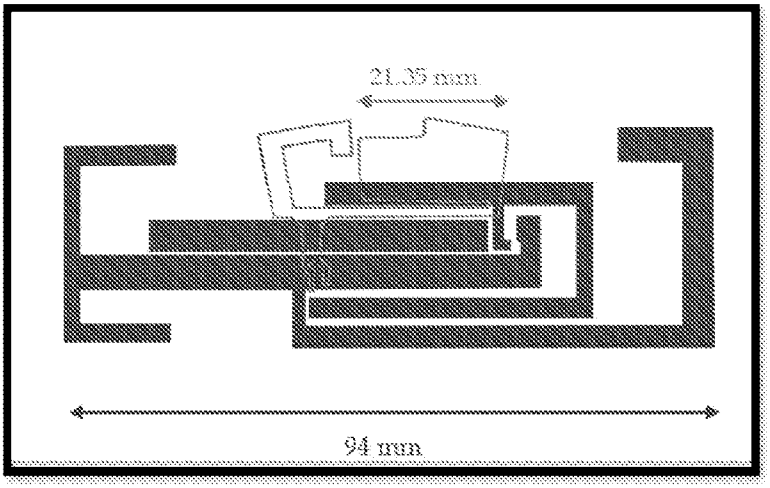
Office Action at 15 and 16 (emphasis added).

87. It is my opinion that such a "simple substitution" would not have been obvious due to the Langley and Bolin antennas operating according to different principles with different structural requirements. Notably, as I discuss in detail above, the Bolin antenna system 1 is designed to operate with a ground plane while Langley's antenna 1 is not. It is my opinion that the skilled artisan would understand that "merely replac[ing]" two such antennas could not be done "while retaining the other structures and operation of the wireless device of Bolin." As illustrated through the simulations I described above, the Langley antenna 1, designed to operate without a ground plane, could not be placed in the wireless device of Bolin while maintaining the Bolin ground plane without substantially altering the operation of the Langley antenna 1. Furthermore, the skilled artisan would understand that the operation of the Langley antenna would be substantially degraded, as also illustrated through the simulations provided above. As the impact of the ground plane would have been well understood by the skilled artisan, it is my opinion that the proposed combination would not have been obvious at the time of invention.

88. Reiterating what is said above regarding the references, the Bolin antenna system is a combination of different types of antennas – main antenna 2 is a built-in patch antenna comprising DCS part 5, GSM part 4, and parasitic PCS part 6, while Bluetooth antenna 3 is a Planar Inverted-F antenna (PIFA). Bolin at ¶¶ [0020]-[0023]. The skilled artisan would have understood that each of these types of antennas requires a ground plane to operate efficiently,

which is why there is no disagreement among the parties that a ground plane is a necessary element of the Bolin antenna system 1. *See, e.g.*, EX1009 at ¶ 79; Request at 25; Office Action at 9.

89. Langley's antenna 1, on the other hand, is designed to operate without a ground plane, as illustrated through the simulations and descriptions provided above. Contrary to the assertion on page 11 of the Office Action, Langley provides no teaching or suggestion of a ground plane, but a substrate of dielectric material FR-4 where the conductive radiating elements may be formed on both sides of the structure. Langley at 4:13-20, 6:21-30. As I note above, the size of the Langley antenna, illustrated below in a scale comparison to the DCS and GSM parts of Bolin, would indicate to the skilled artisan that the Langley antenna is a dipole-like ½ wavelength antenna. As understood by the skilled artisan, dipole-like antennas do not require a ground plane to work efficiently where the patch and PIFA antennas of Bolin do.



90. It is my opinion that these design differences between Langley and Bolin illustrate clearly why it would not have been obvious to the skilled artisan at the time of invention to replace the Bolin main part 2 with the Langley antenna 1. Specifically, Langley's antenna 1 was designed to operate without a ground plane, but the grounds of rejection propose arranging it over a ground plane. This would not have been an obvious modification to the Langley antenna – the skilled artisan would know that an antenna designed to operate with a ground plane cannot be simply substituted into an antenna system with a ground plane without substantially altering the operation of the antenna for the worse. The "simple substitution" argued for in the grounds of rejection would require a change in the principle of operation of the Langley antenna. I understand that

such a proposed modification to a reference is *per se* non-obvious. It is also, simply, not how the skilled artisan would synthesize the teachings of these references at the time of invention.

91. It is my opinion that the simulations provided above confirm the understanding of the skilled artisan: the Langley antenna 1 could not be incorporated into the Bolin antenna system 1 without a substantial reconstruction and redesign of the elements shown in Langley as well as a change in the basic principle under which the Langley antenna 1 was designed to operate. Contrary to the allegations in the grounds of rejection, the skilled artisan could not "merely replac[e] the first antenna (item 2) with the first antenna shown in FIGS. 2 and 3 of Langley." Office Action at 15; *see also* Office Action at 16. Nor would the skilled artisan have expected that such a combination could have been carried out successfully at the time of invention. It is my opinion that the skilled artisan would have understood at the time of invention that the proposed "simple substitution" would essentially "break" the Langley antenna, eliminating intended frequency bands of operation and precipitously lowering the radiation efficiency of the antenna, as confirmed by the simulations provided above.

92. It is further my opinion that the arguments above regarding the combination of Langley with Bolin apply with equal force to the combination of Langley with Bolin and Rutfors and Langley with Ollikainen and Bolin. It is my understanding that both of these grounds of rejection propose "simple substitutions" in which the Langley antenna is incorporated into a ground plane-based antenna system without any further modifications to the device. As I explain above, such a modification would essentially "break" the Langley antenna, eliminating intended frequency bands of operation and precipitously lowering the radiation efficiency of the antenna.

93. Given the reasoning above, it is my opinion that it would not have been obvious to the skilled artisan at the time of invention to combine the references as proposed in each of the grounds of rejection.

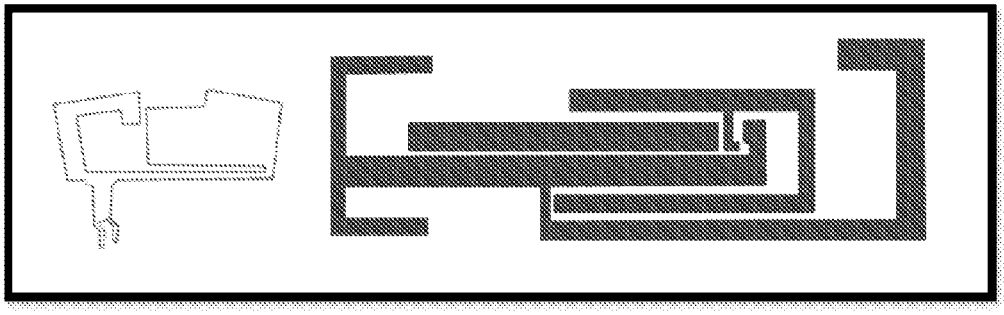
D. Langley's Antenna Does Not Fit in Bolin's Antenna System, Making a "Simple Substitution" of "Merely Replacing" Bolin's Main Antenna with Langley's Antenna Infeasible

94. As previously discussed, it is my understanding that the claims of the '200 Patent were rejected over Bolin in view of Langley based upon a "simple substitution" in which Bolin's main antenna 2 is replaced by Langley's antenna 1. It is my understanding that the grounds of rejection propose replacing the "main antenna 2" of Bolin with the antenna 1 of Langley ***with no***

further modifications to the Bolin structure, (*i.e.*, "while retaining the other structures and operation of the wireless device of Bolin."). Office Action at 15 and 16. It is my opinion that this would not have been an obvious combination to the skilled artisan at the time of invention because the Langley antenna 1 *does not fit in the wireless device of Bolin.*

95. As I have previously discussed, Bolin discloses that the space available in wireless devices was generally insufficient for a multiband antenna and a Bluetooth antenna: "Usually the available space [in a wireless device] is very small—in fact, too small in reality [for the necessary antenna system]." Bolin at ¶ [0002]. Bolin teaches that only through the close arrangement of antennas provided by its techniques can the antenna system 1 be included in the available space. *See* Bolin at ¶¶ [0020]-[0025]. The skilled artisan would understand that the Langley antenna 1 is *multiple times larger than the Bolin antenna that it is proposed to replace.* Therefore, it is my opinion that it would not have been obvious to the skilled artisan at the time of invention to perform the simple substitution set forth in the grounds of rejection.

96. Provided below are scale drawings of Langley's antenna 1 (in blue) and Bolin's DCS part 5 and GSM part 4 (in red) created based on the specific dimensions included in the references. Bolin at FIG. 8; Langley at FIG. 2. Langley's antenna 1 is approximately *two and a half time the size* of the portions of Bolin that it is intended to replace. The skilled artisan would have understood that Langley's antenna 1 *simply would not have fit* in a "simple substitution" that "retain[s] the other structures and operation of the wireless device of Bolin." This unavoidable fact would have been readily apparent to the skilled artisan at the time of invention. For example, Bolin states that, absent its techniques, Bolin's antenna system 1 does not fit in its wireless device, much less the much bigger Langley antenna 1. Bolin at ¶ [0002]



97. It is further my opinion that this "simple substitution" would not have been obvious to the skilled artisan because it is contrary to the intended purpose of Bolin. As explained

throughout Bolin, the intended purpose of the reference is to be able to *reduce the size of the antenna system used in a portable communication device, such as a mobile phone*:

> [0002] **A basic problem of today is to be able to put one or several very small antennas on e.g. a mobile telephone.** Main emphasis is put on size, but a good electrical performance is also important. Now when Bluetooth™ applications have become a world standard, an additional frequency band must be covered in future mobile telephones. It is very hard to include this in an already existing antenna, most commonly a built-in antenna. Another way is to include a new antenna to handle Bluetooth™ communication. Usually the available space is very small—in fact, too small in reality. The antennas will often have to be located very close to each other, since generally, the best position is at the top of the telephone.
>
> [0021] **A significant advantage with the antenna system according to the present invention is the size reduction** that obtained by placing the antennas close together as well as the folding of the antenna patterns.
>
> [0024] **By arranging the antennas in this manner, it is possible to reduce the overall size of the antenna system compared to if the parasitic element was not present.** As can be understood, moving the antennas further apart, which would be necessary in the absence of the parasitic element, would increase the isolation between the main antenna and the Bluetooth™ antenna.

Bolin at ¶¶ [0002], [0021], [0024] (emphasis added).

98. Given these disclosures, it is my opinion that the skilled artisan would not have been motivated to modify the Bolin structure in a way that increases its size, much less increases its size by approximately two and a half times, a necessary result of the combination proposed in the grounds of rejection.

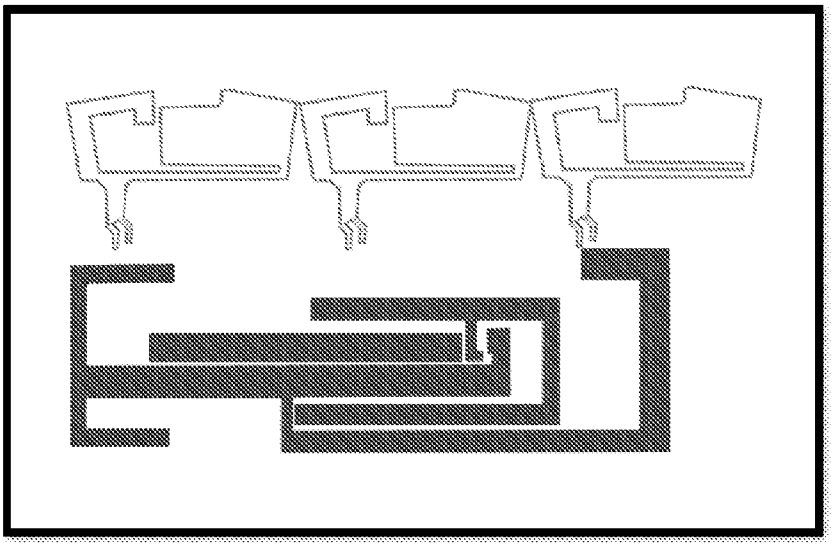
99. Specifically, the Office Action proposes a "simple substitution" in which:

> [I]t would have been obvious to use the first antenna of Langley as the first antenna in the wireless device of Bolin. This combination would simply imply using the other structures of Bolin shown in FIG. 1 of Bolin, but merely replacing the first antenna (item 2) with the first antenna shown in FIGS. 2 and 3 of Langley.

Office Action at 15.

100. The skilled artisan would have understood that making this "simple substitution" would increase the size of the antenna system *substantially*. As illustrated below, the antenna of

Langley (illustrated in blue) is approximately two and a half times the length of the portion of Bolin that it replaces (illustrated three times in red) in the modification proposed in the grounds of rejection.



101. As noted in the language from Bolin quoted above, the intended purpose of the Bolin antenna system 1 is to reduce the overall size of the antenna system. Bolin at ¶¶ [0002], [0021], [0024]. It would, therefore, not be obvious to substantially increase the size of the antenna as proposed in the grounds of rejection.

102. Put differently, Bolin's teachings would have discouraged the skilled artisan from making a "simple substitution" that would result in a *substantial* increase in the size of the antenna system 1. Bolin is clear – at the time of invention, the space available for antenna systems in mobile phones was "in fact, too small in reality" to fit antenna systems substantially larger than those disclosed in Bolin. Therefore, the skilled artisan would have been discouraged from combining the Langley antenna 1, which is multiples larger than the structure it is supposed to replace, with the remainder of the Bolin antenna system.

103. It is further my opinion that the skilled artisan would have understood that to make the sizes of Bolin's antenna system and Langley's antenna compatible, one would have needed to drastically shrink Langley's antenna. It is my opinion that such a modification would not have been obvious. The skilled artisan would have understood that any attempt to scale Langley's antenna 1 to operate in the space available in the Bolin wireless device would substantially change

the operation of the Langley device, altering the frequencies at which the antenna operates and introducing coupling between the fingers of Langley's antenna 1 that would render the operating characteristics of the antenna unpredictable. Specifically, altering the shape of the fingers would change their electromagnetic performance, and therefore, change their frequency bands of operation. Altering the spacing between the fingers would result in different coupling between fingers, altering the electromagnetic performance of the fingers.

104. It is further my opinion that the reasoning above regarding the combination of Langley with Bolin applies with equal force to the combination of Langley with Bolin and Rutfors as well as the combination of Langley with Ollikainen and Bolin. With regard to the rejection that includes Rutfors, it is my understanding that Rutfors was included in the rejection for the sole purpose of including a reference with an explicit disclosure of a ground plane. Office Action at 17. Rutfors does nothing to remedy the above-described deficiencies in the combination of Bolin and Langley.

105. With regard to the combination of Ollikainen, Langley and Bolin, I understand that the grounds of rejection propose another "simple substitution" in which:

> [O]ne having ordinary skill in the art could have substituted the antenna pattern of Langley for the antenna pattern in Ollikainen as such would merely be replacing the antenna pattern 10/20/30 of Ollikainen above with the antenna pattern shown in FIGS. 2 and 3 of Langley on the defined antenna rectangle, **while retaining the other structures and operation of the wireless device of Ollikainen**.

Office Action at 24 (emphasis added).

106. Like Bolin, Ollikainen is specifically concerned with decreasing the size of its antenna system:

> [0002] The development of small antennas for mobile phones has recently received much attention due to size reduction of the handsets, requirements to keep the amount of radiofrequency (RF) power absorbed by a user below a certain level regardless of the handset size, and introduction of multi-mode phones.
>
> ...
>
> [0004] Currently, the antenna is one of the largest parts in a mobile phone. In order to fit more antenna elements with acceptable performance in the available space, there is an ongoing effort to reduce their physical size.

Ollikainen at ¶¶ [0002], [0004].

107. The skilled artisan would have understood that the Ollikainen antenna, like the Bolin antenna, is substantially smaller than the Langley antenna that replaces it. Ollikainen does not provide explicit dimensions for its antenna. However, it does provide the frequencies at which its antenna elements operate. An antenna's size is directly tied to the frequencies at which it operates. Illustrated in an annotated version of Ollikainen's FIG. 2 is the electrical length (in green) of second planar radiating element 20 (Ollikainen, page 4, lines 29-40). Ollikainen is a ¼ wavelength antenna as indicated by it being a short-circuited patch antenna. With a resonating frequency of 880 MHz (i.e., the frequency with the longest wavelength), the electrical length of this second planar radiating element 20 would be less than approximately 85 mm. Assuming for the sake of argument an approximate aspect ratio of 2:1 (*see* Office Action at 19), the dimensions of the Ollikainen antenna are on the order 20 mm by 40 mm. This is substantially smaller than the 29 mm by 94 mm dimensions of the Langley antenna illustrated in FIG. 2 of the reference.

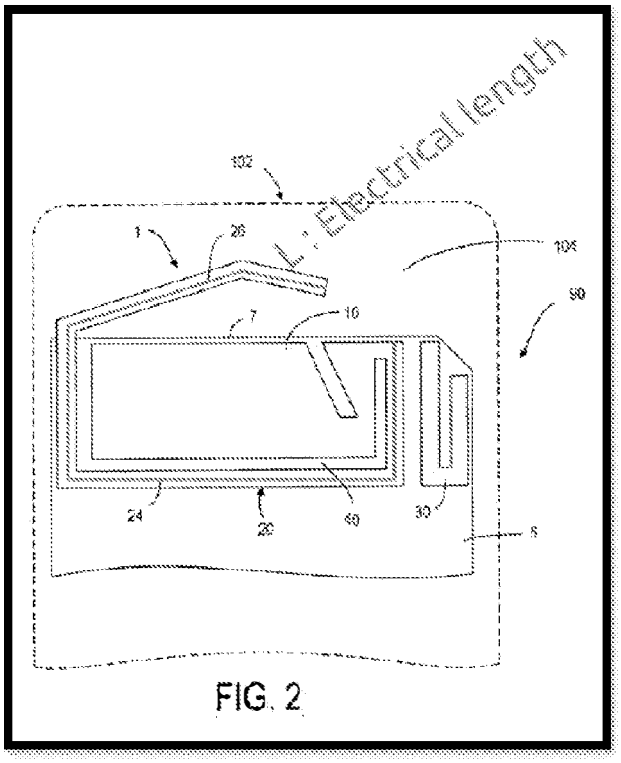


FIG. 2

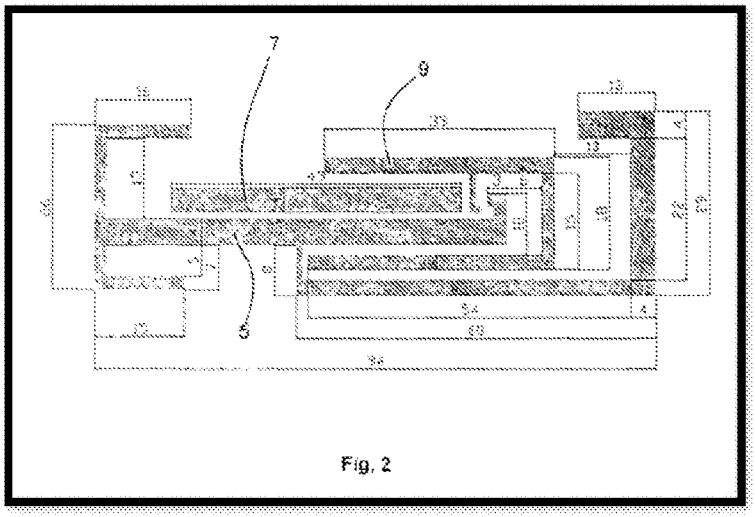


Fig. 2

108. Accordingly, similar to the reasoning provided above for the rejection based on the combination of Bolin and Langley, it is my opinion that a combination of Bolin, Langley and Ollikainen as proposed in the grounds of rejection would not have been obvious at the time of invention.

109. Given the reasoning above, it is my opinion that it would not have been obvious to the skilled artisan at the time of invention to combine the references as proposed in each of the grounds of rejection.

E. Removing the PCS Part 6 from Bolin Would Have Rendered Bolin's Antenna System Unsuitable for its Intended Purpose

110. It is my understanding that the rejection combining the Langley antenna 1 with the Bolin antenna system 1 includes the removal of the entirety of Bolin's main antenna 2. Office Action at 15. As illustrated in FIG. 1 from Bolin (reproduced below), main antenna 2 (or "item 2" in the terms used in the Office Action) includes DCS part 5, GSM part 4 and PCS part 6. *See also* Bolin at ¶¶ [0020]-[0022]. It is my opinion that removing PCS part 6 in order to combine the Langley antenna 1 with the Bolin antenna system 1 would have rendered the combined antenna system unsuitable for the intended purpose of Bolin. It is my opinion that Bolin teaches that it is the PCS part 6 that allows for the placement of the Bluetooth antenna 3 in close proximity to the other antenna structures contained within main antenna 2. Bolin describes the object of the reference as follows:

> It is an object of the present invention to propose a very compact multi band, multi antenna system, with a cheap and sophisticated mechanical concept to get good isolation by clever design of a parasitic element as a high impedance block.

Bolin at ¶ [0006].

111. Bolin teaches that it is PCS part 6 that is the "clever[ly] designed" parasitic element that serves as a high impedance block. It is, therefore, my opinion that it would not have been obvious to the skilled artisan to combine the references as proposed in the grounds of rejection in a way that removes PCS part 6.

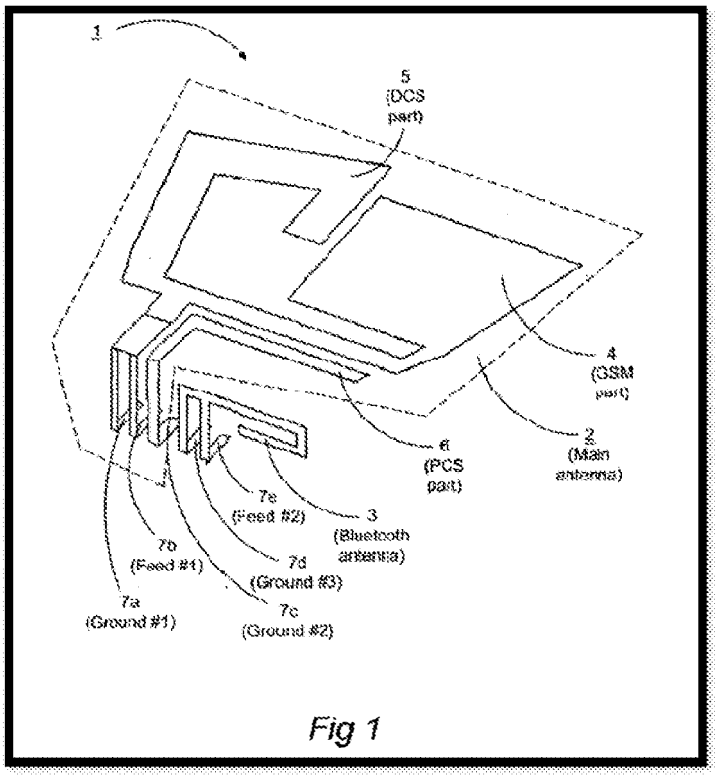


Fig 1

112. The Bolin antenna system includes four radiating portions – DCS part 5 (which operates at the DCS frequency band), GSM part 4 (which operates at the GSM frequency band), PCS part 6 (which operates at the PCS frequency band), and Bluetooth antenna 3 (which operates at the Bluetooth frequency band). PCS part 6, however, also has another function – PCS part 6 acts as a high impedance blocking between Bluetooth antenna 3 and main antenna 2. PCS part 6 is what makes the close placement of Bluetooth antenna 3 and main antenna 2 possible. Absent

PCS part 6, Bolin teaches that it would be necessary to substantially separate Bluetooth antenna 3 from the rest of the antenna system. Or, as explained in the reference:

> The metal trace of the parasitic PCS part 6 is located between the main antenna 2 and the Bluetooth™ antenna 3. It is resonant at PCS 1900 MHz, about 1/4 wavelength, and **will function as a high impedance blocking between the main antenna 2 and the Bluetooth™ antenna 3**.
>
> **By arranging the antennas in this manner, it is possible to reduce the overall size of the antenna system compared to if the parasitic element was not present.** As can be understood, **moving the antennas further apart, which would be necessary in the absence of the parasitic element,** would increase the isolation between the main antenna and the Bluetooth™ antenna.

Bolin at ¶¶ [0023]-[0024] (emphasis added).

113. It is my opinion that the skilled artisan would have understood that it is the presence of the PCS part 6 that allows the Bluetooth antenna 3 to be placed close to main antenna 2, and absent PCS part 6 it would be "*necessary*" to space Bluetooth antenna 3 further from the rest of the antenna system. This is, however, precisely what the grounds of rejection propose: "This combination would … **merely replac[e] the first antenna (item 2) [of Bolin which includes PCS part 6] with the first antenna shown in FIGS. 2 and 3 of Langley**." Office Action at 15 (emphasis added). It is my opinion that such a replacement would have been a non-obvious modification of the references.

114. I understand that a proposed modification cannot render the prior art device inoperable for its intended purpose. As discussed above, the intended purpose of Bolin is to be able to place its Bluetooth antenna 3 close to its main antenna 2 to provide for a compact antenna system 1. Bolin at ¶¶ [0023]-[0024]. Because PCS part 6 is absent in the combination, which *necessitates* providing added space between Bluetooth antenna 3 and the rest of the antenna system 1, it is my opinion that the proposed combination would render the resulting antenna device unsuitable for Bolin's intended purpose of being able to place Bluetooth antenna 3 close to the rest of the antenna system 1.

115. The proposed combination also relies on rationales that are contrary to the teachings of the references, and therefore, would have been non-obvious combinations for failing to provide a *rational* underpinning for the obviousness conclusion. Specifically, in setting forth the grounds

of rejection the "Examiners [found] that one having ordinary skill would apply the improvement of the multi-band antenna of Langley to Bolin to achieve the predictable result of a wireless device that is capable of operating on additional wireless bands **while offering good isolation between its multi-band antenna and its Bluetooth antenna**." Office Action at 16 (emphasis added). This "rationale" is, in my opinion, irrational, as the proposed combination explicitly removes the portion of Bolin's antenna system 1 that provides the "good isolation between its multi-band antenna and its Bluetooth antenna."

116. The proposed rejection is further based on the Examiner's "not find[ing that] the general operation of Bolin would be affected by the proposed modification to use the antenna pattern of Langley [in place of Bolin's main antenna 2]." Office Action at 16. It is my opinion that this is incorrect, and contrary to the understanding of the skilled artisan. Replacing the main antenna 2 of Bolin with the Langley antenna 1 would *significantly* affect the operation of Bolin antenna system as the grounds of rejection propose a "simple substitution" in which the isolating PCS part 6 is removed as part of the modification. Office Action at 15-16. It is my opinion that the skilled artisan would have understood that removing the isolating PCS part 6, without more, would have resulted in interference between the Langley antenna 1 and Bolin's Bluetooth antenna 3. *See, e.g.,* Bolin at ¶ [0024] ("moving the antennas further apart … would be necessary in the absence of the parasitic element"). This interference would greatly affect the operation of the antenna system, rendering it unsuitable for its intended purpose. It is my opinion that this interference would be particularly problematic given that the Langley antenna 1 operates in the Bluetooth frequency band and would serve as a source of IDC.

117. It is further my opinion that the above-described issues in the rejection based on Bolin and Langley apply equally to the rejections based upon Bolin, Langley and Rutfors and upon Ollikainen, Langley and Bolin. With regard to the rejection that includes Rutfors, Rutfors was included for the sole purpose of including a reference with an explicit disclosure of a ground plane. Office Action at 17. Rutfors does nothing to remedy the above-described deficiencies in the combination of Bolin and Langley. Furthermore, like Bolin, Rutfors teaches that a shielding or isolating element is necessary to closely arrange separate radiating structures. Rutfors at ¶ [0005]. The proposed combination provides no such structure, and instead, *removes* the Bolin isolating PCS part 6. Such a combination would not have been obvious to the skilled artisan based on the teachings of Bolin and Rutfors.

118. With regard to the combination of Ollikainen, Langley and Bolin, the grounds of rejection allege that the Bolin Bluetooth antenna 3 could be added to the Ollikainen/Langley combination without affecting the operation of the Ollikainen/Langley structure:

> Examiners further find that this combination [of the Bolin Bluetooth antenna with the Ollikainen/Langley combination] would be predictable because the combination **would not affect the operation of Ollikainen or Langley**, but rather would increase the operational frequencies thereto to further include Bluetooth.

Office Action at 27 (emphasis added).

119. As discussed above, it is my opinion that including the Bolin Bluetooth antenna 3 without also including the isolating PCS part 6 would substantially affect the operation of Ollikainen and Langley due to interference between the antenna structures caused by the lack of isolation. *See* Bolin at ¶¶ [0023]-[0024]. This interference would be particularly problematic to the Ollikainen/Langley combination due to the presence of the additional Bluetooth antenna in the Ollikainen/Langley combination, which would serve as a source of IDC.

120. Given the reasoning above, it is my opinion that it would not have been obvious to the skilled artisan at the time of invention to combine the references as proposed in each of the grounds of rejection.

VI. Conclusion

121. Based on my review of Bolin, Langley, Rutfors, Ollikainen, and the '200 Patent, and for the reasons stated herein, it is my opinion that the cited references, whether considered alone or in combination with the knowledge of the skilled artisan, would not anticipate or render claims 11 and 12 of the '200 Patent obvious to one of skill in the art.

I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct.

Executed this 14th day of August 2024.

/Hossein Hashemi/

Hossein Hashemi, Ph.D.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Control No.	: 90/019,275	Patent	: 11,349,200
Filing Date	: October 12, 2023	Issue Date	: May 31, 2022
Confirmation No.	: 7433	Title:	: Multiple-Body-Configuration Multimedia and Smartphone Multifunction Wireless Devices
		TC/A.U.	: Central Reexamination Unit : 3992
		Examiner	: Kenneth WHITTINGTON
		Customer No.	: 27896
		Docket No.	: 0690.0065L

INFORMATION DISCLOSURE STATEMENT

Pursuant to 37 C.F.R. §1.555, Patent Owner would like to direct the Examiner's attention to the documents listed on the enclosed Information Disclosure Citation Form (PTO/SB/08A).

☐ The IDS cites foreign documents not in English. Pursuant to 37 C.F.R. 1.98(a)(3), a concise explanation of the relevance is provided as indicated below:

☐ Enclosed is a copy of a non-English publication(s) _____. Applicant submits an English-language version of the search report or action, which cites such non-English language publication(s) and indicates the degree of relevance found by the foreign office.

☐ Enclosed is a copy of a non-English publication(s) _____. Applicant submits an English language abstract of the non-English publication(s).

☐ Other:

☒ The IDS cites foreign patent documents in English and/or Non-Patent Literature (NPL) Documents. Patent Owner submits a copy of the Abstract or of the complete publication.

☐ Pursuant to 37 C.F.R. 1.98(a)(2)(iii), enclosed is a copy of pending patent Application Serial No. _____.

☐ No copies of the non-English or non-patent publications listed on the attached Form PTO/SB/08A are being provided pursuant to 37 C.F.R. §1.98(d) because the publications were previously cited by or submitted to the Office in prior Application Serial No. ____, to which the above-identified application claims priority under 35 U.S.C. §120.

The submission of the listed documents is not intended as an admission that any such document constitutes prior art against the claims of the present application. Patent Ownere does not waive any right to take any action that would be appropriate to antedate or otherwise remove any listed document as a competent reference against the claims of the present application.

The Director is hereby authorized to charge any additional appropriate fees that may be required for the above-identified application, and to credit any overpayment, to Deposit Account No. **05-0460**.

Dated: August 14, 2024

Respectfully submitted by:

/Mark J. DeBoy/
Mark J. DeBoy
Reg. No. 66983

EDELL, SHAPIRO & FINNAN, LLC
Customer No. 27896
9801 Washingtonian Blvd., Suite 750
Gaithersburg, MD 20878
(301) 424-3640

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Control No.	: 90/019,275	Patent	: 11,349,200
Filing Date	: October 12, 2023	Issue Date	: May 31, 2022
Confirmation No.	: 7433	Title:	: Multiple-Body-Configuration Multimedia and Smartphone Multifunction Wireless Devices
		TC/A.U.	: Central Reexamination Unit 3992
		Examiner	: Kenneth WHITTINGTON
		Customer No.	: 27896
		Docket No.	: 0690.0065L

CERTIFICATE OF SERVICE

In compliance with 37 C.F.R. § 1.550, the foregoing **INFORMATION DISCLOSURE STATEMENT** and accompanying **FORM PTO/SB/08a and CITED NON-PATENT LITERATURE AND FOREIGN PATENT DOCUMENTS** were served August 14, 2024 to the Third Party Requester by first class mail as follows:

Christopher J. Coulson
Skadden, Arps, Slate, Meagher & Flom LLP
One Manhattan West, 30th Floor
New York, New York 10001

Courtesy copies are being emailed to chris.coulson@skadden.com for opposing counsel's convenience.

Dated: August 14, 2024

Respectfully submitted by:

/Mark J. DeBoy/

Mark J. DeBoy
Reg. No. 66,983

EDELL, SHAPIRO & FINNAN, LLC
CUSTOMER NO. 27896P
1901 Research Boulevard, Suite 400
Rockville, MD 20850
(301) 424-3640

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Control No.	: 90/019,275	Patent	: 11,349,200
Filing Date	: October 12, 2023	Issue Date	: May 31, 2022
Confirmation No.	: 7433	Title:	: Multiple-Body-Configuration Multimedia and Smartphone Multifunction Wireless Devices
		TC/A.U.	: Central Reexamination Unit 3992
		Examiner	: Kenneth WHITTINGTON
		Customer No.	: 27896
		Docket No.	: 0690.0065L

CERTIFICATE OF SERVICE

In compliance with 37 C.F.R. § 1.550, the foregoing **PATENT OWNER'S RESPONSE TO THE NON-FINAL OFFICE ACTION** and accompanying **EXPERT DECLARATION OF HOSSEIN HASHEMI, Ph.D. (EXHIBIT 2001)** were served August 14, 2024 to the Third Party Requester by first class mail as follows:

Christopher J. Coulson
Skadden, Arps, Slate, Meagher & Flom LLP
One Manhattan West, 30th Floor
New York, New York 10001

Courtesy copies are being emailed to chris coulson@skadden.com for opposing counsel's convenience.

Dated: August 14, 2024

Respectfully submitted by:

/Mark J. DeBoy/

Mark J. DeBoy
Reg. No. 66,983

EDELL, SHAPIRO & FINNAN, LLC
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Control No.	: 90/019,275	Patent	: 11,349,200
Filing Date	: October 12, 2023	Issue Date	: May 31, 2022
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		TC/A.U.	: Central Reexamination Unit : 3992
		Examiner	: Kenneth WHITTINGTON
		Customer No.	: 27896
		Docket No.	: 0690.0065L

Mail Stop *Ex Parte* Reexam
ATTN: Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450sssss
Alexandria, VA 22313-1450

STATEMENT OF SUBSTANCE OF INTERVIEW

Pursuant to 37 C.F.R. §1.560,Patent Owner provides the following Statement of Substance of Interview.

A telephonic interview took place on July 19, 2024, between Patent Owner's representatives Mark DeBoy and Patrick Finnan and Examiners Kenneth Whittington, Hetul Patel and James Menefee. With regard to the content of the interview, Patent Owner thanks the Examiners for the detailed Ex Parte Reexamination Interview Summary of July 25, 2024. Patent Owner adopts the Examiners' Interview Summary, and attaches a copy herewith.

Dated: August 14, 2024

Respectfully submitted:

/Mark J. DeBoy/

Mark J. DeBoy, Reg. No. 66,983

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Attorney for Patent Owner
Fractus, S.A.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
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(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

Christopher J. Coulson
SKADDEN, ARPS, SLATE, MEAGHER & FLOM, LLP
ONE MANHATTAN WEST
30TH FLOOR
NEW YORK, NEW YORK 10001

MAILED

JUL 25 2024

CENTRAL REEXAMINATION UNIT

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/019,275*.

PATENT UNDER REEXAMINATION *11349200*.

ART UNIT *3992*.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

PTOL-465 (Rev.07-04)

INTERVIEW SUMMARY CONTINUATION SHEET

Mr. Patrick Finnan (Reg. 39189) also attended the interview.

Patent Owner's representative, Mr. DeBoy, requested the interview to discuss the non-final Office action mailed May 31, 2024 (hereinafter the "**2024 NF Action**"). Mr. DeBoy also provided an agenda, a copy of which is attached (hereinafter the "**Agenda**"). Furthermore, copies of email communications between the Examiners and Mr. DeBoy are attached to this Interview Summary.

In the Agenda, Patent Owner provided generally four arguments traversing the rejections provided in the 2024 NF Action. The summary of each such argument and the discussion related thereto will be taken in turn.

A first argument asserted by Patent Owner was that replacing the smaller antenna structure of Bolin with the larger antenna structures of Langley "seems decidedly nonobvious." Examiners disagree as simply change in size alone was not a sufficient reason to overcome an obviousness rejection. Examiners further noted that one having ordinary skill in the art would understand that replacing a three-frequency antenna with a five-frequency antenna would necessarily change the structure and possibly the size of the antenna.

A second argument by Patent Owner was that the PCS part 6 of Bolin, which provides isolation between the first antenna and second antenna of Bolin, was necessary in Bolin and was removed via the combinations proposed in the 2024 NF Action. Examiners did not find this argument persuasive. As noted in ¶0024 of Bolin, this PCS part 6 was necessary when the first and second antenna were too close

together, which Examiners finds Bolin also implies that it may not be necessary when the antennas are properly spaced.

A third argument by Patent Owner was that in each of the combinations provided in the 2024 NF Action, the resulting combination would have two Bluetooth frequency antennas, which would be redundant and possibly create interfering antenna and rendering the Bolin Bluetooth antenna unsuitable for its intended purpose. Examiners did find this argument persuasive. Examiners agree that one having ordinary skill in the art would not combine these references as proposed in the combination to provide a wireless device with two such antennas. Furthermore, Examiners would not find the combination predictable because such redundant antennas would likely interfere with each other.

A fourth argument by Patent Owner was that placing the Langley antenna structure over the ground plane in the combinations as proposed in the 2024 NF Action would not work as intended because the antenna of Langley was designed "for use without a ground plane." Mr. DeBoy further noted that experiments were conducted by Patent Owner to illustrate that the combination would not operate as intended. Examiners agreed in part. Examiners did not find such an argument persuasive based solely on the disclosures of Langley and Bolin. Thus, Examiners found that Patent Owner for this argument is relying on extrinsic evidence to illustrate the inoperability of the proposed combination. Thus, Examiners suggested and Mr. DeBoy agreed that submission of such extrinsic evidence via a declaration would substantiate such an argument which may overcome the combinability of the references as proposed in the 2024 NF Action.

Any inquiry concerning this communication or earlier communications from the Reexamination Legal Advisor or Examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

Signed:

/KENNETH WHITTINGTON/
Primary Examiner, Art Unit 3992

Conferees:

/JAMES A MENEFEE/
Reexamination Specialist, Art Unit 3992

/H.B.P/
Hetul Patel
Supervisory Patent Reexamination Specialist, Art Unit 3992

Ex Parte Reexamination Interview Summary	Control No.	Patent Under Reexamination	
	90/019,275	11349200	
	Examiner	Art Unit	AIA (FITF) Status
	KENNETH WHITTINGTON	3992	No

All participants (USPTO personnel, patent owner, patent owner's representative):

(1) KENNETH WHITTINGTON	(3) James Menefee (Primary AU3992)
(2) Hetul Patel (SPE AU3992)	(4) Mark J. DeBoy (Reg. 66983)

Date of Interview: 19 July 2024

Type: a) ☐ Telephonic b) ☑ Video Conference
c) ☐ Personal (copy given to: 1) ☐ patent owner 2) ☐ patent owners representative)

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☑ No.
If Yes, brief description: _____

Agreement with respect to the claims f) ☐ was reached. g) ☑ was not reached. h) ☐ N/A.
Any other agreement(s) are set forth below under "Description of the general nature of what was agreed to..."

Claim(s) discussed: 11-12 .

Identification of prior art discussed: all art applied in the outstanding Office action .

Description of the general nature of what was agreed to if an agreement was reached, or any other comments: see attached INTERVIEW SUMMARY CONTINUATION SHEET .

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims patentable, if available, must be attached. Also, where no copy of the amendments that would render the claims patentable is available, a summary thereof must be attached.)

A FORMAL WRITTEN RESPONSE TO THE LAST OFFICE ACTION MUST INCLUDE PATENT OWNER'S STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. (See MPEP § 2281). IF A RESPONSE TO THE LAST OFFICE ACTION HAS ALREADY BEEN FILED, THEN PATENT OWNER IS GIVEN **ONE MONTH** FROM THIS INTERVIEW DATE TO PROVIDE THE MANDATORY STATEMENT OF THE SUBSTANCE OF THE INTERVIEW
(37 CFR 1.560(b)). THE REQUIREMENT FOR PATENT OWNERS STATEMENT CAN NOT BE WAIVED.
EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).

/KENNETH WHITTINGTON/ Primary Examiner, Art Unit 3992	/JAMES A MENEFEE/ Reexamination Specialist, Art Unit 399	/H.B.P/ Hetul Patel SPRS, Art Unit 3992

cc: Requester (if third party requester)

From: Whittington, Kenneth J. (AU3992)
To: Mark J. DeBoy
Cc: Patrick Finnan
Subject: RE: Interview for reexamination 90/019275
Date: Friday, July 19, 2024 10:47:00 AM
Attachments: image001.png

Howdy. Glad we got the interview in.

Forgot to state during the interview but please be sure to provide an Interview Summary. Your summary must be filed either as a separate paper within one month after the date of the interview, or as a separate part of a response to an outstanding Office action, whichever is later. See MPEP 2281.

Thanks,

Ken W.

Kenneth J. Whittington
Primary Examiner AU3992
kenneth.whittington@uspto.gov
(571)272-2264

From: Mark J. DeBoy <mdeboy@esfip.com>
Sent: Thursday, July 18, 2024 10:18 AM
To: Whittington, Kenneth J. (AU3992) <Kenneth.Whittington@USPTO.GOV>
Cc: Patrick Finnan <pfinnan@esfip.com>
Subject: RE: Interview for reexamination 90/019275

CAUTION: This email has originated from a source outside of USPTO. **PLEASE CONSIDER THE SOURCE** before responding, clicking on links, or opening attachments.

Dear Examiner Whittington,

Please find the attached Agenda for tomorrow's interview in the above-referenced *ex parte* reexamination.

Please let me know if you have any questions or concerns.

Best regards,
Mark

Mark J. DeBoy
Partner

ESF IPLAW
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From: Whittington, Kenneth J. (AU3992) <Kenneth.Whittington@USPTO.GOV>
Sent: Tuesday, July 9, 2024 12:10 PM
To: Mark J. DeBoy <mdeboy@esfip.com>
Cc: Patrick Finnan <pfinnan@esfip.com>
Subject: RE: Interview for reexamination 90/019275

Once again a conflict. Can we move it from 11am to 10am Friday (7/19)?

Ken W.

Kenneth J. Whittington
Primary Examiner AU3992
kenneth.whittington@uspto.gov
(571)272-2264

From: Mark J. DeBoy <mdeboy@esfip.com>
Sent: Tuesday, July 9, 2024 10:01 AM
To: Whittington, Kenneth J. (AU3992) <Kenneth.Whittington@USPTO.GOV>
Cc: Patrick Finnan <pfinnan@esfip.com>
Subject: RE: Interview for reexamination 90/019275

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Dear Examiner Whittington,

That time on Friday the 19th works for us.

Thank you!
Mark

Mark J. DeBoy
Partner

ESF IPLAW

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From: Whittington, Kenneth J. (AU3992) <Kenneth.Whittington@USPTO.GOV>
Sent: Tuesday, July 9, 2024 9:47 AM
To: Mark J. DeBoy <mdeboy@esfip.com>
Subject: RE: Interview for reexamination 90/019275

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Doh! Hard to get so many people in one place at the same time. How about this Friday (7/19) at 11am?

Ken W.

Kenneth J. Whittington
Primary Examiner AU3992
kenneth.whittington@uspto.gov
(571)272-2264

From: Mark J. DeBoy <mdeboy@esfip.com>
Sent: Tuesday, July 9, 2024 9:39 AM
To: Whittington, Kenneth J. (AU3992) <Kenneth.Whittington@USPTO.GOV>; Patel, Hetul <Hetul.Patel@USPTO.GOV>; Corsaro, Nick <Nick.Corsaro@USPTO.GOV>
Cc: Patrick Finnan <pfinnan@esfip.com>
Subject: Interview for reexamination 90/019275

CAUTION: This email has originated from a source outside of USPTO. **PLEASE CONSIDER THE SOURCE** before responding, clicking on links, or opening attachments.

Dear Examiners Whittington, Petal and Corsaro,

First, thank you for including me on the meeting invites for this case. It is much easier than playing telephone tag, as often happens when trying to schedule interviews.

I am writing because there is another attorney working on this case, Pat Finnan (copied here), who cannot make the Monday, July 15th, 11AM time that was recently proposed. Pat is travelling for portions of Monday, making it difficult for him to join that meeting. Would it be possible to find another time on Tuesday?

Thank you!
Mark

Mark J. DeBoy
Partner

ESF IPLAW

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Fax: 301-762-4056

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Control No.	: 90/019,275	Patent	: 11,349,200
Filing Date	: October 12, 2023	Issue Date	: May 31, 2022
Confirmation No.	: 7433	Title:	: Multiple-Body-Configuration Multimedia and Smartphone Multifunction Wireless Devices
		TC/A.U.	: Central Reexamination Unit 3992
		Examiner	: Kenneth WHITTINGTON
		Customer No.	: 27896
		Docket No.	: 0690.0065L

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Alexandria, VA 22313-1450

INTERVIEW AGENDA

For Discussion Purposes Only

Dear Examiner Whittington,

Please find the following agenda for the examiner interview in *Ex Parte* Reexamination Control No. 90/019,275.

Dated: July 18, 2024

Respectfully submitted by:

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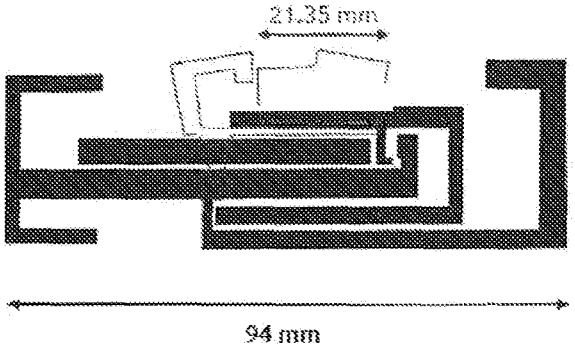
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Agenda

1. ***The Langley Antenna Structure and the Bluetooth Frequency Band***
    a. Patent Owner ("PO") would like to discuss the Langley disclosure, and in particular, the fact that the disclosed antenna operates at the Bluetooth frequency band. *See, e.g.*, Langley at 8 (charts indicating operation at the Bluetooth band). The grounds of rejection rely on a contrary understanding of the reference. *See, e.g.*, Office Action of May 31, 2024 ("Office Action") at 26 ("One having ordinary skill in the art would do so to provide an additional antenna to the wireless device to operate over Bluetooth, **which is lacking in the combination of Ollikainen and Langley**")(emphasis added).
    b. PO would like to discuss how Langley's operation at the Bluetooth band would affect the proposed combinations of references.
        i. Ground A – Obviousness Rejection Applying Bolin and Langley – Because both Bolin and Langley operate at the Bluetooth frequency band, combining them would result in interference between the two antennas, rendering *at least* the Bolin Bluetooth antenna unsuitable for its intended purposes.
        ii. Ground B – Obviousness Rejection Applying Bolin, Langley and Rutfors – Same issue as above.
        iii. Ground C – Obviousness Rejection Applying Ollikainen, Langley and Bolin – Same issue as above. Additionally, this rejection is structured to explicitly add the Bolin Bluetooth antenna because "Bluetooth… is lacking in the combination of Ollikainen and Langley." OA at 26. Langley operating at the Bluetooth frequency band undermines the rationale for adding the Bolin antenna to the combination of Ollikainen and Langley.

2. ***The Relative Sizes of the Bolin and Langley Antennas***

a. PO would like to discuss the relative sizes of the Langley and Bolin antenna structures. As indicated in the illustration provided below, created from the dimensions provided in the two references, the Langley antenna structure (blue) dwarfs the Bolin antenna structure (red).



b. PO would like to discuss how Langley's large size would affect the proposed combinations of references.

i. Ground A – Obviousness Rejection Applying Bolin and Langley – One of the intended purposes of the Bolin reference is to provide for size reduction of mobile device antennas. *See, e.g.*, Bolin at ¶¶ [0002], [0006], [0021], [0024]. The proposed combination takes the exact opposite approach, replacing the relatively small Bolin antenna with the much larger antenna from Langley. Such a replacement seems decidedly non-obvious.

ii. Ground B – Obviousness Rejection Applying Bolin, Langley and Rutfors – Same issue as above.

iii. Ground C – Obviousness Rejection Applying Ollikainen, Langley and Bolin – Same issue as above. Additionally, Ollikainen is similarly directed to antenna size reduction. *See, e.g.*, Ollikainen at ¶¶ [0002], [0004]. These further teachings in Ollikainen reinforce the non-obviousness of the combination, particularly because the Ollikainen antenna structure would also have to be substantially smaller than the

Langley structure to operate as a λ/4 resonator at the disclosed wavelengths. Furthermore, this proposed combination incorporates the Bolin antenna because "Bluetooth… is lacking in the combination of Ollikainen and Langley." OA at 26. It would not have been obvious to do this because 1) Langley already operates at the Bluetooth band, and 2) the teachings in the references of reducing size would motivate the POSITA to *avoid* adding an additional, redundant Bluetooth antenna.

3. The Omission of the Bolin "PCS Part 6"

a. The proposed combination of Bolin and Langley "replac[es] the first antenna (item 2) [of Bolin] with the first antenna shown in FIGS. 2 and 3 of Langley." OA at 15. The proposed combination of Ollikainen, Langley and Bolin "modif[ies] the combination of Ollikainen and Langley with the additional second antenna as taught by Bolin." OA at 26. In either case, the "PCS part 6" from Bolin is not included in the combinations. Specifically, the "PCS part 6" is part of "item 2" in Bolin which is removed in the combination of Bolin and Langley. "PCS part 6" is separate from the second antenna in Bolin, and therefore, it is not included when Bolin's second antenna is added into the Ollikainen/Langley combination.

b. PO would like to discuss how the omission of Bolin's "PCS part 6" would affect the proposed combinations of references.

   i. Ground A – Obviousness Rejection Applying Bolin and Langley – Bolin explains that the "PCS part 6" is necessary for proper operation of the second Bluetooth antenna 3. Bolin at ¶¶ [0023]-[0024]. Without "PCS part 6," the Bolin Bluetooth antenna lacks the "necessary … isolation between the main antenna and the Bluetooth™ antenna." . Bolin at ¶ [0024]. First, eliminating the "PCS part 6" from the combination would render the Bluetooth antenna in Bolin inoperable due to a lack of "necessary" isolation. Second, replacing the Bolin main antenna with the Langley antenna would *increase* the need for isolation given that the

Langley antenna also operates at the Bluetooth frequency band, rendering the combined device unsuitable for its intended purpose.

ii. Ground B – Obviousness Rejection Applying Bolin, Langley and Rutfors – Same issue as above.

iii. Ground C – Obviousness Rejection Applying Ollikainen, Langley and Bolin – Same issue as above. Additionally, the POSITA would not add the Bolin Bluetooth antenna to the Ollikainen/Langley combination without including the "necessary" isolation taught in Bolin. Furthermore, given Langley already operates at the Bluetooth frequency range, and Bolin and Ollikainen teach antennas should be reduced in size, it would not have been obvious to add a redundant Bluetooth antenna *as well as an isolating structure* to the Ollikainen/Langley combination.

4. ***Placing the Langley Antenna Structure over a Ground Plane***

a. The Langley reference provides no disclosure of a ground plane. Not all antennas are designed to operate in conjunction with a ground plane. Therefore, the POSITA would understand that the Langley antenna was designed for use without a ground plane. The POSITA would also understand that the operating characteristics of the Langley antenna, such as the number of frequency bands and the specific frequency bands in which it operates, would be different if the antenna were placed over a ground plane.

b. PO would like to discuss how the presence of a ground plane in Bolin and its absence in Langley would affect the proposed combinations of references.

i. Ground A – Obviousness Rejection Applying Bolin and Langley – this combination of Bolin and Langley is predicated on the Langley antenna structure operating the same way when placed over the Bolin ground plane. *See, e.g.*, OA at 15 ("One having ordinary skill in the art would do so to increase the number of frequencies of the antenna for the wireless device. … Furthermore, Examiners find this combination is merely the simple substitution of one known element for another to obtain predictable results."). The POSITA would understand that this is not the case. The

POSITA would understand that simply substituting the Langley antenna structure for the Bolin structure would not predictably result in more frequency bands of operation as the presence of the ground plane would substantially alter the operating characteristics of the Langley antenna structure.

ii. Ground B – Obviousness Rejection Applying Bolin, Langley and Rutfors – Same issue as above.

iii. Ground C – Obviousness Rejection Applying Ollikainen, Langley and Bolin – Same issue as above.

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		TC/A.U.	: Central Reexamination Unit 3992
		Examiner	: Kenneth WHITTINGTON
		Customer No.	: 27896
		Docket No.	: 0690.0065L

CERTIFICATE OF SERVICE

In compliance with 37 C.F.R. § 1.550, the foregoing **STATEMENT OF SUBSTANCE OF INTERVIEW** was served August 14, 2024 to the Third Party Requester by first class mail as follows:

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Dated: August 14, 2024

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STATEMENT OF RELATED PROCEEDINGS

Pursuant to 37 C.F.R. §1.565(a), Patent Owner provides the following Statement of Related Proceedings.

Patent Owner submits that U.S. Patent No. 11,349,200 ("the '200 Patent") was involved in the following prior proceedings:

- Inter Partes Review IPR2024-00088, which was terminated on February 20, 2024, prior to a final written decision.
- *Fractus, S.A. v. ADT LLC d/b/a ADT Security Services*, 2:22-cv-00412 (E.D. Tex.) filed on October 21, 2022, and dismissed February 20, 2024.
- *Fractus, S.A. v. Vivint, Inc.*, 2:22-cv-00413 (consolidated with 22-cv-412) (E.D. Tex.) filed on October 21, 2022, and dismissed February 20, 2024.

For completeness, Patent Owner also notes the following matters involving patents in the same family as the '200 Patent:

- Inter Partes Review IPR2024-00087 of U.S. Patent No. 8,738,103, which was terminated on February 20, 2024, prior to a final written decision.
- Inter Partes Review IPR2024-00089 of U.S. Patent No. 8,994,604, which was terminated on February 20, 2024, prior to a final written decision.
- Ex Parte Reexamination Control No. 90/019,500 of U.S. Patent No. 8,738,103, for which reexamination was ordered on July 24, 2024.

Dated: August 14, 2024

Respectfully submitted:

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		Customer No.	: 27896
		Docket No.	: 0690.0065L

CERTIFICATE OF SERVICE

In compliance with 37 C.F.R. § 1.550, the foregoing **STATEMENT OF RELATED PROCEEDINGS** was served August 14, 2024 to the Third Party Requester by first class mail as follows:

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DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc., 567 F.3d 1314 (Fed. Cir. 2009) 30

Ex Parte Alfred Yoakim, Youcef Ait Bouziad, Fabien Ludovic Agon, Alexandre Kollep & Gilles Gavillet, No. APPEAL 2023-000207, 2024 WL 3084222, at *4 (P.T.A.B. June 20, 2024) 26

In re Kahn, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006) 18, 36

In re Ratti, 270 F.2d 810, (CCPA 1959) 25, 26, 27

KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398 (2007) 18, 36

Quad Env't Techs. Corp. v. Union Sanitary Dist., 946 F.2d 870 (Fed. Cir. 1991) 39

Ricoh Co., Ltd. v. Quanta Computer Inc., 550 F.3d 1325 (Fed. Cir. 2008) 30

Statutes

35 U.S.C. §103(a) (pre-AIA) 5, 17

Other Authorities

MPEP § 2141 ..... 18, 36

MPEP § 2143 ..... 25, 31

LISTING OF THE CLAIMS

This listing includes only claims subject to this reexamination proceeding.

11. (pending) A wireless device comprising:

an antenna system comprising a ground plane and at least two antennas within the wireless device, the antenna system comprising:

a first antenna configured to provide operation in at least three frequency bands being used by 4G communication standards, the first antenna defining an antenna contour comprising an entire perimeter of the first antenna, the antenna contour comprising at least twenty segments, wherein the antenna contour has a level of complexity defined by complexity factor F21 having a value of at least 1.20 and complexity factor F32 having a value of at least 1.35, and wherein the first antenna defines an antenna box that is a minimum-sized parallelepiped that completely encloses a volume of the first antenna and wherein each face of the minimum-sized parallelepiped is tangent to at least one point of the volume of the first antenna, an orthogonal projection of the antenna box along a normal to a face with a largest area of the first antenna defining an antenna rectangle, an aspect ratio of the antenna rectangle being defined as a ratio between a width and a height of the antenna rectangle, wherein the aspect ratio has a value of at least 2; and

a second antenna configured to provide operation in a first wireless service, the second antenna being proximate to a side of a ground plane rectangle enclosing the ground plane.

12. (pending) The wireless device of claim 11, wherein the first antenna is configured to support at least four frequency bands.

REMARKS

Patent Owner respectfully requests reconsideration of the rejections raised in the Office Action in view of the following remarks.

I. CLAIM STATUS

Claims 1-10 and 13-20 are not subject to reexamination. Claims 11 and 12 are subject to reexamination and have been rejected as follows:

- Claims 11 and 12 were rejected under pre-AIA 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Application Publication No. 2004/0137950 to Thomas Bolin et al. published on July 15, 2004 (hereinafter **"Bolin")** in view of United Kingdom Patent Application Publication No. GB2416625 to Richard Langley et al., published on February 1, 2006 (hereinafter **"Langley").**
- Claims 11 and 12 were rejected under pre-AIA 35 U.S.C. §103(a) as being unpatentable over Bolin in view of Langley and U.S. Patent Application Publication No. 2004/0051669 to Thomas Rutfors et al., published on March 18, 2004 (hereinafter **"Rutfors")**.
- Claims 11 and 12 were rejected under pre-AIA 35 U.S.C. §103(a) as being unpatentable over European Patent Application Publication No. EP1294049 to Jani Ollikainen et al., published on March 19, 2003 (hereinafter **"Ollikainen")** in view of Langley and Bolin.
- Claims 11 and 12 were rejected on the ground of non-statutory double patenting as being unpatentable over claim 8 of U.S. Patent No. 11,735,810 (hereinafter "**the '810 Patent**") in view of Langley.
- Claims 11 and 12 were provisionally rejected on the ground of non-statutory double patenting as being unpatentable over claim 6 of U.S. Patent Application No. 18/339,523 (hereinafter "**the '523 Patent Application**") in view of Langley.[1]

[1] For completeness of the record, Patent Owner notes that the Office Action has a typographical error which indicates this application as U.S. Patent Application No. 18/338,523.

II. EXECUTIVE SUMMARY

Claims 11 and 12 of the '200 Patent have been rejected under the above-outlined grounds of rejection. With respect to the grounds under 35 U.S.C. § 103, Patent Owner submits that the grounds of rejection are in error based on the following four lines of argumentation:

1. The grounds of rejection are based on a flawed understanding of Langley's antenna that undermines the proposed combinations of references;
2. The Bolin and Langley antennas operate according to different principles, as do Langley and Ollikainen, rendering the proposed combinations non-obvious;
3. Langley's antenna does not fit in the antenna systems with which it is combined, making a "simple substitution" of "merely replacing" Bolin's or Ollikainen's main antenna with Langley's antenna infeasible; and
4. Omitting the PCS part 6 of Bolin's antenna from the rejections' combinations renders the combinations unsuitable for their intended purposes.

With regard to the obviousness-type double patenting rejections, Patent Owner is submitting terminal disclaimers to obviate the rejections.

III. SUMMARY OF THE CITED ART

A. Summary of Bolin

Bolin, a U.S. Patent Pre-Grant Publication published on July 15, 2004, discloses a multi-band, multi-antenna system 1 that includes a main antenna 2 and a Bluetooth antenna 3. Declaration of Hossein Hashemi, PhD. ("Hashemi Declaration") at ¶34. The main antenna 2 includes a DCS part 5 that is resonant at the DCS frequency band, a GSM part 4 that is resonant at the GSM frequency band, and a parasitic PCS part 6 that serves as a PCS antenna and as an isolating element between the main antenna 2 and the Bluetooth antenna 3. Bolin at Abstract, ¶¶ [0019]-[0023]; Hashemi Declaration at ¶34.

Bolin structures its antenna system 1 in this way to solve a problem in the art, specifically, the problem of trying to fit a Bluetooth antenna in the housing of a mobile telephone in which much of the available space is already taken up with the mobile telephone's cellular antenna and other components:

> A basic problem of today is to be able to put one or several very small antennas on e.g. a mobile telephone. Main emphasis is put on size, but a good electrical performance is also important. Now when Bluetooth™ applications have become a World Standard, an additional

> frequency band must be covered in future mobile telephones. It is very hard to include this in an already existing antenna, most commonly a built-in antenna. Another way is to include a new antenna to handle Bluetooth™ communication. Usually the available space is very small-in fact, too small in reality. The antennas will often have to be located very close to each other, since generally, the best position is at the top of the telephone.

Bolin at ¶ [0002]; *see also* Hashemi Declaration at ¶36.

Bolin is able to reduce the size of the antenna system 1 by using the PCS part 6 as a high impedance block that allows the Bluetooth antenna 3 to be placed in close proximity to the main antenna 2. Bolin at ¶ [0006]; *see also* Hashemi Declaration at ¶37. This is, in fact, "the object of the invention (Bolin at ¶ [0006]), which the reference explains as follows:

> The main antenna 2 comprises a dual band PIFA antenna with a GMS part 4 and a DCS part 5. In addition, the main antenna 2 comprises a parasitic PCS part 6. The main antenna 2 and the Bluetooth™ PIFA antenna 3 are printed on the same flexible substrate (not shown in the drawings) and constitute a common flex film.
>
> The metal trace of the parasitic PCS part 6 is located between the main antenna 2 and the Bluetooth™ antenna 3. It is resonant at PCS 1900 MHz, about 1/4 wavelength, and will function as a high impedance blocking between the main antenna 2 and the Bluetooth™ antenna 3.
>
> By arranging the antennas in this manner, it is possible to reduce the overall size of the antenna system compared to if the parasitic element was not present. As can be understood, moving the antennas further apart, which would be necessary in the absence of the parasitic element, would increase the isolation between the main antenna and the Bluetooth™ antenna.

Bolin at ¶¶ [0022]-[0024]; *see also* Hashemi Declaration at ¶38.

As illustrated in FIG. 8 from Bolin, a scale drawing of the disclosed antenna, Bolin was able to achieve a small antenna for the time, which was approximately 35 mm wide. Hashemi Declaration at ¶40.

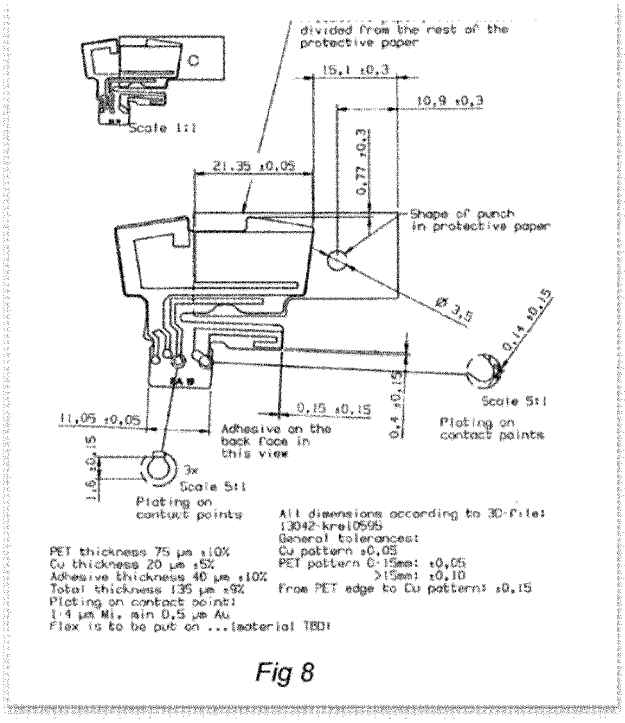


Fig 8

Absent the presence of parasitic PCS part 6, Bolin teaches that it would not be possible to include the main antenna 2 and the Bluetooth antenna 3 in the same housing, where the "available space is very small – in fact, too small in reality" to fit both antennas with sufficient isolation for them to operate correctly. Bolin at ¶ [0002]; *see also* Hashemi Declaration at ¶41. If PCS part 6 is removed, the Bluetooth antenna 3 would have to be separated from main antenna 2, resulting in a substantially larger antenna. *See* Bolin at ¶ [0024]; *see also* Hashemi Declaration at ¶41.

B. Summary of Langley

Langley is the February 1, 2006 publication of United Kingdom Patent Application No. 0416406.7, filed on July 22, 2004. Langley discloses a multi-band antenna that operates at five frequency bands. Langley at 2:24-26, 4:29-32, 8:8-13; *see also* Hashemi Declaration at ¶42. Langley provides two examples of its antenna, all of which share similar size and operating characteristics. *See, e.g.,* Langley at FIGs. 2 and 13.

Of importance to any antenna, and the present response in particular, are the frequency bands of operation of the antenna, the size of the antenna, and the presence or absence of a ground plane. As explained below, like Bolin, Langley operates at the Bluetooth frequency band, but unlike Bolin,

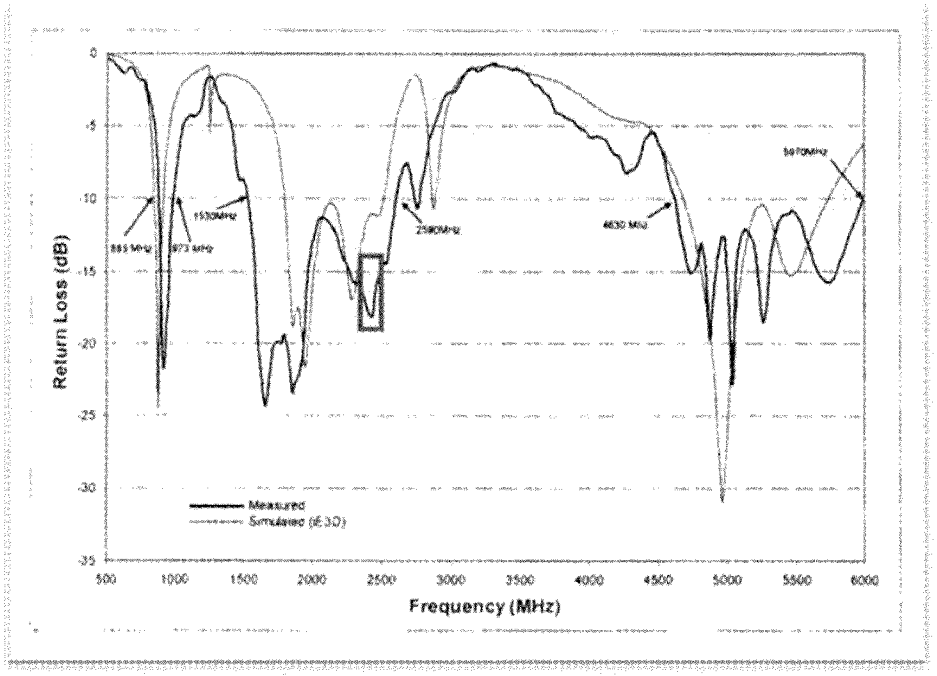
Langley is a *much* larger antenna that is designed to operate *without* a ground plane. Hashemi Declaration at ¶43.

Reproduced below are tables from Langley identifying the frequency bands at which the disclosed antenna operates. As clearly illustrated in these tables (annotated below), the Langley antenna, like Bolin, provides operation at the Bluetooth frequency band. Hashemi Declaration at ¶36

System	Frequency Band
GSM 900	890 – 960 MHz
DCS1800	1710 – 1880 MHz
DECT	1900 MHz
UMTS	1920 – 2170 MHz
Bluetooth	2400 – 2483.5 MHz
Hiperlan 1/2	5150 – 5725 MHz

Frequency band (MHz)	Bandwidth	System covered
895 – 973	88 MHz	GSM900
1530 – 2590	1060 MHz	DCS1800 UMTS Bluetooth DECT
4630 – 5970	1340 MHz	Hiperlan 1 Hiperlan 2

Operation at the Bluetooth frequency band is illustrated in the return loss graph of FIG. 4 of Langley, and FIGs. 9a-c illustrate the radiation pattern for the Bluetooth frequency band. Hashemi Declaration at ¶44.



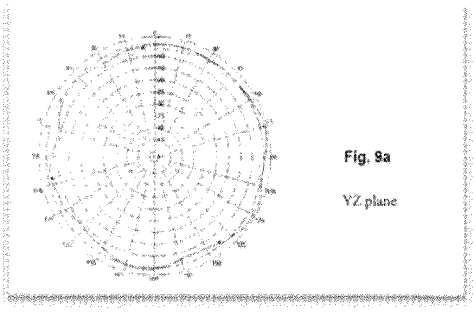


Fig. 9a

YZ plane

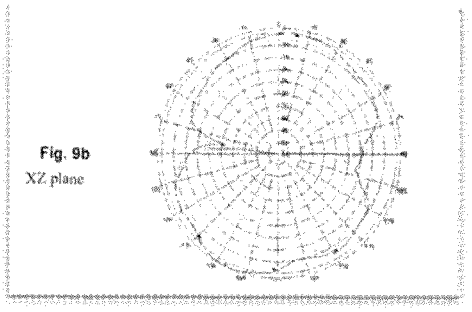


Fig. 9b

XZ plane

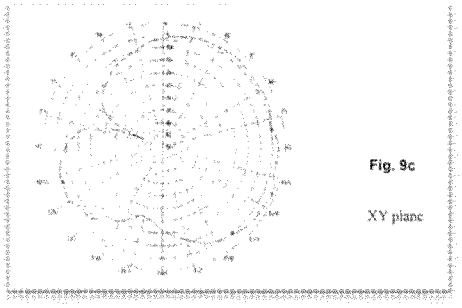


Fig. 9c

XY plane

Unlike Bolin, however, this Bluetooth operation is not implemented through a separate antenna, but is instead, an integral part of the Langley antenna. *See, e.g.,* Langley at 9:21-31; *see also* Hashemi Declaration at ¶45.

Also relevant to the present proceeding is the size of the Langley antenna. Reproduced below is FIG. 2 of Langley, a scale drawing of the disclosed antenna that shows it is substantially larger than, for example, the Bolin antenna. Hashemi Declaration at ¶46.

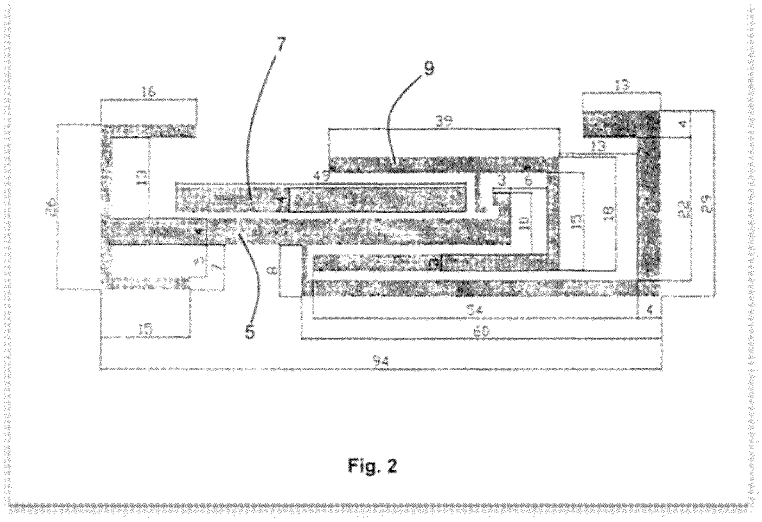


Fig. 2

Where the Bolin antenna is approximately 35 mm wide, the Langley antenna is approximately two and a half times as wide, measuring 94 mm in width. Hashemi Declaration at ¶47.

Finally, of particular importance to this proceeding (and omitted from Requester's descriptions of Langley (*see* Request at 18, 28-34), the skilled artisan would understand that Langley is designed to operate *without* a ground plane. Specifically, given the substantial size of Langley, and the absence of any discussion of a ground plane in the reference, the skilled artisan would understand that Langley operates as a dipole-like antenna that is designed to operate without a ground plane. Hashemi Declaration at ¶48; *see also* Section VI.B, *infra*. The absence of a ground plane on Langley's substrate is confirmed by Langley noting that its radiating elements may be reproduced on both sides of the substrate to improve antenna performance. Langley at 4:13-20, 6:21-30; *see also* Hashemi Declaration at ¶48.

C. Summary of Rutfors

Rutfors is U.S. Pre-Grant Publication No. 2004/0051669, which published on March 18, 2004, and is based on U.S. Application No. 10/312,563, filed on July 10, 2001. As explained in the Abstract, Rutfors is generally directed to:

> An antenna arrangement for a portable radio communication device, comprising a first (**1**) and a second (**2**) antenna element, and a conductive shield (**4**) connectable to a ground plane device (**3**), said first (**1**) and second (**2**) antenna elements are located on opposite sides of the shield (**4**), wherein said first (**1**) and second (**2**) antenna elements are of different types.

Rutfors at Abstract; *see also* Hashemi Declaration at ¶67.

Accordingly, like Bolin but unlike Langley, Rutfors is designed to operate in conjunction with a ground plane. Hashemi Declaration at ¶68. The ground plane is the main feature of Rutfors relied upon in the grounds of rejection. *See* Office Action at 17.

As further explained in the Summary of the Invention, the invention of Rutfors is directed to providing "an antenna arrangement that offers improved isolation, i.e. decreased coupling, between antennas in a portable radio communication device, such as a mobile telephone." Rutfors at ¶ [0005]. It is the above-noted shield 4 that provides this isolation:

> With a shield between internal antennas in a portable radio communication device the coupling between the antennas is reduced and therewith it is possible to place the antennas close to each other. Further, with internal antennas of different types, such as meander antenna and PIFA, the coupling between the antennas are less than with

> two antennas of the same type, such as PIFA and PIFA. Thus two antennas of different types and separated by a shield can be positioned closer together than two of the same type separated by a shield, still providing the same amount of isolation.

Rutfors at ¶ [0010]; *see also* Hashemi Declaration at ¶69.

Accordingly, like Bolin, Rutfors teaches the skilled artisan that it is only through the inclusion of an isolating structure, such as Rutfors' shield 4 or Bolin's parasitic PCS part 6, that two antennas can be arranged close together in order to reduce the size of an antenna system. Hashemi Declaration at ¶70.

D. Summary of Ollikainen

Ollikainen is European Patent Publication No. EP 1294049 B1, which published on April 13, 2005, and is based on European Patent Application No. 02016563.5, which was filed on July 24, 2002. Ollikainen discloses an antenna system 1 that includes "a first radiating element 10, a second radiating element 20 and a third radiating element 30." Ollikainen at ¶ [0016]; *see also* Hashemi Declaration at ¶71. The first radiating element "is a short-circuited patch having a first resonance frequency," and the second radiating element "is a short-circuited patch having a second resonance frequency" that shares a feed line 14 with the first radiating element. Ollikainen at ¶ [0016]; *see also* Hashemi Declaration at ¶71. The third radiating element resonates at a third resonant frequency and is physically separated from the first and second radiating elements. Hashemi Declaration at ¶71. Like the first and second radiating elements, the third radiating element is a short-circuited patch. Ollikainen at ¶ [0016]; *see also* Hashemi Declaration at ¶71. As all three radiating elements of the Ollikainen device are short-circuited patch antennas, the antenna system 1 includes a ground plane 5. Ollikainen at ¶ [0016]; *see also* Hashemi Declaration at ¶71. Like many of the other references relied upon in the Office Action, Ollikainen recognizes the importance "of small antennas for mobile phones." Ollikainen at ¶ [0002]; *see also* Hashemi Declaration at ¶71.

IV. SUMMARY OF 35 U.S.C. § 103 REJECTIONS

A. Obviousness Rejection Applying Bolin and Langley

In rejecting claims 11 and 12 of the '200 Patent over Bolin in view of Langley, the grounds of rejection propose a "simple substitution" in which the main antenna 2 of Bolin is wholesale replaced by the antenna 1 of Langley. Or, as explained in the Office Action:

> Examiners find it would have been obvious at the time the invention was made to use the first antenna of Langley as the first antenna in the

> wireless device of Bolin. **This combination would simply imply using the other structures of Bolin shown in FIG. 1 of Bolin, but merely replacing the first antenna (item 2) with the first antenna shown in FIGS. 2 and 3 of Langley**. … Examiners find this combination is merely the **simple substitution** of one known element for another to obtain **predictable results**. … Examiners find that one having ordinary skill in the art could have substituted the antenna pattern of Langley for the antenna pattern in Bolin as such would **merely be replacing the antenna pattern 2 of Bolin above with the antenna pattern shown in FIGS. 2 and 3 of Langley on the defined antenna rectangle, while retaining the other structures and operation of the wireless device of Bolin**.

Office Action at 15 and 16 (emphasis added).

In other words, the grounds of rejection propose replacing the main antenna 2 of Bolin with the antenna 1 of Langley with no further modifications to the Bolin device, i.e., "while retaining the other structures and operation of the wireless device of Bolin." Office Action at 15 and 16.

As described in the above-quoted language from the Office Action, the substitution proposed in the grounds of rejection removes the entirety of the main antenna 2 of Bolin, including the parasitic PCS part 6, and replaces it with the antenna 1 from Langley. The rationales provided for this "simple substitution" include:

- "Examiners find it would have been obvious … to increase the number of frequencies of the antenna for the wireless device." Office Action at 15 and 16.
- "Examiners find this combination is merely the simple substitution of one known element for another to obtain predictable results." Office Action at 15 and 16.
- "Examiners further find that one having ordinary skill would apply the improvement of the multi-band antenna of Langley to Bolin to achieve the predictable result of a wireless device that is capable of operating on additional wireless bands while offering good isolation between its multi-band antenna and its Bluetooth antenna." Office Action at 15 and 16.
- "Finally, Examiners do not find the general operation of Bolin would be affected by the proposed modification to use the antenna pattern of Langley, but rather would improve the operation of the antenna system of Bolin to operation by allowing it to communicate[e] over a wider band of frequencies." Office Action at 15 and 16.

The combinations and rationales are provided without accounting for:

- The combination resulting in two Bluetooth antennas incorporated into a single antenna system.
- The combination positioning the Langley antenna 1 over a ground plane in spite of it being designed according to a principle of operation that does not utilize a ground plane.
- The proposed combination *greatly* increasing the size of the Bolin antenna system 1 in spite of the teachings in every reference to *reduce* the size of the antenna system.
- The Langley antenna not fitting within the Bolin and Ollikainen wireless devices.
- The combination removing the PCS part 6 of Bolin in spite of Bolin teaching that this is the inventive aspect of the antenna system that allows for placement of its Bluetooth antenna in close proximity to other radiating structures.

B. Obviousness Rejection Applying Bolin, Langley and Rutfors

The rejection of claims 11 and 12 over Bolin, Langley and Rutfors takes the previous rejection based on Bolin and Langley and simply adds the Rutfors ground plane. Office Action at 17. Or, as explained in the Office Action:

> However, Examiners do recognize that Bolin, while teaching a PCB does not use the phrase "ground plane" for this PCB. Nevertheless, Rutfors discloses that its PCB for the wireless device is the ground plane device. See Rutfors ¶ 0025 and claim 15. It would thus have been obvious and known at the time the invention was made that the PCB of Bolin would be a ground plane device forming a ground plane.

Office Action at 17.

It is alleged that such a combination would have been obvious because:

> One having ordinary skill in the art would know this in view of Rutfors, which discloses the ground plane device is the PCB of a wireless device and thus the ground plane would be part of this ground plane device. Furthermore, such would have been obvious in view of Bolin which discloses that the grounding lines for the antennas are connected to the PCB as evidenced above.

Office Action at 17.

This combination is made without accounting for the issues described in section VI.A-D, *infra*. In fact, failing to account for these issues is amplified in some cases due to the inclusion of Rutfors. Rutfors, like Bolin, teaches that a shielding element is necessary for the close arrangement of antenna elements. Rutfors at ¶ [0010]. The Bolin shielding structure has been removed in the

combination, and only the ground plane from Rutfors is added. Accordingly, the combination of antenna elements with no shielding structure of this rejection is now contrary to two of the cited references.

C. Obviousness Rejection Applying Ollikainen, Langley and Bolin

The combination of Ollikainen, Langley and Bolin takes a slightly different approach, beginning with Ollikainen because it includes a ground plane (Office Action at 17) and substitutes the Langley antenna 1 for the first radiating element 10, second radiating element 20 and third radiating element 30 of Ollikainen (Office Action at 23). As explained in the rejection:

> In view of these teachings of Ollikainen and Langley, Examiners find it would have been obvious at the time the invention was made to use the first antenna of Langley as the first antenna in the wireless device of Ollikainen. This combination would simply imply using the other structures of Ollikainen shown in FIGS. 1-3 of Ollikainen, but **merely replacing the first antenna (items 10/20/30) with the first antenna shown in FIGS. 2 and 3 of Langley**.

Office Action at 23 (emphasis added).

It is alleged that such a combination would have been obvious for substantially the same reasons as described above for the combination of Bolin and Langley in section IV.A, *supra.* Mainly:

- The combination "is merely the simple substitution of one known element for another to obtain predictable results." Office Action at 23.
- "[O]ne having ordinary skill would apply the improvement of the multi-band antenna of Langley to Ollikainen to achieve the predictable result of a wireless device that is capable of operating on additional wireless bands." Office Action at 24.
- The "Examiners do not find the general operation of Ollikainen would be affected by the proposed modification to use the antenna pattern of Langley." Office Action 24.

This combination and these rationales fail to account for the same issues described above in the combination of Langley and Bolin. *See* Section IV.A, *supra;* Section VI.A-D, *infra.*

Like the combination of Langley with Bolin, this combination of Langley and Ollikainen *greatly* increases the size of the antenna, which is contrary to the teachings of Ollikainen. *See* Ollikainen at ¶ [0002]-[0005]. This increase in size is so drastic that the resulting antenna structure would not fit within the Ollikainen device. Also like the combination of Langley and Bolin, this combination places the Langley antenna over a ground plane, which is contrary to Langley's design and principle of operation. *See* Section III.B, *supra; see also* Section VI.B, *infra.*

Finally, in order to meet the requirements of the claims of the '200 Patent, the Bolin Bluetooth antenna 3 is incorporated into the combination of Ollikainen and Langley. Office Action at 26. It is alleged that this inclusion of the Bolin Bluetooth antenna would have been obvious because "One having ordinary skill in the art would do so to provide an additional antenna to the wireless device to operate over Bluetooth, which is lacking in the combination of Ollikainen and Langley, while providing a size reduction in the arrangement." Office Action at 26. This combination and rationale introduces additional problems into the combination. First, the rationale is false on both accounts – Bluetooth operation is not lacking in the combination of Ollikainen and Langley (*see* Section III.B, *supra),* and the inclusion of the Bolin Bluetooth antenna would increase, not reduce, the size of the arrangement. Furthermore, the rejection fails to account for how the Bolin Bluetooth antenna 3 could be incorporated into the combination without the isolating PCS part 6 that Bolin teaches is required for a close arrangement of its Bluetooth antenna 3 with other radiating structures.

V. SUMMARY OF THE '200 PATENT

The '200 Patent is entitled "Multiple-Body-Configuration Multimedia and Smartphone Multifunction Wireless Device," and was filed on April 30, 2021, and issuing on May 31, 2022. '200 Patent at Title Page. The '200 Patent issued from United States Patent Application No. 17/246,192, and claims priority to European Patent No. 06117352, filed on July 18, 2006. '200 Patent at Title Page.

As indicated in the Claim Status, *supra,* claim 11 recites "a wireless device" that includes "an antenna system." *See* Hashemi Declaration at ¶32. The recited parts of the antenna system are a ground plane, a first antenna, and a second antenna. '200 Patent at claim 11; *see also* Hashemi Declaration at ¶32. The claims further recite structural and operational requirements for the antenna system that allow for example embodiments of the recited wireless device to provide multiband operation with reduced-sized antenna structures. '200 Patent, *passim; see also* Hashemi Declaration at ¶32. The claims recite novel features of the first antenna, such as the recited F21 and F32 complexity factors, as well as a novel arrangement of the first and second antennas relative to the ground plane. Hashemi Declaration at ¶32. The novel features of the claims are, to an extent, beyond the scope of the present response due to the clear errors in how the grounds of rejection propose combining the cited references.

VI. RESPONSE TO REJECTIONS UNDER 35 U.S.C. § 103

As set forth in detail below, Patent Owner respectfully asserts that the above-described rejections are in error based on *at least* four separate lines of argumentation, all of which apply to each of the three rejections under 35 U.S.C. § 103 (pre-AIA). These four lines of argumentation are:

1. The grounds of rejection are based on a flawed understanding of Langley's antenna that undermines the proposed combinations of references (Hashemi Declaration at ¶74);
2. The Bolin and Langley antennas operate according to different principles, as do the Langley and Ollikainen antennas, rendering the proposed combinations non-obvious (Hashemi Declaration at ¶74);
3. Langley's antenna does not fit in the antenna systems with which it is combined, making a "simple substitution" of "merely replacing" Bolin's or Ollikainen's main antenna with Langley's antenna infeasible (Hashemi Declaration at ¶74); and
4. Omitting the PCS part 6 from Bolin's antenna system from the rejections' combinations renders the combinations unsuitable for their intended purposes (Hashemi Declaration at ¶74).

Accordingly, Patent Owner has organized its response around these four lines of argumentation instead of a more traditional approach in which each ground of rejection is addressed separately. The sections set forth below first address the rejection based on the combination of Bolin and Langley. The sections then explain how the same arguments apply to the combinations of Bolin, Langley and Rutfors and finally Ollikainen, Langley and Bolin. To the extent each argument applies differently to these additional grounds of rejection, this is also explained at the end of each section.

Patent Owner also notes that these four lines of argumentation are based primarily on errors in how and why the references are combined in the grounds of rejection. Patent Owner has also reviewed how the Examiners have applied the cited art to the claims of the '200 Patent. Patent Owner does not concede that the Examiners have correctly applied the art against the claims. Nor does Patent Owner concede that the Examiners' claim interpretations of certain claim limitations are correct. However, as illustrated through the discussion below, there are clear errors in the proposed combinations of references which confirm the patentability of the claims without Patent Owner having to address the specific manner in which the Examiners have construed the claims and applied

the references against the '200 Patent. Patent Owner reserves the right to argue that the Examiners have erroneously construed the claims or applied the art, if necessary.

A. The Grounds of Rejection are Based on a Flawed Understanding of the Langley Reference that Undermines the Proposed Combination of References

The rejections combining the Langley antenna 1 with the Bolin wireless device are based on a flawed understanding of the operation of the Langley antenna 1. It is the Examiners' understanding that the Langley antenna 1 does *not* operate at the Bluetooth frequency band. Office Action at 26. This understanding is incorrect. Langley provides operation at the Bluetooth frequency band, as described throughout the disclosure. Langley, *passim; see also* Hashemi Declaration at ¶¶43-45, 76. This faulty understanding of Langley is then used to justify the combination of Langley with the other references. *See, e.g.,* Office Action at 26; *see also* Hashemi Declaration at ¶76. Accordingly, the grounds of rejection fail to provide a *rational* underpinning for the proposed combination as the proposed combination is premised on a factual error. *See* Hashemi Declaration at ¶76. Therefore, the grounds of rejection fail to present a *prima facie* case of obviousness. MPEP § 2141.III ("*In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006), stated that '[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.'"); *see also KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007).

First, the skilled artisan would not have preserved the Bolin Bluetooth antenna in the same structure as the Langley antenna due to the teachings in the references of reducing the size of the antenna system. Hashemi Declaration at ¶77. Second, including a redundant Bluetooth antenna in the combined structure would result in interference between the two antennas, interference that Bolin teaches should be avoided. Hashemi Declaration at ¶77.

As explained throughout Bolin, the intended purpose of the reference is to be able to reduce the size of the antenna system used in a portable communication device, such as a mobile phone:

> [0002] **A basic problem of today is to be able to put one or several very small antennas on e.g. a mobile telephone. Main emphasis is put on size, but a good electrical performance is also important**. Now when Bluetooth™ applications have become a world standard, an additional frequency band must be covered in future mobile telephones. It is very hard to include this in an already existing antenna, most commonly a built-in antenna. Another way is to include a new antenna to handle Bluetooth™ communication. **Usually the available space is very small—in fact, too small in reality. The**

> **antennas will often have to be located very close to each other, since generally, the best position is at the top of the telephone**.
>
> [0021] **A significant advantage with the antenna system according to the present invention is the size reduction** that obtained by placing the antennas close together as well as the folding of the antenna patterns.
>
> [0024] **By arranging the antennas in this manner, it is possible to reduce the overall size of the antenna system compared to if the parasitic element was not present**. As can be understood, moving the antennas further apart, which would be necessary in the absence of the parasitic element, would increase the isolation between the main antenna and the Bluetooth™ antenna.

Bolin at ¶¶ [0002], [0021], [0024] (emphasis added); *see also* Hashemi Declaration at ¶78.

Bolin is so concerned with reducing the size of its antenna that it identifies the width of the antenna traces as a consideration that must be addressed when balancing performance with the need for a small sized antenna:

> The actual width of the feed traces is a tradeoff between size and performance. By widening the feed traces, a better performance would be achieved. However, wider feed traces result in an increased size of the antenna system.

Bolin at ¶ [0025]; *see also* Hashemi Declaration at ¶79.

Langley similarly identifies the "need for a compact and efficient multi-band antenna." Langley at 2:21-22. Unsurprisingly, Ollikainen and Rutfors also recognize the need for antenna size reduction. *E.g.,* Ollikainen at ¶¶ [0002]-[0005]; *e.g.,* Rutfors at ¶¶ [0002], [0017]; *see also* Hashemi Declaration at ¶80.

Given these clear teachings in the prior art of the need to *reduce* the overall size of the antenna system, the skilled artisan would not, based on the teachings of all the cited references, add to the size of the Langley antenna 1 by preserving the now unnecessary Bolin Bluetooth antenna in the combined system. Hashemi Declaration at ¶¶81-82. Put differently, the grounds of rejection propose an unnecessarily large antenna system without gaining any increase in operation. Bolin, on the other hand, talks about the need to sometimes sacrifice performance to ensure adequate size reduction. *See, e.g.,* Bolin at ¶ [0025]; *see also* Hashemi Declaration at ¶81. The skilled artisan simply would not have increased the size of an antenna system by preserving the Bolin Bluetooth antenna if it comes with no additional operational or performance benefits. Hashemi Declaration at ¶¶81-83.

As also noted above, the skilled artisan would also avoid the combination of the Langley Bluetooth operation with an additional (and unnecessary) Bluetooth antenna from Bolin due to the interference that may result. As understood by the skilled artisan, antennas in the same device that operate at the same or adjacent frequency bands can cause In-Device Coexistence (IDC) interference. Hashemi Declaration at ¶¶81-83. The proposed grounds of rejection preserve the Bolin Bluetooth antenna 3, which would serve as an additional source of interference with no added operation while simultaneously *removing the inventive structure* from Bolin that Bolin explicitly teaches is necessary to provide isolation between its Bluetooth antenna and the rest of the Bolin antenna system 1 (*see* Section VI.D for a further discussion of the deficiencies in the rejection caused by the removal of Bolin's isolating PCS part 6 from the proposed combinations). Hashemi Declaration at ¶¶81-83. The skilled artisan would further understand that the traditional way of decreasing such interference is through physically separating the antenna structures, increasing the size of the antenna system. Hashemi Declaration at ¶¶81-83. The skilled artisan simply would not retain an unnecessary source of IDC interference, which provides no additional operation, and that increases the size of the antenna structure – such a combination runs contrary to the teachings of the cited references and the knowledge of the skilled artisan. Hashemi Declaration at ¶¶81-83.

Accordingly, it simply would not have been obvious at the time of invention to substitute the Langley antenna 1 for the main antenna 2 in Bolin's antenna system 1 while retaining Bolin's Bluetooth antenna 3 in the combined structure. Hashemi Declaration at ¶¶81-83.

The arguments above regarding the combination of Langley with Bolin apply with equal force to the combination of Langley with Bolin and Rutfors, and with greater force to the combination of Langley with Ollikainen and Bolin. With regard to the rejection that includes Rutfors, Rutfors was included for the sole purpose of including a reference with an explicit disclosure of a ground plane. Office Action at 17. Rutfors does nothing to remedy the above-described deficiencies in the combination of Bolin and Langley. Hashemi Declaration at ¶84.

With regard to the rejection based on the combination of Bolin with Ollikainen and Langley, all of the arguments presented above apply analogously to this rejection. Hashemi Declaration at ¶85. The Examiners' flawed reading of Langley further undermines the Ollikainen/Langley/Bolin combination as a correct reading of Langley explicitly contradicts the stated obviousness rationale provided in the grounds of rejection. Hashemi Declaration at ¶85. In this rejection the inclusion of the Bolin Bluetooth antenna into the Ollikainen/Langley combination was justified because it would

allegedly provide "operat[tion] over Bluetooth, *which is lacking in the combination of Ollikainen and Langley*, while providing *a size reduction in the arrangement*." Office Action at 26 (emphasis added); *see also* Hashemi Declaration at ¶85. Including the Bolin Bluetooth antenna with the Ollikainen/Langley combination does not address a lack of Bluetooth operation (Langley already operates at the Bluetooth frequency band) and it would increase, not reduce, the size of the antenna arrangement. Hashemi Declaration at ¶85.

In light of the above, Patent Owner submits that claim 11 patentably distinguishes over all of the grounds of rejection, and claim 12 patentably distinguishes over the grounds of rejection due *at least* to its dependence from claim 11, as well as its additionally recited features. Hashemi Declaration at ¶86.

B. The Bolin and Langley Antennas Operate According to Different Principles Rendering the Proposed Combination Non-Obvious

As indicated throughout the Office Action, Request and Requester's Expert Declaration, the primary rationale for replacing the main antenna 2 of Bolin's antenna system 1 with Langley's antenna 1 is that doing so would be a "simple substitution" in which the skilled artisan would substitute the antenna pattern of Langley for the antenna pattern in Bolin with no further modifications to the operation or structure of Bolin's antenna system:

> Examiners find it would have been obvious at the time the invention was made to use the first antenna of Langley as the first antenna in the wireless device of Bolin. **This combination would simply imply using the other structures of Bolin shown in FIG. 1 of Bolin, but merely replacing the first antenna (item 2) with the first antenna shown in FIGS. 2 and 3 of Langley**. … Examiners find this combination is merely the **simple substitution** of one known element for another to obtain predictable results. … Examiners find that one having ordinary skill in the art could have substituted the antenna pattern of Langley for the antenna pattern in Bolin as such would **merely be replacing the antenna pattern 2 of Bolin above with the antenna pattern shown in FIGS. 2 and 3 of Langley on the defined antenna rectangle, while retaining the other structures and operation of the wireless device of Bolin**.

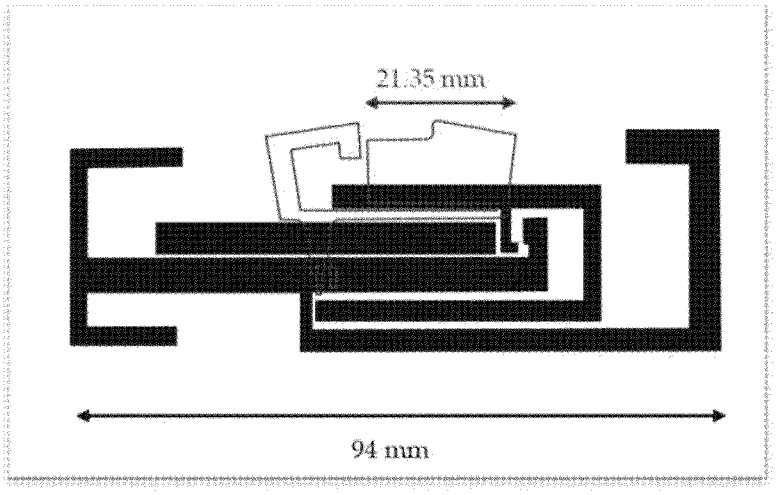
Office Action at 15 and 16 (emphasis added); *see also* Hashemi Declaration at ¶86.

Such a "simple substitution" would not have been obvious due to the Langley and Bolin antennas operating according to different principles with different structural requirements. Hashemi Declaration at ¶87. Notably, the Bolin antenna system is designed to operate with a ground plane while Langley's antenna is not. Hashemi Declaration at ¶87. The skilled artisan would understand

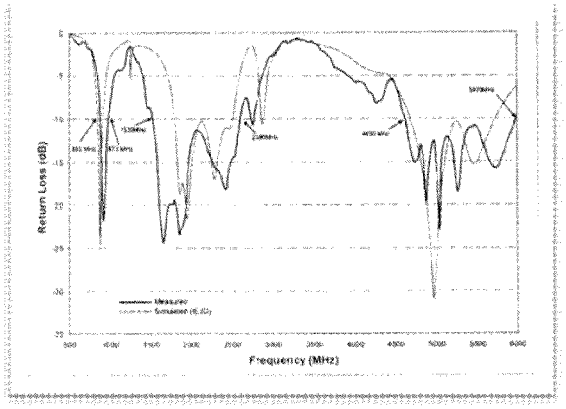
that "merely replac[ing]" two such antennas could not be effectuated "while retaining the other structures and operation of the wireless device of Bolin" – shoehorning the Langley antenna 1 into the Bolin antenna structure 1 while maintaining the Bolin ground plane will result in substantially different behavior from the disclosed Langley antenna. Hashemi Declaration at ¶87. As the impact of the ground plane would have been well understood by the skilled artisan, the proposed combination would not have been obvious. Hashemi Declaration at ¶87.

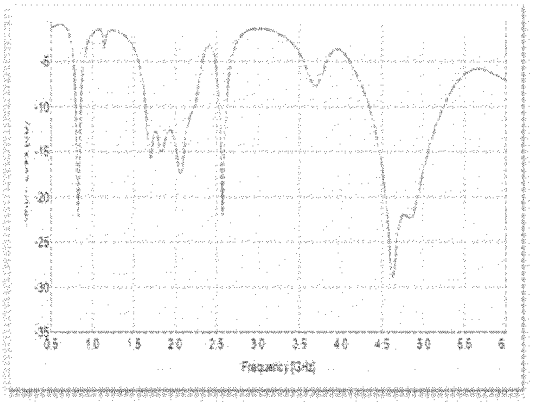
The Bolin antenna system 1 is a combination of different types of antennas – main antenna 2 is a built-in patch antenna comprising DCS part 5, GSM part 4, and parasitic PCS part 6, while Bluetooth antenna 3 is a Planar Inverted-F antenna (PIFA). Bolin at ¶¶ [0020]-[0023]; *see also* Hashemi Declaration at ¶88. As would have been understood by the skilled artisan, each of these types of antennas requires a ground plane to operate efficiently, which is why there is no disagreement among the parties that a ground plane is a necessary element of the Bolin structure. S*ee, e.g.*, Declaration of Manos Tentzeris (Exhibit 1009) at ¶ 79; Request at 25; Office Action at 9; *see also* Hashemi Declaration at ¶88.

Langley, on the other hand, is designed to operate without a ground plane. Hashemi Declaration at ¶89. Contrary to the assertion on page 11 of the Office Action, Langley provides no teaching or suggestion of a ground plane, but a substrate of dielectric material FR-4 where the conductive radiating elements may be formed on both sides of the substrate. Langley at 4:13-20, 6:21-30; *see also* Hashemi Declaration at ¶89. Second, the size of the Langley antenna, illustrated below in a scale comparison to the DCS and GSM parts of Bolin, would indicate to the skilled artisan that the Langley antenna is a dipole-like ½ wavelength antenna. Hashemi Declaration at ¶89. As understood by the skilled artisan, dipole-like antennas do not require a ground plane to work efficiently where the patch and PIFA antennas of Bolin do. Hashemi Declaration at ¶89.



Finally, Patent Owner's expert declaration provides simulations of the Langley antenna with and without a ground plane. As illustrated in the comparison provided below between Patent Owner's simulated return loss without a ground plane (right figure) and Langley's own simulations illustrated in FIG. 4 (left figure), it is clear that the Langley antenna was designed to operate without a ground plane – Patent Owner's simulations without a ground plane substantially match those of Langley. Hashemi Declaration at ¶¶50-66.



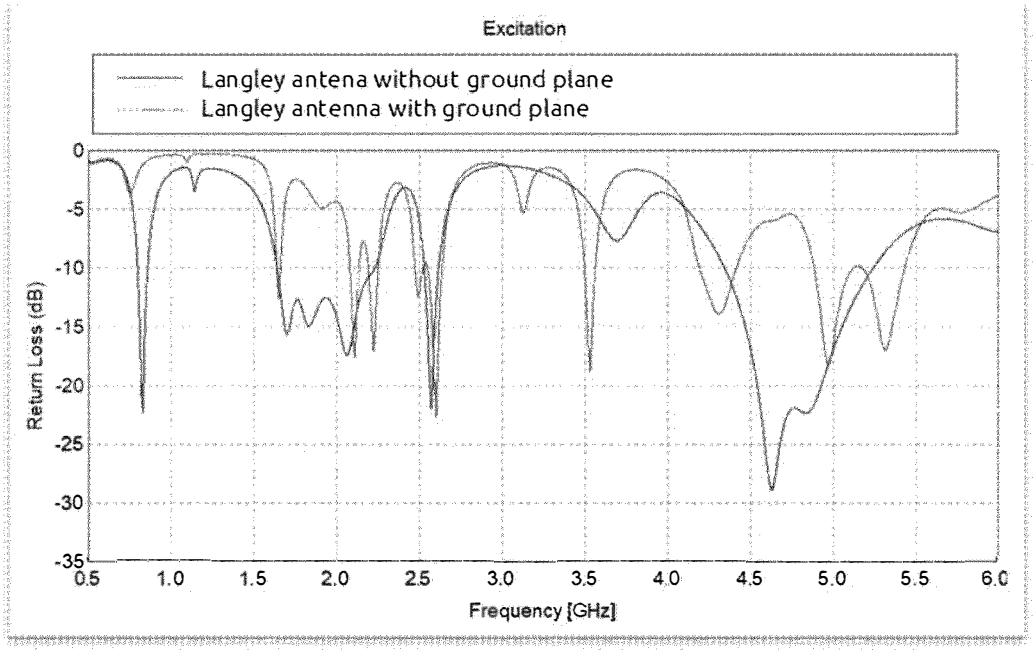


As illustrated above, the resonant frequencies in Patent Owner's simulations of Langley's antenna 1 without a ground plane substantially match those indicated in Langley, with resonant frequencies appearing around 700-800 MHz, 1700-2100 MHz, 2500 MHz and 4500-5200 MHz in both plots. Hashemi Declaration at ¶¶50-66.

This strong agreement between Patent Owner's simulations of Langley's antenna 1 without a ground plane and those provided in Langley validates that the antenna disclosed by Langley operates

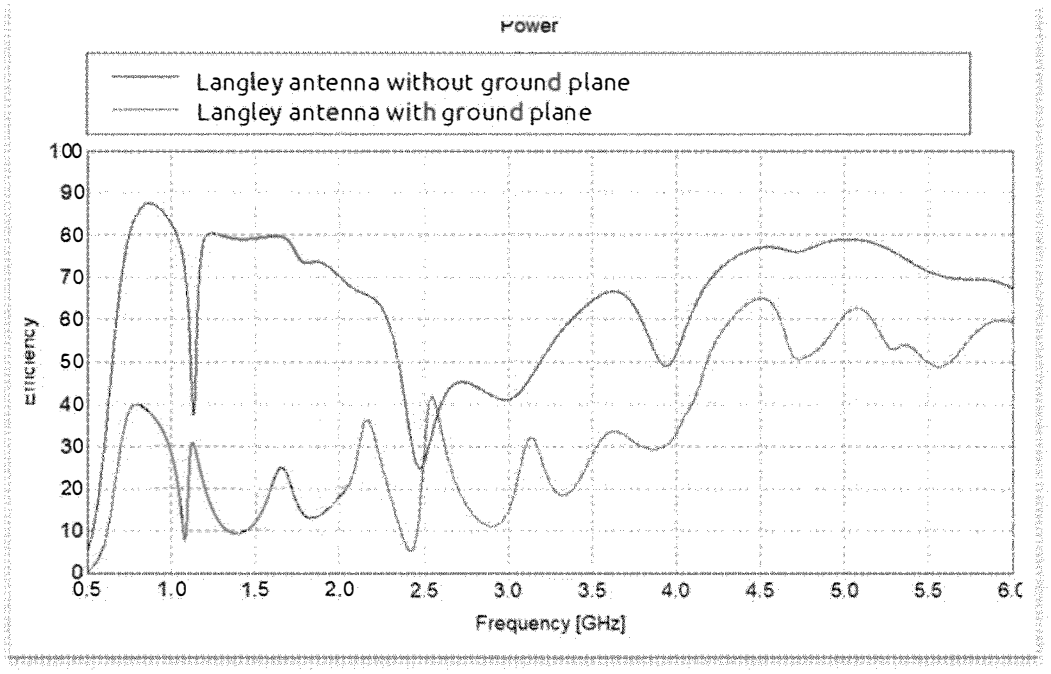
without a ground plane, particularly in the absence of any teaching or suggestion of a ground plane in the reference. Hashemi Declaration at ¶¶50-66.

Patent Owner's simulations of Langley *with* a ground plane, however, are substantially different from those disclosed in Langley. In Patent Owner's simulations with a ground plane, only the Bluetooth frequency band (~2500 MHz) and Hiperlan (5150-5725 MHz) are substantially preserved with similar performance characteristics for the return loss, as illustrated in the graph of return loss provided below. Hashemi Declaration at ¶¶50-66. The GSM900, DCS1800 and DECT frequency bands are lost when the Langley antenna is operated over a ground plane, and operation in the UMTS frequency band is limited to a small section of the band (2080-2130 MHz). Hashemi Declaration at ¶¶50-66. These simulations confirm that Langley's antenna 1 was designed to operate *without* a ground plane.



The differences in operation of Langley's antenna 1 with and without a ground plane are even more stark when viewed from the perspective of radiation efficiency. Hashemi Declaration at ¶¶50-66. The radiation efficiency of an antenna is defined as the ratio of the power radiated by an antenna to the power fed to the excitation port of the antenna. Hashemi Declaration at ¶¶50-66. As illustrated below in simulations provided by Patent Owner's expert, the radiation efficiency for the Langley antenna drops precipitously when the antenna is arranged over a ground plane, especially in the

regions of the frequency spectrum associated with the GSM 900, DCS 1800, DECT, UMTS and Bluetooth frequency bands. Hashemi Declaration at ¶¶50-66.



This design difference between Langley and Bolin is fatal to the obviousness of the proposed combination of the references as it changes the principle of operation of the Langley antenna – Langley's antenna 1 was designed to operate without a ground plane, but the grounds of rejection propose arranging it over a ground plane. Hashemi Declaration at ¶91. This would not have been an obvious modification to the Langley antenna. MPEP § 2143.

It is black letter law that "If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." MPEP § 2143.01(VI) *citing In re Ratti*, 270 F.2d 810, 813, (CCPA 1959). This is, however, precisely what the proposed rejections incorporating the Langley antenna 1 into the Bolin antenna system 1 are asking – take an antenna designed to operate as a dipole-like ½ wavelength antenna without a ground plane and incorporate it into a structure with a ground plane because doing so is, allegedly, a simple substitution. Hashemi Declaration at ¶91. This is not how the skilled artisan would have viewed the Bolin and Langley references. Hashemi Declaration at ¶91.

As illustrated through the simulations provided above, the skilled artisan would understand that the Langley antenna could not be incorporated into the Bolin antenna system 1 without a substantial reconstruction and redesign of the elements shown in Langley as well as a change in the basic principle under which the Langley antenna was designed to operate. Hashemi Declaration at ¶91. Contrary to the allegations in the grounds of rejection, the skilled artisan could not "merely replac[e] the first antenna (item 2) with the first antenna shown in FIGS. 2 and 3 of Langley." Office Action at 15; *see also* Office Action at 16; *see also* Hashemi Declaration at ¶91. This proposed mere substitution of the antenna pattern of Langley for the antenna pattern of Bolin could not be accomplished through a simple substitution, as illustrated through the simulations provided above. Hashemi Declaration at ¶¶50-66, 91. This proposed "simple substitution" would essentially "break" the Langley antenna, eliminating intended frequency bands of operation and precipitously lowering the radiation efficiency of the antenna. Hashemi Declaration at ¶¶50-66, 91. This "breaking" of the Langley antenna illustrates that the proposed combination would have been anything but "predictable." Hashemi Declaration at ¶¶50-66, 91.

As understood by the skilled artisan, "replacing the antenna pattern 2 of Bolin above with the antenna pattern shown in FIGS. 2 and 3 of Langley" would require a complete redesign of the Langley antenna in order for it to operate as intended with a ground plane. Hashemi Declaration at ¶91. The Langley antenna's principle of operation would need to be altered from that of a ½ wavelength antenna without ground plane to, for example, a ¼ wavelength antenna with a ground plane. Hashemi Declaration at ¶¶50-66, 91. This change in principle of operation would need to be accompanied by a complete reconstruction and redesign of the Langley antenna. Hashemi Declaration at ¶91. This would not have been an obvious combination. *See In re Ratti,* 270 F.2d 810, 813 (C.C.P.A. 1959) ("We hold, further, that the combination of Jepson with Chinnery et al. is not a proper ground for rejection of the claims here on appeal. This suggested combination of references would require a substantial reconstruction and redesign of the elements shown in Chinnery et al. as well as a change in the basic principles under which the Chinnery et al. construction was designed to operate."); *see also Ex Parte Alfred Yoakim, Youcef Ait Bouziad, Fabien Ludovic Agon, Alexandre Kollep & Gilles Gavillet,* No. APPEAL 2023-000207, 2024 WL 3084222, at *4 (P.T.A.B. June 20, 2024) ("Based on the foregoing, we find that modifying Navarro as proposed by the Examiner would require a change in the basic principles under which the [Navarro] construction was designed to operate. *In re Ratti*,

270 F.2d 810, 813 (CCPA 1959). For that reason, the obviousness rejection of claims 15-19, 22-24, 27, and 28 is not sustained.")(internal quotations omitted).

The arguments above regarding the combination of Langley with Bolin apply with equal force to the combination of Langley with Bolin and Rutfors and Langley with Ollikainen and Bolin. Hashemi Declaration at ¶92. Both of these grounds of rejection propose "simple substitutions" in which the Langley antenna is incorporated into a ground plane-based antenna system without any further modifications to the device. Hashemi Declaration at ¶92. As explained above in the context of the rejection based on Langley and Bolin, such a modification would essentially "break" the Langley antenna, eliminating intended frequency bands of operation and precipitously lowering the radiation efficiency of the antenna. Hashemi Declaration at ¶92.

In light of the above, Patent Owner submits that claim 11 patentably distinguishes over all of the grounds of rejection, and claim 12 patentably distinguishes over the grounds of rejection due *at least* to its dependence from claim 11, as well as its additionally recited features.

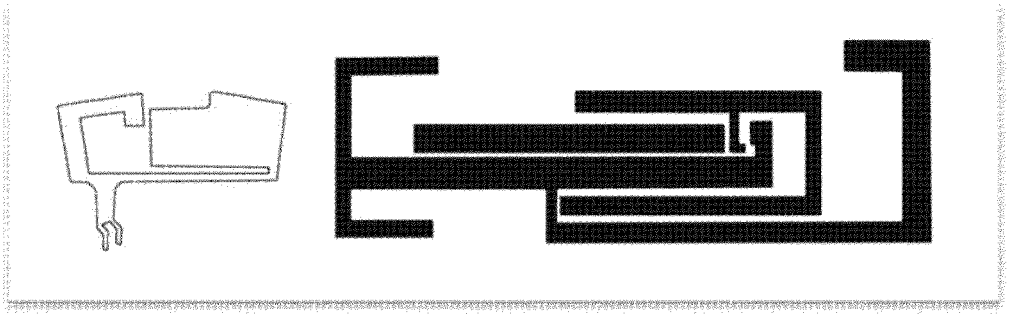
C. Langley's Antenna Does Not Fit in Bolin's Antenna System, Making a "Simple Substitution" of "Merely Replacing" Bolin's Main Antenna with Langley's Antenna Infeasible

As described above, Claim 11 has been rejected over Bolin in view of Langley based upon a "simple substitution" in which Bolin's main antenna 2 is wholesale replace by Langley's antenna 1. In other words, the grounds of rejection propose replacing the "main antenna 2" of Bolin with the antenna 1 of Langley *with no further modifications to Bolin, i.e., "while retaining the other structures and operation of the wireless device of Bolin."* Office Action at 15-16; *see also* Hashemi Declaration at ¶94. This is *not* a feasible combination for one simple reason: the Langley antenna 1 *does not fit in the wireless device of Bolin.* Hashemi Declaration at ¶94.

As noted in Bolin, "Usually the available space [in a wireless device] is very small—in fact, too small in reality [for the necessary antenna system]." Bolin at ¶ [0002]; *see also* Hashemi Declaration at ¶95. Bolin teaches that the available space is simply "too small in reality" to effectively fit a multiband antenna and a Bluetooth antenna in its wireless antenna system 1, and only through the close arrangement of antennas provided by its techniques can the antenna system 1 be included in the available space. *See* Bolin at ¶¶ [0020]-[0025]; *see also* Hashemi Declaration at ¶95. The problem with the proposed "simple substitution" in which the Langley antenna 1 replaces the main antenna 2 of Bolin "while retaining the other structures and operation of the wireless device of Bolin" is that

the Langley antenna 1 is *multiple times larger than the Bolin antenna that it is proposed to replace.* Hashemi Declaration at ¶95.

Provided below are scale drawings of Langley's antenna 1 (in blue) and Bolin's DCS part 5 and GSM part 4 (in red) created based on the specific dimensions included in the references. Bolin at FIG. 8; Langley at FIG. 2; Hashemi Declaration at ¶96. Langley's antenna 1 is approximately *two and a half time the size* of the portions of Bolin that it is intended to replace. Bolin states that, absent its techniques, the disclosed antenna system 1 does not fit in its wireless device. Bolin at ¶ [0002] ("Usually the available space is very small—in fact, too small in reality"); *see also* Hashemi Declaration at ¶96. Langley's antenna 1 *simply will not fit* in a "simple substitution" that "retain[s] the other structures and operation of the wireless device of Bolin." Hashemi Declaration at ¶96. This unavoidable fact would have been readily apparent to the skilled artisan at the time of invention. Hashemi Declaration at ¶96. Therefore, for this reason alone, the rejection based on the combination of Bolin with Langley cannot be maintained.



The problems with this rejection can also be viewed as relying on a modification of the Bolin wireless device that is contrary to the intended purpose of Bolin. Hashemi Declaration at ¶97. As explained throughout Bolin, the intended purpose of the reference is to be able to *reduce the size of the antenna system used in a portable communication device, such as a mobile phone*:

> [0002] **A basic problem of today is to be able to put one or several very small antennas on e.g. a mobile telephone. Main emphasis is put on size, but a good electrical performance is also important**. Now when Bluetooth™ applications have become a world standard, an additional frequency band must be covered in future mobile telephones. It is very hard to include this in an already existing antenna, most commonly a built-in antenna. Another way is to include a new antenna to handle Bluetooth™ communication. **Usually the available space is very small—in fact, too small in reality. The antennas will often have to be located very close to each other, since generally, the best position is at the top of the telephone**.

> [0021] **A significant advantage with the antenna system according to the present invention is the size reduction** that obtained by placing the antennas close together as well as the folding of the antenna patterns.
>
> [0024] **By arranging the antennas in this manner, it is possible to reduce the overall size of the antenna system compared to if the parasitic element was not present.** As can be understood, moving the antennas further apart, which would be necessary in the absence of the parasitic element, would increase the isolation between the main antenna and the Bluetooth™ antenna.

Bolin at ¶¶ [0002], [0021], [0024] (emphasis added); *see also* Hashemi Declaration at ¶97.

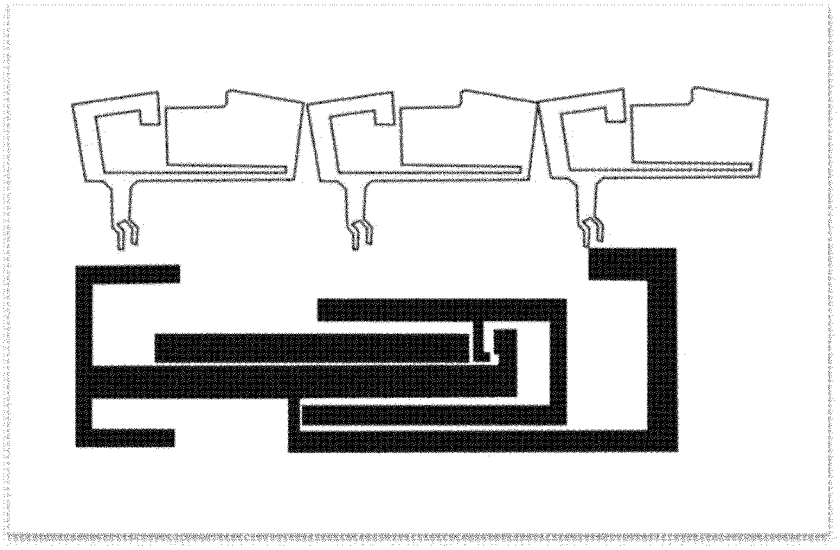
Given these clear teachings in Bolin, the skilled artisan would not have been motivated to modify the Bolin structure in a way that increases its size, much less increases its size by approximately two and a half times. Hashemi Declaration at ¶98. The grounds of rejection, perhaps unwittingly, would nevertheless require such a modification.

Specifically, the Office Action proposes a "simple substitution" in which:

> [I]t would have been obvious to use the first antenna of Langley as the first antenna in the wireless device of Bolin. This combination would simply imply using the other structures of Bolin shown in FIG. 1 of Bolin, but merely replacing the first antenna (item 2) with the first antenna shown in FIGS. 2 and 3 of Langley.

Office Action at 15; *see also* Hashemi Declaration at ¶99.

Making this "simple substitution" would increase the size of Bolin's antenna system 1 *substantially*. Hashemi Declaration at ¶100. As illustrated below, the antenna of Langley (illustrated in blue) is approximately two and a half times the length of the portion of Bolin that it replaces (illustrated three times in red) in the modification proposed in the grounds of rejection. Hashemi Declaration at ¶100.



As noted in the language from Bolin quoted above, the intended purpose of the Bolin antenna system 1 is to reduce the overall size of the antenna system. Bolin at ¶¶ [0002], [0021], [0024]; *see also* Hashemi Declaration at ¶101. It would, therefore, not have been obvious to substantially increase the size of the antenna system as proposed in the grounds of rejection. Hashemi Declaration at ¶101.

Furthermore, the Bolin teachings are a clear teaching away from the alleged "simple substitution" that would result in a *substantial* increase in the size of the antenna system. Bolin is clear – at the time of invention, the space available for the antenna systems in mobile phones was "in fact, too small in reality" to fit antenna systems substantially larger than those disclosed in Bolin. Therefore, the skilled artisan would have been discouraged from combining the Langley antenna 1, which is multiples larger than the structure it is supposed to replace, with the remainder of the Bolin antenna system 1. Hashemi Declaration at ¶101. "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." *Ricoh Co., Ltd. v. Quanta Computer Inc*., 550 F.3d 1325, 1332 (Fed. Cir. 2008) (quoting *In re Kahn*, 441 F.3d 977, 990 (Fed.Cir.2006)); *see also DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc*., 567 F.3d 1314, 1327 (Fed. Cir. 2009). The teachings of Bolin would have clearly discouraged the skilled artisan from replacing its main antenna 2 in its antenna system 1 with the Langley antenna 1, and therefore, the proposed combination would not have been obvious.

To make the sizes of Bolin's antenna system 1 and Langley's antenna 1 compatible, one would have needed to drastically shrink Langley's antenna 1. Hashemi Declaration at ¶103. Not only is

such a modification not contemplated by the rejections, which are based on a "simple substitution" involving "merely replacing," such a modification would not have been obvious. Hashemi Declaration at ¶103. For example, any attempt to scale Langley's antenna 1 to operate in the space available in the Bolin wireless device would substantially change the operation of the Langley device, altering the frequencies at which the antenna operates and introducing coupling between the Langley fingers that would render the operating characteristics of the antenna unpredictable. Hashemi Declaration at ¶100. Specifically, altering the shape of the fingers would change their electromagnetic performance, and therefore, change their frequency bands of operation. Hashemi Declaration at ¶103. Altering the spacing between the fingers would result in different coupling between fingers, altering the electromagnetic performance of the fingers. Hashemi Declaration at ¶103. Such an unpredictable modification should not be set forth or maintained. MPEP § 2143 ("If results would not have been predictable, Office personnel should not enter an obviousness rejection using the combination of prior art elements rationale, and should withdraw such a rejection if it has been made.").

The arguments above regarding the combination of Langley with Bolin apply with equal force to the combination of Langley with Bolin and Rutfors as well as the combination of Langley with Ollikainen and Bolin. Hashemi Declaration at ¶104. With regard to the rejection that includes Rutfors, Rutfors was included in the combination of references for the sole purpose of including a reference with an explicit disclosure of a ground plane. Office Action at 17; *see also* Hashemi Declaration at ¶104. Rutfors does nothing to remedy the above-described deficiencies in the combination of Bolin and Langley. Hashemi Declaration at ¶104.

With regard to the combination of Ollikainen, Langley and Bolin, the grounds of rejection propose another "simple substitution" in which:

> [O]ne having ordinary skill in the art could have substituted the antenna pattern of Langley for the antenna pattern in Ollikainen as such would merely be replacing the antenna pattern 10/20/30 of Ollikainen above with the antenna pattern shown in FIGS. 2 and 3 of Langley on the defined antenna rectangle, **while retaining the other structures and operation of the wireless device of Ollikainen**.

Office Action at 24 (emphasis added); *see also* Hashemi Declaration at ¶105.

Like Bolin, Ollikainen is specifically concerned with decreasing the size of its antenna structure:

> [0002] The development of small antennas for mobile phones has recently received much attention due to size reduction of the handsets,

> requirements to keep the amount of radiofrequency (RF) power absorbed by a user below a certain level regardless of the handset size, and introduction of multi-mode phones.
>
> ...
>
> [0004] Currently, the antenna is one of the largest parts in a mobile phone. In order to fit more antenna elements with acceptable performance in the available space, there is an ongoing effort to reduce their physical size.

Ollikainen at ¶¶ [0002], [0004]; *see also* Hashemi Declaration at ¶106.

Also like Bolin, the first, second and third radiating elements of the Ollikainen antenna 1 are substantially smaller than the Langley antenna 1 that replaces them. Hashemi Declaration at ¶107. Ollikainen does not provide explicit dimensions for its antenna 1. Hashemi Declaration at ¶107. However, it does provide the frequencies at which its antenna elements operate. Hashemi Declaration at ¶107. As understood by the skilled artisan, an antenna's size is directly tied to the frequencies at which it operates. Hashemi Declaration at ¶107. Illustrated in an annotated version of Ollikainen's FIG. 2 is the electrical length (in green) of second planar radiating element 20. Ollikainen at 4:29-40; Hashemi Declaration at ¶107. Ollikainen is a ¼ wavelength antenna as indicated by it being a short-circuited patch antenna. Hashemi Declaration at ¶17. With a resonating frequency of 880 MHz (i.e., the frequency with the longest wavelength), the electrical length of this second planar radiating element 20 would be approximately 85 mm. Hashemi Declaration at ¶107. Assuming *arguendo* an approximate aspect ratio of 2:1 (*see* Office Action at 19), the dimensions of the Ollikainen antenna 1 are on the order 20 mm by 40 mm. This is substantially smaller than the 29 mm by 94 mm dimensions of the Langley antenna 1 illustrated in FIG. 2 of the reference. Hashemi Declaration at ¶107.

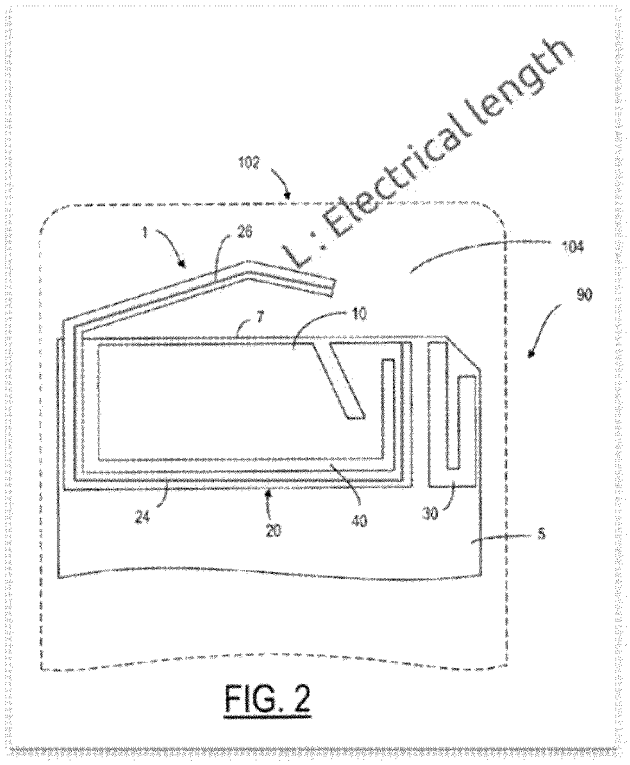


FIG. 2

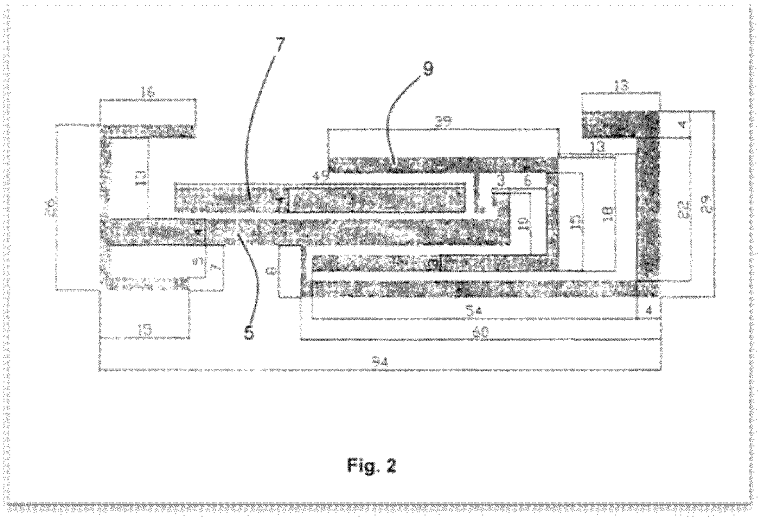


Fig. 2

Accordingly, similar to the reasoning provided above for the rejection based on the combination of Bolin and Langley, a combination of Bolin, Langley and Ollikainen would have similarly failed to render the claims of the '200 Patent obvious. Hashemi Declaration at ¶108.

In light of the above, Patent Owner submits that claim 11 patentably distinguishes over all of the grounds of rejection, and claim 12 patentably distinguishes over the grounds of rejection due *at least* to its dependence from claim 11, as well as its additionally recited features. Hashemi Declaration at ¶109.

D. Removing the PCS Part 6 from Bolin Would Have Rendered Bolin's Antenna System Unsuitable for its Intended Purpose

The rejection combining the Langley antenna 1 with the Bolin antenna system 1 includes the removal of the entirety of Bolin's main antenna 2. Office Action at 15 ("This combination would simply imply using the other structures of Bolin shown in FIG. 1 of Bolin, but **merely replacing the first antenna (item 2) with the first antenna shown in FIGS. 2 and 3 of Langley**.")(emphasis added); *see also* Hashemi Declaration at ¶110. As illustrated in FIG. 1 from Bolin (reproduced below), main antenna 2 (or "item 2" in the terms used in the Office Action) includes DCS part 5, GSM part 4 and PCS part 6. *See also* Bolin at ¶¶ [0020]-[0022]; *see also* Hashemi Declaration at ¶110. Removing PCS part 6 in order to combine Langley with Bolin, however, would have rendered the combined antenna system unsuitable for the intended purpose of Bolin. Hashemi Declaration at ¶110. Specifically, it is the PCS part 6 that allows for the placement of the Bluetooth antenna 3 in close proximity to the other antenna contained within antenna system 1. Hashemi Declaration at ¶110. Bolin describes the object of the reference as follows:

> It is an object of the present invention to propose a very compact multi band, multi antenna system, with a cheap and sophisticated mechanical concept to get good isolation by clever design of a parasitic element as a high impedance block.

Bolin at ¶ [0006]; *see also* Hashemi Declaration at ¶110.

It is PCS part 6 that is the "clever[ly] designed" parasitic element that serves as a high impedance block. Hashemi Declaration at ¶111. Accordingly, it would not have been obvious to the skilled artisan to combine the references as proposed in the grounds of rejection in a way that removes PCS part 6. Hashemi Declaration at ¶111.

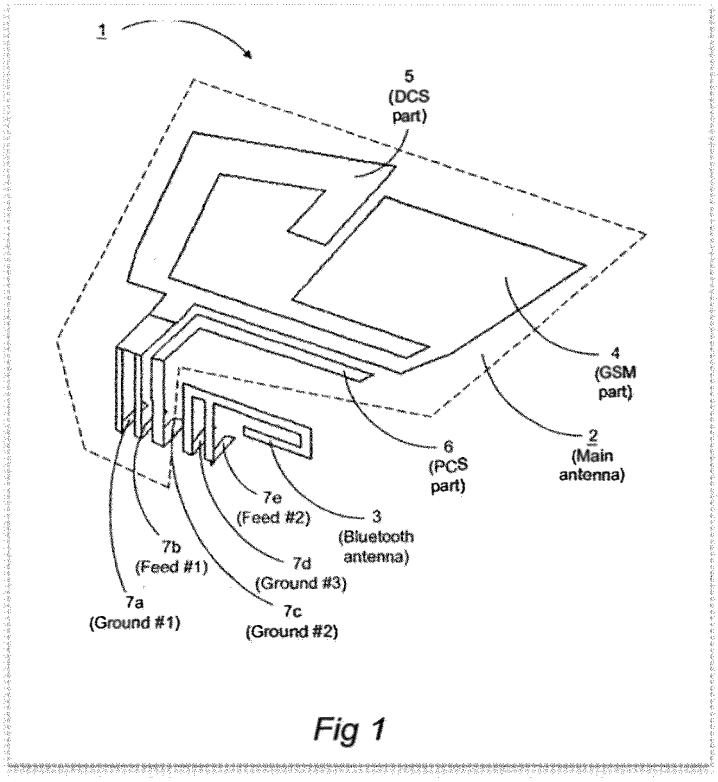


Fig 1

By way of background, the Bolin antenna system 1 includes four radiating portions – DCS part 5 (which operates at the DCS frequency band), GSM part 4 (which operates at the GSM frequency band), PCS part 6 (which operates at the PCS frequency band), and Bluetooth antenna 3 (which operates at the Bluetooth frequency band). Hashemi Declaration at ¶112. PCS part 6, however, also has another function – PCS part 6 acts as a high impedance blocking between Bluetooth antenna 3 and main antenna 2. Hashemi Declaration at ¶112. PCS part 6 is what makes the close placement of Bluetooth antenna 3 and main antenna 2 possible. Hashemi Declaration at ¶112. Absent PCS part 6, Bolin teaches that it would be necessary to substantially separate Bluetooth antenna 3 from the rest of the antenna system 1. Hashemi Declaration at ¶112. Or, as explained in the reference:

> The metal trace of the parasitic PCS part 6 is located between the main antenna 2 and the Bluetooth™ antenna 3. It is resonant at PCS 1900 MHz, about 1/4 wavelength, and **will function as a high impedance blocking between the main antenna 2 and the Bluetooth™ antenna 3**.
>
> **By arranging the antennas in this manner, it is possible to reduce the overall size of the antenna system compared to if the parasitic element was not present.** As can be understood, **moving the**

> **antennas further apart, which would be necessary in the absence of the parasitic element,** would increase the isolation between the main antenna and the Bluetooth™ antenna.

Bolin at ¶¶ [0023]-[0024] (emphasis added); *see also* Hashemi Declaration at ¶112.

Accordingly, it is the presence of the PCS part 6 that allows the Bluetooth antenna 3 to be placed close to main antenna 2. Hashemi Declaration at ¶113. Absent PCS part 6 it would be "*necessary"* to space Bluetooth antenna 3 further from the rest of the antenna system. Hashemi Declaration at ¶113. This is, however, precisely what the grounds of rejection propose: "This combination would … **merely replac[e] the first antenna (item 2) [of Bolin which includes PCS part 6] with the first antenna shown in FIGS. 2 and 3 of Langley**." Office Action at 15 (emphasis added); *see also* Hashemi Declaration at ¶113. Such a replacement is a non-obvious modification of the references. Hashemi Declaration at ¶113.

It is well recognized that a proposed modification cannot render the prior art device inoperable for its intended purpose. MPEP § 2141. As discussed above, the intended purpose of Bolin is to be able to place its Bluetooth antenna 3 close to its main antenna 2 to provide for a compact antenna system. Bolin at ¶¶ [0023]-[0024]; *see also* Hashemi Declaration at ¶114. The grounds of rejection propose removing PCS part 6, the portion of the Bolin device that allows for this close placement of the two antennas. By removing the PCS part 6, it is "*necessary*" to increase the distance between the Bluetooth antenna and the rest of the antenna system. Bolin at ¶ [0024]; *see also* Hashemi Declaration at ¶114. Because PCS part 6 is absent in the combination, which *necessitates* providing added space between Bluetooth antenna 3 and the rest of the antenna system, the proposed combination would render the resulting antenna device unsuitable for Bolin's intended purpose of being able to place Bluetooth antenna 3 close to the rest of the antenna system. Hashemi Declaration at ¶114.

The proposed combination also relies on rationales that are contrary to the teachings of the references, and therefore, would have been non-obvious combinations for failing to provide a *rational* underpinning for the obviousness conclusion. MPEP § 2141.III ("*In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006), stated that '[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.'"); *see also KSR Int'l Co. v. Teleflex Inc*., 550 U.S. 398, 418 (2007); *see also* Hashemi Declaration at ¶115.

Specifically, in setting forth the grounds of rejection the "Examiners [found] that one having ordinary skill would apply the improvement of the multi-band antenna of Langley to Bolin to achieve

the predictable result of a wireless device that is capable of operating on additional wireless bands **while offering good isolation between its multi-band antenna and its Bluetooth antenna**." Office Action at 16 (emphasis added); *see also* Hashemi Declaration at ¶115. This "rationale" is, in fact, irrational, as the proposed combination explicitly removes the portion of Bolin that provides the "good isolation between its multi-band antenna and its Bluetooth antenna." Hashemi Declaration at ¶115.

The proposed rejection is further based on the Examiners "not find[ing that] the general operation of Bolin would be affected by the proposed modification to use the antenna pattern of Langley [in place of Bolin's main antenna 2]." Office Action at 16. This is simply incorrect, and therefore, fails to provide the required rational underpinning for the obviousness conclusion. Replacing the main antenna 2 of Bolin with the Langley antenna 1 would *significantly* affect the operation of Bolin antenna system 1 as the grounds of rejection propose a "simple substitution" in which the isolating PCS part 6 is removed as part of the modification. Office Action at 15-16; Hashemi Declaration at ¶116. The skilled artisan would have understood that removing the isolating PCS part 6, without more, would have resulted in interference between the Langley antenna 1 and Bolin's Bluetooth antenna 3. *See, e.g.,* Bolin at ¶ [0024] ("moving the antennas further apart … would be necessary in the absence of the parasitic element"); Hashemi Declaration at ¶116. This interference would greatly affect the operation of the antenna system 1, rendering it unsuitable for its intended purpose. Hashemi Declaration at ¶116. Furthermore, this interference would be particularly problematic given that the Langley antenna operates in the Bluetooth frequency band (*see* section III.B, *supra).* Hashemi Declaration at ¶116

Accordingly, Patent Owner respectfully submits that the arguments set forth above illustrate that the proposed combination of Bolin and Langley would not have been obvious at the time of invention. Therefore, claim 11 patentably distinguishes over the cited art.

Patent Owner also submits that the above-described issues in the rejection based on Bolin and Langley are equally fatal to the rejections of claim 11 based upon Bolin, Langley and Rutfors and Ollikainen, Langley and Bolin. Hashemi Declaration at ¶117. With regard to the rejection that includes Rutfors, Rutfors was included for the sole purpose of including a reference with an explicit disclosure of a ground plane. Office Action at 17; *see also* Hashemi Declaration at ¶117. Rutfors does nothing to remedy the above-described deficiencies in the combination of Bolin and Langley. Hashemi Declaration at ¶117. Furthermore, like Bolin, Rutfors teaches that a shielding or isolating element is necessary to closely arrange separate radiating structures. Rutfors at ¶ [0005]; *see also*

Hashemi Declaration at ¶117. The proposed combination provides no such structure, and instead, *removes* the Bolin isolating PCS part 6. Hashemi Declaration at ¶117. Such a combination would not have been obvious to the skilled artisan based on the teachings of Bolin and Rutfors. Hashemi Declaration at ¶117.

With regard to the combination of Ollikainen, Langley and Bolin, the grounds of rejection allege that the Bolin Bluetooth antenna 3 could be added to the Ollikainen/Langley combination without affecting the operation of the Ollikainen/Langley structure:

> Examiners further find that this combination [of the Bolin Bluetooth antenna with the Ollikainen/Langley combination] would be predictable because the combination **would not affect the operation of Ollikainen or Langley**, but rather would increase the operational frequencies thereto to further include Bluetooth.

Office Action at 27 (emphasis added); *see also* Hashemi Declaration at ¶118.

As discussed above, including the Bolin Bluetooth antenna 3 without also including the isolating PCS part 6 would substantially affect the operation of Ollikainen and Langley due to interference between the antenna structures caused by the lack of isolation. *See* Bolin at ¶¶ [0023]-[0024]; *see also* Hashemi Declaration at ¶118. This interference would be particularly problematic to the Ollikainen/Langley combination due to the presence of the additional Bluetooth antenna in the Ollikainen/Langley combination. Hashemi Declaration at ¶118.

In light of the above, Patent Owner submits that claim 11 patentably distinguishes over all of the grounds of rejection, and claim 12 patentably distinguishes over the grounds of rejection due *at least* to its dependence from claim 11, as well as its additionally recited features.

VII. RESPONSE TO OBVIOUSNESS-TYPE DOUBLE PATENTING REJECTIONS

Claims 11 and 12 were rejected under non-statutory obviousness-type double patenting grounds as being unpatentable over claims of the '810 Patent in view of Langley. To expedite the present reexamination, Patent Owner is concurrently filing a terminal disclaimer disclaiming the terminal part of the statutory term of the '200 Patent, which would extend beyond the expiration date of the full statutory term of the '810 Patent. Patent Owner respectfully asserts that this rejection has been obviated by the filing of the terminal disclaimer. The submission of the terminal disclaimer is not an admission that the claims of the '810 Patent in view of Langley as applied by the Examiners are substantively sufficient to support the Examiners' rejection. Patent Owner does not waive any right to take alternative action in the future and notes that the filing of the present terminal disclaimer

does not constitute an admission that the rejected claims would have been obvious over the claims of the '810 Patent in view of Langley. *See Quad Env't Techs. Corp. v. Union Sanitary Dist.,* 946 F.2d 870, 874 (Fed. Cir. 1991) ("the filing of a terminal disclaimer simply serves the statutory function of removing the rejection of double patenting, and raises neither presumption nor estoppel on the merits of the rejection.").

Claims 11 and 12 were provisionally rejected under non-statutory obviousness-type double patenting grounds as being unpatentable over claims of the '523 Patent in view of Langley. To expedite the present reexamination, Patent Owner is concurrently filing a terminal disclaimer disclaiming the terminal part of the statutory term of the '200 Patent, which would extend beyond the expiration date of the full statutory term of any patent issuing from the '523 Application. Patent Owner respectfully asserts that this rejection has been obviated by the filing of the terminal disclaimer. The submission of the terminal disclaimer is not an admission that the claims of the '523 Application in view of Langley as applied by the Examiners are substantively sufficient to support the Examiners' rejection. Patent Owner does not waive any right to take alternative action in the future and notes that the filing of the present terminal disclaimer does not constitute an admission that the rejected claims would have been obvious over the claims of the '523 Application in view of Langley. *See Quad Env't Techs. Corp.,* 946 F.2d at 874.

VIII. CONCLUSION

For the reasons stated in the foregoing arguments, Patent Owner submits that the proposed combinations of the cited references would not have been obvious at the time of invention. Confirmation of the patentability of claims 11 and 12 is respectfully requested.

No fee is believed due for the present submission. In the event that the Commissioner determines that an additional fee is required for consideration of the present submission, the U.S. Patent and Trademark Office is hereby authorized to charge any LARGE ENTITY fee deficiency, or credit any overpayment, to Deposit Account No. 05-0460 referencing docket number 0690.0065L.

Dated: August 14, 2024

Respectfully submitted:

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Control No.	: 90/019,275	Patent	: 11,349,200
Filing Date	: October 12, 2023	Issue Date	: May 31, 2022
Confirmation No.	: 7433	Title:	: Multiple-Body-Configuration Multimedia and Smartphone Multifunction Wireless Devices
		TC/A.U.	: Central Reexamination Unit : 3992
		Examiner	: Kenneth WHITTINGTON
		Customer No.	: 27896
		Docket No.	: 0690.0065L

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PATENT OWNER'S RESPONSE TO THE NON-FINAL OFFICE ACTION

In response to the Non-Final Office Action ("Office Action") mailed on May 31, 2024, the Patent Owner Fractus, S.A. (hereinafter referred to as "Patent Owner"), presents the following remarks in the above-captioned reexamination proceedings of Patent No. 11,349,200 (hereinafter "the '200 patent").

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Cases

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Ex Parte Alfred Yoakim, Youcef Ait Bouziad, Fabien Ludovic Agon, Alexandre Kollep & Gilles Gavillet, No. APPEAL 2023-000207, 2024 WL 3084222, at *4 (P.T.A.B. June 20, 2024) 26

In re Kahn, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006) 18, 36

In re Ratti, 270 F.2d 810, (CCPA 1959) 25, 26, 27

KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398 (2007) 18, 36

Quad Env't Techs. Corp. v. Union Sanitary Dist., 946 F.2d 870 (Fed. Cir. 1991) 39

Ricoh Co., Ltd. v. Quanta Computer Inc., 550 F.3d 1325 (Fed. Cir. 2008) 30

Statutes

35 U.S.C. §103(a) (pre-AIA) 5, 17

Other Authorities

MPEP § 2141 ..... 18, 36

MPEP § 2143 ..... 25, 31

LISTING OF THE CLAIMS

This listing includes only claims subject to this reexamination proceeding.

11. (pending) A wireless device comprising:

an antenna system comprising a ground plane and at least two antennas within the wireless device, the antenna system comprising:

a first antenna configured to provide operation in at least three frequency bands being used by 4G communication standards, the first antenna defining an antenna contour comprising an entire perimeter of the first antenna, the antenna contour comprising at least twenty segments, wherein the antenna contour has a level of complexity defined by complexity factor F21 having a value of at least 1.20 and complexity factor F32 having a value of at least 1.35, and wherein the first antenna defines an antenna box that is a minimum-sized parallelepiped that completely encloses a volume of the first antenna and wherein each face of the minimum-sized parallelepiped is tangent to at least one point of the volume of the first antenna, an orthogonal projection of the antenna box along a normal to a face with a largest area of the first antenna defining an antenna rectangle, an aspect ratio of the antenna rectangle being defined as a ratio between a width and a height of the antenna rectangle, wherein the aspect ratio has a value of at least 2; and

a second antenna configured to provide operation in a first wireless service, the second antenna being proximate to a side of a ground plane rectangle enclosing the ground plane.

12. (pending) The wireless device of claim 11, wherein the first antenna is configured to support at least four frequency bands.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Filing Date	: October 12, 2023	Issue Date	: May 31, 2022
Confirmation No.	: 7433	Title:	: Multiple-Body-Configuration Multimedia and Smartphone Multifunction Wireless Devices
		TC/A.U.	: Central Reexamination Unit : 3992
		Examiner	: Kenneth WHITTINGTON
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11. (pending) A wireless device comprising:

an antenna system comprising a ground plane and at least two antennas within the wireless device, the antenna system comprising:

a first antenna configured to provide operation in at least three frequency bands being used by 4G communication standards, the first antenna defining an antenna contour comprising an entire perimeter of the first antenna, the antenna contour comprising at least twenty segments, wherein the antenna contour has a level of complexity defined by complexity factor F21 having a value of at least 1.20 and complexity factor F32 having a value of at least 1.35, and wherein the first antenna defines an antenna box that is a minimum-sized parallelepiped that completely encloses a volume of the first antenna and wherein each face of the minimum-sized parallelepiped is tangent to at least one point of the volume of the first antenna, an orthogonal projection of the antenna box along a normal to a face with a largest area of the first antenna defining an antenna rectangle, an aspect ratio of the antenna rectangle being defined as a ratio between a width and a height of the antenna rectangle, wherein the aspect ratio has a value of at least 2; and

a second antenna configured to provide operation in a first wireless service, the second antenna being proximate to a side of a ground plane rectangle enclosing the ground plane.

12. (pending) The wireless device of claim 11, wherein the first antenna is configured to support at least four frequency bands.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/019,275	10/12/2023	11349200	SKAD002	7433

27896 7590 07/25/2024
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EXAMINER
WHITTINGTON, KENNETH

ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
07/25/2024	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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ONE MANHATTAN WEST
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NEW YORK, NEW YORK 10001

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/019,275* .

PATENT UNDER REEXAMINATION *11349200* .

ART UNIT *3992* .

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

PTOL-465 (Rev.07-04)

INTERVIEW SUMMARY CONTINUATION SHEET

Mr. Patrick Finnan (Reg. 39189) also attended the interview.

Patent Owner's representative, Mr. DeBoy, requested the interview to discuss the non-final Office action mailed May 31, 2024 (hereinafter the "**2024 NF Action**"). Mr. DeBoy also provided an agenda, a copy of which is attached (hereinafter the "**Agenda**"). Furthermore, copies of email communications between the Examiners and Mr. DeBoy are attached to this Interview Summary.

In the Agenda, Patent Owner provided generally four arguments traversing the rejections provided in the 2024 NF Action. The summary of each such argument and the discussion related thereto will be taken in turn.

A first argument asserted by Patent Owner was that replacing the smaller antenna structure of Bolin with the larger antenna structures of Langley "seems decidedly nonobvious." Examiners disagree as simply change in size alone was not a sufficient reason to overcome an obviousness rejection. Examiners further noted that one having ordinary skill in the art would understand that replacing a three-frequency antenna with a five-frequency antenna would necessarily change the structure and possibly the size of the antenna.

A second argument by Patent Owner was that the PCS part 6 of Bolin, which provides isolation between the first antenna and second antenna of Bolin, was necessary in Bolin and was removed via the combinations proposed in the 2024 NF Action. Examiners did not find this argument persuasive. As noted in ¶0024 of Bolin, this PCS part 6 was necessary when the first and second antenna were too close

together, which Examiners finds Bolin also implies that it may not be necessary when the antennas are properly spaced.

A third argument by Patent Owner was that in each of the combinations provided in the 2024 NF Action, the resulting combination would have two Bluetooth frequency antennas, which would be redundant and possibly create interfering antenna and rendering the Bolin Bluetooth antenna unsuitable for its intended purpose. Examiners did find this argument persuasive. Examiners agree that one having ordinary skill in the art would not combine these references as proposed in the combination to provide a wireless device with two such antennas. Furthermore, Examiners would not find the combination predictable because such redundant antennas would likely interfere with each other.

A fourth argument by Patent Owner was that placing the Langley antenna structure over the ground plane in the combinations as proposed in the 2024 NF Action would not work as intended because the antenna of Langley was designed "for use without a ground plane." Mr. DeBoy further noted that experiments were conducted by Patent Owner to illustrate that the combination would not operate as intended. Examiners agreed in part. Examiners did not find such an argument persuasive based solely on the disclosures of Langley and Bolin. Thus, Examiners found that Patent Owner for this argument is relying on extrinsic evidence to illustrate the inoperability of the proposed combination. Thus, Examiners suggested and Mr. DeBoy agreed that submission of such extrinsic evidence via a declaration would substantiate such an argument which may overcome the combinability of the references as proposed in the 2024 NF Action.

Any inquiry concerning this communication or earlier communications from the Reexamination Legal Advisor or Examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

Signed:

/KENNETH WHITTINGTON/
Primary Examiner, Art Unit 3992

Conferees:

/JAMES A MENEFEE/
Reexamination Specialist, Art Unit 3992

/H.B.P/
Hetul Patel
Supervisory Patent Reexamination Specialist, Art Unit 3992

Control No.	Patent Under Reexamination	
90/019,275	11349200	
Examiner	**Art Unit**	**AIA (FITF) Status**
KENNETH WHITTINGTON	3992	No

Ex Parte Reexamination Interview Summary

All participants (USPTO personnel, patent owner, patent owner's representative):

(1) KENNETH WHITTINGTON.

(2) Hetul Patel (SPE AU3992)

(3) James Menefee (Primary AU3992)

(4) Mark J. DeBoy (Reg. 66983)

Date of Interview: 19 July 2024

Type: a) ☐ Telephonic b) ☑ Video Conference
c) ☐ Personal (copy given to: 1) ☐ patent owner 2) ☐ patent owners representative)

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☑ No.
If Yes, brief description: ____

Agreement with respect to the claims f) ☐ was reached. g) ☑ was not reached. h) ☐ N/A.
Any other agreement(s) are set forth below under "Description of the general nature of what was agreed to..."

Claim(s) discussed: 11-12 .

Identification of prior art discussed: all art applied in the outstanding Office action .

Description of the general nature of what was agreed to if an agreement was reached, or any other comments: see attached INTERVIEW SUMMARY CONTINUATION SHEET .

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims patentable, if available, must be attached. Also, where no copy of the amendments that would render the claims patentable is available, a summary thereof must be attached.)

A FORMAL WRITTEN RESPONSE TO THE LAST OFFICE ACTION MUST INCLUDE PATENT OWNER'S STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. (See MPEP § 2281). IF A RESPONSE TO THE LAST OFFICE ACTION HAS ALREADY BEEN FILED, THEN PATENT OWNER IS GIVEN **ONE MONTH** FROM THIS INTERVIEW DATE TO PROVIDE THE MANDATORY STATEMENT OF THE SUBSTANCE OF THE INTERVIEW
(37 CFR 1.560(b)). THE REQUIREMENT FOR PATENT OWNERS STATEMENT CAN NOT BE WAIVED.
EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).

/KENNETH WHITTINGTON/	/JAMES A MENEFEE/	/H.B.P/ Hetul Patel
Primary Examiner, Art Unit 3992	Reexamination Specialist, Art Unit 399	SPRS, Art Unit 3992

cc: Requester (if third party requester)

From: Whittington, Kenneth J. (AU3992)
To: Mark J. DeBoy
Cc: Patrick Finnan
Subject: RE: Interview for reexamination 90/019275
Date: Friday, July 19, 2024 10:47:00 AM
Attachments: image001.png

Howdy. Glad we got the interview in.

Forgot to state during the interview but please be sure to provide an Interview Summary. Your summary must be filed either as a separate paper within one month after the date of the interview, or as a separate part of a response to an outstanding Office action, whichever is later. See MPEP 2281.

Thanks,

Ken W.

Kenneth J. Whittington
Primary Examiner AU3992
kenneth.whittington1@uspto.gov
(571)272-2264

From: Mark J. DeBoy <mdeboy@esfip.com>
Sent: Thursday, July 18, 2024 10:18 AM
To: Whittington, Kenneth J. (AU3992) <Kenneth.Whittington@USPTO.GOV>
Cc: Patrick Finnan <pfinnan@esfip.com>
Subject: RE: Interview for reexamination 90/019275

CAUTION: This email has originated from a source outside of USPTO. **PLEASE CONSIDER THE SOURCE** before responding, clicking on links, or opening attachments.

Dear Examiner Whittington,

Please find the attached Agenda for tomorrow's interview in the above-referenced *ex parte* reexamination.

Please let me know if you have any questions or concerns.

Best regards,
Mark

Mark J. DeBoy
Partner

ESF IPLAW

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From: Whittington, Kenneth J. (AU3992) <Kenneth.Whittington@USPTO.GOV>
Sent: Tuesday, July 9, 2024 12:10 PM
To: Mark J. DeBoy <mdeboy@esfip.com>
Cc: Patrick Finnan <pfinnan@esfip.com>
Subject: RE: Interview for reexamination 90/019275

Once again a conflict. Can we move it from 11am to 10am Friday (7/19)?

Ken W.

Kenneth J. Whittington
Primary Examiner AU3992
kenneth.whittington@uspto.gov
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From: Mark J. DeBoy <mdeboy@esfip.com>
Sent: Tuesday, July 9, 2024 10:01 AM
To: Whittington, Kenneth J. (AU3992) <Kenneth.Whittington@USPTO.GOV>
Cc: Patrick Finnan <pfinnan@esfip.com>
Subject: RE: Interview for reexamination 90/019275

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Dear Examiner Whittington,

That time on Friday the 19th works for us.

Thank you!
Mark

Mark J. DeBoy
Partner

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From: Whittington, Kenneth J. (AU3992) <Kenneth.Whittington@USPTO.GOV>
Sent: Tuesday, July 9, 2024 9:47 AM
To: Mark J. DeBoy <mdeboy@esfip.com>
Subject: RE: Interview for reexamination 90/019275

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Doh! Hard to get so many people in one place at the same time. How about this Friday (7/19) at 11am?

Ken W.

Kenneth J. Whittington
Primary Examiner AU3992
kenneth.whittington@uspto.gov
(571)272-2264

From: Mark J. DeBoy <mdeboy@esfip.com>
Sent: Tuesday, July 9, 2024 9:39 AM
To: Whittington, Kenneth J. (AU3992) <Kenneth.Whittington@USPTO.GOV>; Patel, Hetul <Hetul.Patel@USPTO.GOV>; Corsaro, Nick <Nick.Corsaro@USPTO.GOV>
Cc: Patrick Finnan <pfinnan@esfip.com>
Subject: Interview for reexamination 90/019275

CAUTION: This email has originated from a source outside of USPTO. **PLEASE CONSIDER THE SOURCE** before responding, clicking on links, or opening attachments.

Dear Examiners Whittington, Petal and Corsaro,

First, thank you for including me on the meeting invites for this case. It is much easier than playing telephone tag, as often happens when trying to schedule interviews.

I am writing because there is another attorney working on this case, Pat Finnan (copied here), who cannot make the Monday, July 15th, 11AM time that was recently proposed. Pat is travelling for portions of Monday, making it difficult for him to join that meeting. Would it be possible to find another time on Tuesday?

Thank you!
Mark

Mark J. DeBoy
Partner

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		Docket No.	: 0690.0065L

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Alexandria, VA 22313-1450

INTERVIEW AGENDA

For Discussion Purposes Only

Dear Examiner Whittington,

Please find the following agenda for the examiner interview in *Ex Parte* Reexamination Control No. 90/019,275.

Dated: July 18, 2024

Respectfully submitted by:

EDELL, SHAPIRO & FINNAN, LLC
CUSTOMER NO. 27896
9801 Washingtonian Blvd., Suite 750
Gaithersburg, MD 20878
(301) 424-3640

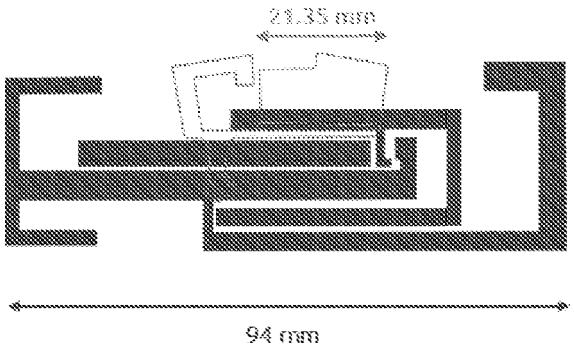
/Mark J. DeBoy/
Mark J. DeBoy
Reg. No. 66983

Agenda

1. ***The Langley Antenna Structure and the Bluetooth Frequency Band***
    a. Patent Owner ("PO") would like to discuss the Langley disclosure, and in particular, the fact that the disclosed antenna operates at the Bluetooth frequency band. *See, e.g.*, Langley at 8 (charts indicating operation at the Bluetooth band). The grounds of rejection rely on a contrary understanding of the reference. *See, e.g.*, Office Action of May 31, 2024 ("Office Action") at 26 ("One having ordinary skill in the art would do so to provide an additional antenna to the wireless device to operate over Bluetooth, **which is lacking in the combination of Ollikainen and Langley**")(emphasis added).
    b. PO would like to discuss how Langley's operation at the Bluetooth band would affect the proposed combinations of references.
        i. Ground A – Obviousness Rejection Applying Bolin and Langley – Because both Bolin and Langley operate at the Bluetooth frequency band, combining them would result in interference between the two antennas, rendering *at least* the Bolin Bluetooth antenna unsuitable for its intended purposes.
        ii. Ground B – Obviousness Rejection Applying Bolin, Langley and Rutfors – Same issue as above.
        iii. Ground C – Obviousness Rejection Applying Ollikainen, Langley and Bolin – Same issue as above. Additionally, this rejection is structured to explicitly add the Bolin Bluetooth antenna because "Bluetooth… is lacking in the combination of Ollikainen and Langley." OA at 26. Langley operating at the Bluetooth frequency band undermines the rationale for adding the Bolin antenna to the combination of Ollikainen and Langley.

2. The Relative Sizes of the Bolin and Langley Antennas

a. PO would like to discuss the relative sizes of the Langley and Bolin antenna structures. As indicated in the illustration provided below, created from the dimensions provided in the two references, the Langley antenna structure (blue) dwarfs the Bolin antenna structure (red).



b. PO would like to discuss how Langley's large size would affect the proposed combinations of references.

i. Ground A – Obviousness Rejection Applying Bolin and Langley – One of the intended purposes of the Bolin reference is to provide for size reduction of mobile device antennas. *See, e.g.,* Bolin at ¶¶ [0002], [0006], [0021], [0024]. The proposed combination takes the exact opposite approach, replacing the relatively small Bolin antenna with the much larger antenna from Langley. Such a replacement seems decidedly non-obvious.

ii. Ground B – Obviousness Rejection Applying Bolin, Langley and Rutfors – Same issue as above.

iii. Ground C – Obviousness Rejection Applying Ollikainen, Langley and Bolin – Same issue as above. Additionally, Ollikainen is similarly directed to antenna size reduction. *See, e.g.,* Ollikainen at ¶¶ [0002], [0004]. These further teachings in Ollikainen reinforce the non-obviousness of the combination, particularly because the Ollikainen antenna structure would also have to be substantially smaller than the

Langley structure to operate as a λ/4 resonator at the disclosed wavelengths. Furthermore, this proposed combination incorporates the Bolin antenna because "Bluetooth… is lacking in the combination of Ollikainen and Langley." OA at 26. It would not have been obvious to do this because 1) Langley already operates at the Bluetooth band, and 2) the teachings in the references of reducing size would motivate the POSITA to *avoid* adding an additional, redundant Bluetooth antenna.

3. The Omission of the Bolin "PCS Part 6"

a. The proposed combination of Bolin and Langley "replac[es] the first antenna (item 2) [of Bolin] with the first antenna shown in FIGS. 2 and 3 of Langley." OA at 15. The proposed combination of Ollikainen, Langley and Bolin "modif[ies] the combination of Ollikainen and Langley with the additional second antenna as taught by Bolin." OA at 26. In either case, the "PCS part 6" from Bolin is not included in the combinations. Specifically, the "PCS part 6" is part of "item 2" in Bolin which is removed in the combination of Bolin and Langley. "PCS part 6" is separate from the second antenna in Bolin, and therefore, it is not included when Bolin's second antenna is added into the Ollikainen/Langley combination.

b. PO would like to discuss how the omission of Bolin's "PCS part 6" would affect the proposed combinations of references.

   i. Ground A – Obviousness Rejection Applying Bolin and Langley – Bolin explains that the "PCS part 6" is necessary for proper operation of the second Bluetooth antenna 3. Bolin at ¶¶ [0023]-[0024]. Without "PCS part 6," the Bolin Bluetooth antenna lacks the "necessary … isolation between the main antenna and the Bluetooth^{tm} antenna." . Bolin at ¶ [0024]. First, eliminating the "PCS part 6" from the combination would render the Bluetooth antenna in Bolin inoperable due to a lack of "necessary" isolation. Second, replacing the Bolin main antenna with the Langley antenna would *increase* the need for isolation given that the

Langley antenna also operates at the Bluetooth frequency band, rendering the combined device unsuitable for its intended purpose.

ii. Ground B – Obviousness Rejection Applying Bolin, Langley and Rutfors – Same issue as above.

iii. Ground C – Obviousness Rejection Applying Ollikainen, Langley and Bolin – Same issue as above. Additionally, the POSITA would not add the Bolin Bluetooth antenna to the Ollikainen/Langley combination without including the "necessary" isolation taught in Bolin. Furthermore, given Langley already operates at the Bluetooth frequency range, and Bolin and Ollikainen teach antennas should be reduced in size, it would not have been obvious to add a redundant Bluetooth antenna *as well as an isolating structure* to the Ollikainen/Langley combination.

4. Placing the Langley Antenna Structure over a Ground Plane

a. The Langley reference provides no disclosure of a ground plane. Not all antennas are designed to operate in conjunction with a ground plane. Therefore, the POSITA would understand that the Langley antenna was designed for use without a ground plane. The POSITA would also understand that the operating characteristics of the Langley antenna, such as the number of frequency bands and the specific frequency bands in which it operates, would be different if the antenna were placed over a ground plane.

b. PO would like to discuss how the presence of a ground plane in Bolin and its absence in Langley would affect the proposed combinations of references.

i. Ground A – Obviousness Rejection Applying Bolin and Langley – this combination of Bolin and Langley is predicated on the Langley antenna structure operating the same way when placed over the Bolin ground plane. *See, e.g.,* OA at 15 ("One having ordinary skill in the art would do so to increase the number of frequencies of the antenna for the wireless device. … Furthermore, Examiners find this combination is merely the simple substitution of one known element for another to obtain predictable results."). The POSITA would understand that this is not the case. The

POSITA would understand that simply substituting the Langley antenna structure for the Bolin structure would not predictably result in more frequency bands of operation as the presence of the ground plane would substantially alter the operating characteristics of the Langley antenna structure.

ii. Ground B – Obviousness Rejection Applying Bolin, Langley and Rutfors – Same issue as above.

iii. Ground C – Obviousness Rejection Applying Ollikainen, Langley and Bolin – Same issue as above.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/019,275	10/12/2023	11349200	SKAD002	7433

27896 7590 07/23/2024
EDELL, SHAPIRO & FINNAN, LLC
9801 Washingtonian Blvd.
Suite 750
Gaithersburg, MD 20878

EXAMINER
WHITTINGTON, KENNETH

ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
07/23/2024	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patents and Trademark Office
P.O.Box 1450
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July 23, 2024

THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS

CHRISTOPHER J. COULSON
SKADDEN, ARPS, SLATE, MEAGHER & FLOM, LLP
ONE MANHATTAN WEST, 30TH FLOOR
NEW YORK, NY 10001

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. : 90019275
PATENT NO. : 11349200
ART UNIT : 3992

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above-identified ex parte reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the ex parte reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

Decision on Petition for Extension of Time in Reexamination

Application No.: 90/019,275	**Applicant(s): 11,349,200**
Examiner	**Art Unit**
Whittington, Kenneth	3992

1. THIS IS A DECISION ON THE PETITION FILED July 22, 2024.

2. THIS DECISION IS ISSUED PURSUANT TO:
   A. ☒ 37 CFR 1.550(c) – The time for taking any action by a patent owner in a third party requested *ex parte* reexamination proceeding will be extended only for sufficient cause and for a reasonable time specified.
   B. ☐ 37 CFR 1.550(c) – The time for taking action by a patent owner in a patent owner requested *ex parte* reexamination proceeding will only be extended for more than two months for sufficient cause and for a reasonable time specified.
   C. ☐ 37 CFR 1.956 – The time for taking any action by a patent owner in an *inter partes* reexamination proceeding will be extended only for sufficient cause and for a reasonable time specified.

   The petition is before the Central Reexamination Unit for consideration.

3. FORMAL MATTERS: Patent Owner requests that the time period for filing a response to the Order granting *ex parte* reexamination mailed on May 31, 2024, which set a two (2) month period to file a 37 CFR 1.530 Patent Owner Statement, be extended by two weeks.
   A. Petition fee per 37 CFR § 1.17(g)):
      i. ☐ Petition includes authorization to debit a deposit account.
      ii. ☒ Petition includes authorization to charge a credit card account.
      iii. ☐ Other: _____.
   B. ☒ Proper certificate of service was provided. (Not required in reexamination where patent owner is requester).
   C. ☒ Petition was timely filed.
   D. ☒ Petition properly signed.

4. DECISION (See MPEP 2265 and 2665)
   A. ☒ Granted for: **2 Weeks** or ☐ Granted-in-part for __. 37 CFR 1.550(c) and 37 CFR 1.956).
      i. ☐ Other/comment: _____.
   B. ☐ Dismissed because:
      i. ☐ Formal matters (See unchecked box(es) (A, B, C and/or D) in section 3 above).
      ii. ☐ Petitioner failed to provide a factual accounting of reasonably diligent behavior by all those responsible for preparing a response to the outstanding Office action within the statutory time period.
      iii. ☐ Petitioner failed to explain why, in spite of the action taken thus far, the requested additional time is needed.
      iv. ☐ The statements provided fail to establish sufficient cause to warrant extension of the time for taking action (See attached).
      v. ☐ The petition is moot.
      vi. ☐ Other/comment: _____.

5. CONCLUSION:

Direct telephone inquiries to either QAS Stephen J. Stein at 571-272-1544 or SPRS Andrew J. Fischer at 571-272-6779.

/Andrew J. Fischer/, Supervisory Patent Reexamination Specialist, Central Reexamination Unit

UNITED STATES
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Alexandria, VA 22313 - 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
90/019,275	**07/22/2024 09:05:54 PM Z ET**	**SKAD002**

Title of Invention

Multiple-Body-Configuration Multimedia and Smartphone Multifunction Wireless Devices

Application Information

APPLICATION TYPE	Utility / ex parte reexam	PATENT #	11349200
CONFIRMATION #	7433	FILED BY	MARK DEBOY
PATENT CENTER #	66472529	FILING DATE	10/12/2023
CUSTOMER #	27896	FIRST NAMED INVENTOR	- 11349200
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
Petiton_for_Ext_of_Time_CLEAN.pdf	5	Reexam Request for Extension of Time	38 KB
Exhibit_A_CLEAN.pdf	3	Reexam - Affidavit/Declaration/Exhibit Filed by 3rd Party	667 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
Petiton_for_Ext_of_Time_CLEAN.pdf	C3A0430D12B58ABAB5A33D6A6CDA8A78F689D8EF4684E3C5 3AB32254AFAAB9AB9454E94257B4368611F5E96EC07194C372

FCD99C6E794BCD043C1ADFE4E52D8C

Exhibit_A_CLEAN.pdf	D6990769DCFEB117C1C6DDE843575255571 1BED37792AFD20 7C9D266F93E15E81D33DD882337F31C7CD664125C172894C8 C5E6E399F91DED27C85142EE61F92A

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
90/019,275	07/22/2024 09:05:54 PM Z ET	SKAD002

Title of Invention

Multiple-Body-Configuration Multimedia and Smartphone Multifunction Wireless Devices

Application Information

APPLICATION TYPE	Utility / ex parte reexam	PATENT #	11349200
CONFIRMATION #	7433	FILED BY	MARK DEBOY
PATENT CENTER #	66472529	AUTHORIZED BY	-
CUSTOMER #	27896	FILING DATE	10/12/2023
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	- 11349200

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 1022	E20247LL06238403	MARK DEBOY

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1463	PETITIONS REQUIRING THE PETITION FEE SET FORTH IN 37 CFR 1.17(G) (GROUP II)	220.00	1	220.00
			TOTAL AMOUNT:	$220.00

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

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New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Mark J. DeBoy

From: Mark J. DeBoy
Sent: Thursday, July 18, 2024 10:18 AM
To: Whittington, Kenneth J. (AU3992)
Cc: Patrick Finnan
Subject: RE: Interview for reexamination 90/019275
Attachments: Reexamination No 90_019275 -- Examiner Interview Agenda.pdf

Dear Examiner Whittington,

Please find the attached Agenda for tomorrow's interview in the above-referenced e*x parte* reexamination.

Please let me know if you have any questions or concerns.

Best regards,
Mark

Mark J. DeBoy
Partner
ESF IPLAW
EDELL · SHAPIRO · FINNAN
9801 Washingtonian Boulevard, Suite 750
Gaithersburg, MD 20878
mdeboy@esfip.com
Direct: 240-864-2459
Fax: 301-762-4056

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From: Whittington, Kenneth J. (AU3992) <Kenneth.Whittington@USPTO.GOV>
Sent: Tuesday, July 9, 2024 12:10 PM
To: Mark J. DeBoy <mdeboy@esfip.com>
Cc: Patrick Finnan <pfinnan@esfip.com>
Subject: RE: Interview for reexamination 90/019275

Once again a conflict. Can we move it from 11am to 10am Friday (7/19)?

Ken W.

Kenneth J. Whittington
Primary Examiner AU3992
kenneth.whittington@uspto.gov

(571)272-2264

From: Mark J. DeBoy <mdeboy@esfip.com>
Sent: Tuesday, July 9, 2024 10:01 AM
To: Whittington, Kenneth J. (AU3992) <Kenneth.Whittington@USPTO.GOV>
Cc: Patrick Finnan <pfinnan@esfip.com>
Subject: RE: Interview for reexamination 90/019275

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Dear Examiner Whittington,

That time on Friday the 19th works for us.

Thank you!
Mark

Mark J. DeBoy
Partner
ESF IPLAW
EDELL · SHAPIRO · FINNAN
9801 Washingtonian Boulevard, Suite 750
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From: Whittington, Kenneth J. (AU3992) <Kenneth.Whittington@USPTO.GOV>
Sent: Tuesday, July 9, 2024 9:47 AM
To: Mark J. DeBoy <mdeboy@esfip.com>
Subject: RE: Interview for reexamination 90/019275

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Doh! Hard to get so many people in one place at the same time. How about this Friday (7/19) at 11am?

Ken W.

Kenneth J. Whittington
Primary Examiner AU3992
kenneth.whittington@uspto.gov

(571)272-2264

From: Mark J. DeBoy <mdeboy@esfip.com>
Sent: Tuesday, July 9, 2024 9:39 AM
To: Whittington, Kenneth J. (AU3992) <Kenneth.Whittington@USPTO.GOV>; Patel, Hetul <Hetul.Patel@USPTO.GOV>; Corsaro, Nick <Nick.Corsaro@USPTO.GOV>
Cc: Patrick Finnan <pfinnan@esfip.com>
Subject: Interview for reexamination 90/019275

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Dear Examiners Whittington, Petal and Corsaro,

First, thank you for including me on the meeting invites for this case. It is much easier than playing telephone tag, as often happens when trying to schedule interviews.

I am writing because there is another attorney working on this case, Pat Finnan (copied here), who cannot make the Monday, July 15th, 11AM time that was recently proposed. Pat is travelling for portions of Monday, making it difficult for him to join that meeting. Would it be possible to find another time on Tuesday?

Thank you!
Mark

Mark J. DeBoy
Partner
ESF IPLAW
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9801 Washingtonian Boulevard, Suite 750
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mdeboy@esfip.com
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Fax: 301-762-4056

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Control No.	: 90/019,275	Patent	: 11,349,200
Filing Date	: October 12, 2023	Issue Date	: May 31, 2022
Confirmation No.	: 7433	Title:	: Multiple-Body-Configuration Multimedia and Smartphone Multifunction Wireless Devices
		TC/A.U.	: Central Reexamination Unit 3992
		Examiner	: Kenneth WHITTINGTON
		Customer No.	: 27896
		Docket No.	: 0690.0065L

Mail Stop *Ex Parte* Reexam
ATTN: Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PETITION FOR EXTENSION OF TIME UNDER 37 C.F.R. § 1.550

This is a request under the provisions of 37 C.F.R. § 1.550 to extend the period for filing a response in the above-identified *ex partes* reexamination proceeding. Patent Owner herewith requests the Director of the United States Patent and Trademark Office to extend the time for responding to the Non-Final Office Action dated May 31, 2024 ("Office Action") for two weeks, from July 31, 2024 to August 14, 2024. This is Patent Owner's first request for an extension of time and sufficient cause for the request is provided below.

Legal and Procedural Background

The current proceeding is a third party requested *ex parte* reexamination. The initial request for *ex parte* reexamination was submitted on October 23, 2023, reexamination was ordered on January 10, 2024, and the Office Action issued on May 31, 2024.

Pursuant to 37 C.F.R. § 1.550, a request for an extension of time must: 1) specify the requested period of extension and be accompanied by the petition fee set forth in 37 C.F.R. § 1.17(g), 2) be filed on or before the day on which the action by the patent owner is due, 3) include a showing of sufficient cause, and 4) be for a reasonable amount of time. 37 C.F.R. § 1.550. The request should also include a statement of the action patent owner has taken to timely provide a response. MPEP § 2265.VI. With regard to the first and second requirements,

Patent Owner is requesting a two week extension of time, extending the due date from July 31, 2024 to August 14, 2024, the present petition is being submitted prior to Patent Owner's current due date of July 31, 2024, and the petition is being accompanied by a credit card payment for the fee set forth in 37 C.F.R. § 1.17(g). Applicant provides the following remarks directed to the third and fourth requirements.

Statement of What Action Patent Owner Has Taken to Timely Provide a Response

Upon receipt of the Office Action, Patent Owner, its counsel, and its expert have worked diligently to review the Office Action, review the cited art, develop arguments, and perform relevant experiments and simulations of the relied-upon prior art disclosures. Upon completion of the initial review of the Office Action, the undersigned reached out to Examiner Whittington on June 21, 2024 to schedule an interview in the proceeding. At that time, the undersigned learned that Examiner Whittington was out of the Office for two weeks, returning on or about July 8, 2024. The undersigned also reached out to Supervisory Patent Examiner Hutel Patel, who informed the undersigned that Examiner Whittington should be the examiner to schedule the interview and Patent Owner should reach back out to Examiner Whittington upon his return. On July 8, 2024, Patent Owner reached back out to Examiner Whittington, and the interview was initially scheduled for July 16, 2024. This date presented a conflict for the examiners, and after a few additional proposed dates, the interview was rescheduled for July 19, 2024, less than two weeks from Patent Owner's current response date of July 31, 2024. The communications between the undersigned and the examiners are summarized in the email communications submitted herewith as Exhibit A. The interview took place on July 19, 2024, which Patent Owner believes was helpful for both the examiners and the Patent Owner. For example, the parties to the interview discussed potential simulations that would be helpful for the examiners to better understand Patent Owner's arguments.

Sufficient Cause Exists for the Extension

Additional time is needed to enable Patent Owner to fully respond to the Office Action in the way discussed between the parties during the interview. The interview in this proceeding was delayed for a number of weeks due to conflicts with the examiners' schedules. Once the interview was conducted, additional simulations were identified as being particularly helpful to

the examiners in understanding the arguments that Patent Owner anticipates presenting in its response of the Office Action. Because these simulations were initially identified during the interview, which was delayed due to the examiners' schedules, it will be difficult for Patent Owner and its expert to finalize the simulations and incorporate them into its response and expert declaration in the less than two-weeks between the interview and the July 31, 2024 due date for Patent Owner's response to the Office Action. Accordingly, Patent Owner respectfully submits that sufficient cause exists for the requested extension of time.

Patent Owner also notes that this is its first request for an extension of time, and it is requesting only a two-week extension, half that of the one month extensions of time that are generally granted if sufficient cause is shown. MPEP § 2265.VI ("However, in third party requested ex parte reexaminations, a first request for an extension of time will generally be granted if a sufficient cause is shown, and for a reasonable time specified — usually one month.").

Finally, Patent Owner notes that the present extension of time is being requested to develop evidence and arguments that the examiners indicated would assist them in evaluating Patent Owner's arguments. In "balance[ing] the need to provide the patent owner with a fair opportunity to present an argument against any attack on the patent, and the requirement of the statute that the proceeding be conducted with special dispatch" (*id.*), providing the requested extension of time may ultimately assist the Office in resolving the reexamination with special dispatch. As discussed above, the extension of time is being requested so that Patent Owner can present evidence that the examiners agreed would assist them in evaluating Patent Owner's arguments. Allowing Patent Owner to present this evidence may decrease the time needed to resolve the issues in the reexamination.

Conclusion

Based on the foregoing, Patent Owner respectfully submits that the current circumstances establish sufficient cause under 37 C.F.R. § 1.550 for the extension of time and requests that this petition be granted to extend the time period for response to the Office Action for two weeks, from July 31, 2024 to August 14, 2024.

Credit card payment has been submitted concurrently herewith for payment of the fee under 37 C.F.R. § 1.17(g). The Director is hereby authorized to charge any additional appropriate fees that may be required for the above-identified reexamination proceeding, and to credit any overpayment, to Deposit Account No. **05-0460**.

Dated: July 22, 2024

Respectfully submitted by:

/Mark J. DeBoy/

Mark J. DeBoy
Reg. No. 66,983

EDELL, SHAPIRO & FINNAN, LLC
CUSTOMER NO. 27896
1901 Research Boulevard, Suite 400
Rockville, MD 20850
(301) 424-3640

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Control No.	: 90/019,275	Patent	: 11,349,200
Filing Date	: October 12, 2023	Issue Date	: May 31, 2022
Confirmation No.	: 7433	Title:	: Multiple-Body-Configuration Multimedia and Smartphone Multifunction Wireless Devices
		TC/A.U.	: Central Reexamination Unit 3992
		Examiner	: Kenneth WHITTINGTON
		Customer No.	: 27896
		Docket No.	: 0690.0065L

CERTIFICATE OF SERVICE

In compliance with 37 C.F.R. § 1.550, the foregoing **PETITION FOR EXTENSION OF TIME UNDER 37 C.F.R. § 1.550** and accompanying **EXHIBIT** were served July 22, 2024 to the Third Party Requester by first class mail as follows:

Christopher J. Coulson
Skadden, Arps, Slate, Meagher & Flom LLP
One Manhattan West, 30th Floor
New York, New York 10001

A courtesy copy is being emailed to chris.coulson@skadden.com for opposing counsel's convenience.

Dated: July 22, 2024

Respectfully submitted by:

/Mark J. DeBoy/

Mark J. DeBoy
Reg. No. 66,983

EDELL, SHAPIRO & FINNAN, LLC
CUSTOMER NO. 27896P
1901 Research Boulevard, Suite 400
Rockville, MD 20850
(301) 424-3640

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/019,275	10/12/2023	11349200	SKAD002	7433

27896 7590 05/31/2024
EDELL, SHAPIRO & FINNAN, LLC
9801 Washingtonian Blvd.
Suite 750
Gaithersburg, MD 20878

EXAMINER
WHITTINGTON, KENNETH

ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
05/31/2024	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

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(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

Christopher J. Coulson
SKADDEN, ARPS, SLATE, MEAGHER & FLOM, LLP
ONE MANHATTAN WEST
30TH FLOOR
NEW YORK, NEW YORK 10001

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/019,275* .

PATENT UNDER REEXAMINATION *11349200* .

ART UNIT *3992* .

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

Office Action in Ex Parte Reexamination

Control No.	Patent Under Reexamination	
90/019,275	11349200	
Examiner	**Art Unit**	**AIA (FITF) Status**
KENNETH WHITTINGTON	3992	No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

a. ☐ Responsive to the communication(s) filed on ____.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.

b. ☐ This action is made FINAL.

c. ☑ A statement under 37 CFR 1.530 has not been received from the patent owner.

A shortened statutory period for response to this action is set to expire 2 month(s) from the mailing date of this letter. Failure to respond within the period for response will result in termination of the proceeding and issuance of an *ex parte* reexamination certificate in accordance with this action. 37 CFR 1.550(d). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).** If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. ☐ Notice of References Cited by Examiner, PTO-892.
2. ☐ Information Disclosure Statement, PTO/SB/08.
3. ☐ Interview Summary, PTO-474.
4. ☐ _____.

Part II SUMMARY OF ACTION

1a. ☑ Claims 11-12 are subject to reexamination.
1b. ☐ Claims 1-10 and 13-20 are not subject to reexamination.
2. ☐ Claims _____ have been canceled in the present reexamination proceeding.
3. ☐ Claims _____ are patentable and/or confirmed.
4. ☑ Claims 11-12 are rejected.
5. ☐ Claims ____ are objected to.
6. ☐ The drawings, filed on _____ are acceptable.
7. ☐ The proposed drawing correction, filed on ____ has been (7a) ☐ approved (7b) ☐ disapproved.
8. ☑ Acknowledgment is made of the priority claim under 35 U.S.C. 119(a)-(d) or (f).
   a) ☑ All b) ☐ Some* c) ☐ None of the certified copies have
   1 ☐ been received.
   2 ☐ not been received.
   3 ☑ been filed in Application No. 17/246,192.
   4 ☐ been filed in reexamination Control No. _____.
   5 ☐ been received by the International Bureau in PCT application No. _____.
   * See the attached detailed Office action for a list of the certified copies not received.
9. ☐ Since the proceeding appears to be in condition for issuance of an *ex parte* reexamination certificate except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte* Quayle, 1935 C.D. 11, 453 O.G. 213.
10. ☐ Other: _____

cc: Requester (if third party requester)

EX PARTE NON-FINAL OFFICE ACTION

This Non-Final Office Action addresses claims 11 and 12 of United States Patent No. 11,349,200 to Carles Puente Baliarda et al., entitled MULTIPLE-BODY-CONFIGURATION MULTIMEDIA AND SMARTPHONE MULTIFUNCTION WIRELESS DEVICES (hereinafter the "**200 Patent**"). Substantial new questions of patentability (SNQs) affecting claims 11 and 12 of the 200 Patent were raised by the request for *ex parte* reexamination filed October 23, 2023 (hereinafter the "**Request**") as determined in the Order Granting Ex Parte Reexamination mailed January 10, 2024 (hereinafter the "**Order**").

Claims 11 and 12 are subject to reexamination herein.

Claims 11 and 12 are rejected.

I. REFERENCES/DOCUMENTS CITED HEREIN

(a) U.S. Patent Application Publication No. 2004/0137950 to Thomas Bolin et al. published on July 15, 2004 (hereinafter "**Bolin**").

(b) United Kingdom Patent Application Publication No. GB2416625 to Richard Langley et al., published on February 1, 2006 (hereinafter "**Langley**").

(c) U.S. Patent Application Publication No. 2004/0051669 to Thomas Rutfors et al., published on March 18, 2004 (hereinafter "**Rutfors**").

(d) European Patent Application Publication No. EP1294049 to Jani Ollikainen et al., published on March 19, 2003 (hereinafter "**Ollikainen**").

(e) Declaration of Manos M. Tentzeris, PHD, exhibit 1009 to the Request (hereinafter referred to as "**Tentzeris Declaration**").

(f) U.S. Patent No. 11,735,810 to Carles Puente Baliarda et al., issued on August 22, 2023 (hereinafter the "**810 Patent**").

(g) U.S. Patent Application No. 18,338,523 to Carles Puente Baliarda et al., filed on June 22, 2023 (hereinafter the "**523 Application**").

II. ACKNOWLEDGEMENTS

References (a) – (d) noted above have been asserted in the Request as providing disclosures and/or teachings relevant to the claims of the 200 Patent. The Request and all its accompanying documents and evidence have been fully considered in the Examiners' determinations and findings discussed below.

Because more than two months has passed since the mailing of the Order and the Patent Owner has chosen not to file a Patent Owner's Statement, this non-final rejection is proper.

III. PRIORITY

After careful review of the prosecution history of the 200 Patent, Examiners find that the 200 Patent resulted from U.S. Patent Application No. 17/246,192, filed April 30, 2021 (hereinafter the "192 Application"), which is a continuation from U.S. Patent Application No. 16/832,820, filed March 27, 2020, now U.S. Patent No. 11,031,677, which is a continuation from U.S. Patent Application No. 15/856,626, filed December 28, 2017, now U.S. Patent No. 10,644,380, which is a continuation from U.S. Patent Application No. 14/738,090 filed June 12, 2015, now U.S. Patent No. 9,899,727, which is a continuation from U.S. Patent Application No. 14/246,491 filed on April 7, 2014, now

U.S. Patent No. 9,099,773, which is a continuation from U.S. Patent Application No. 11/614,429, filed December 21, 2006, now U.S. Patent No. 8,738,103, which claims the benefit of U.S. Provisional Patent Application No. 60/856,410 filed on November 3, 2006 and U.S. Provisional Patent Application No. 60/831,544 filed on July 18, 2006. Based on a review of these prior patents and applications, Examiners find the earliest claimed priority date for the 200 Patent is July 18, 2006.

IV. CLAIM INTERPRETATION

A. Lexicographic Definitions

After careful review of the original specification, the prosecution history, and unless expressly noted otherwise by the Examiners, the Examiners find that they are able to locate several lexicographic definitions (either express or implied) with the required clarity, deliberateness, and precision which are necessary to interpret the patent claims. See MPEP §2111.01 IV. Each such definition is as follows:

ground plane rectangle – "a ground plane rectangle is defined as being the minimum-sized rectangle that encompasses the ground plane of the antenna system included in the PCB of the MFWD 100 that comprises the feeding means responsible for the operation of the antenna system in its lowest frequency band. That is, the ground plane rectangle is a rectangle whose edges are tangent to at least one point of the ground plane. See 200 Patent col. 14, lines 37-44.

antenna box – "[a]n antenna box for the MFWD 100 is herein defined as being the minimum-sized parallelepiped of square or rectangular faces that completely encloses the antenna volume of space and wherein each one of the faces of the

minimum-sized parallelepiped is tangent to at least one point of the volume. Moreover, each possible pair of faces of the minimum-size parallelepiped shares an edge forming an inner angle of 90°." See 200 Patent col. 11, lines 35-42.

antenna rectangle – "an antenna rectangle is defined as being the orthogonal projection of the antenna box along the normal to the face with largest area of the antenna box." See 200 Patent col. 14, lines 21-24.

aspect ratio – "[t]he aspect ratio of the antenna rectangle is defined as the ratio between the width and the height of the antenna rectangle." See 200 Patent col. 14, lines 34-36.

antenna contour – "[t]he antenna contour of the antenna system is a set of joined and/or disjointed segments comprising: the perimeter of one or more antenna elements placed in the antenna rectangle, the perimeter of closed slots and/or closed apertures defined within the antenna elements, and/or the orthogonal projection onto the antenna rectangle of perimeters of antenna elements, or perimeters of or parts of antenna elements that are placed in the antenna box but not in the antenna rectangle." See 200 Patent col. 15, lines 16-26.

Complexity factor F21 -

$$F_{21} = -\frac{\log(N_2) - \log(N_1)}{\log(1/2)}$$

Complexity factor F32 -

$$F_{32} = -\frac{\log(N_3) - \log(N_2)}{\log(1/2)}$$

Wherein

N_1 – the number of cells of the grid G_1 that are at least partially inside the antenna rectangle and include at least a point of the antenna contour. See 200 Patent col. 19, lines12-17.

N_2 – the number of cells of the grid G_2 that are completely inside the antenna rectangle and include at least a point of the antenna contour. See 200 patent col. 19, lines 17-19 and col. 20, lines 5-8.

N3 – the number of cells of the grid G_3 that are completely inside the antenna rectangle and include at least a point of the antenna contour. See 200 Patent at col. 20, lines 8-11.

Wherein N1, N2 and N3 are determined using the following grids:

Grid G_2 – a grid of cells drawn over the antenna rectangle such that "the size of a cell and its aspect ratio (i.e., the ratio between the width and the height of the cells) are first chosen so that the antenna rectangle is perfectly tessellated with an odd number of columns and an odd number of rows." See 200 Patent col. 17, lines 28-32. "[C]olumns of cells are associated with the longer side of an antenna rectangle, while rows of cells are associated with a shorter side of the antenna rectangle." See 200 Patent col. 17, lines 33-36.

Grid G_1 – a grid of cells over the antenna rectangle and is "obtained by combining four (4) cells of the grid G_2." See 200 Patent col. 18, lines 12-13. Thus, the Grid G_1 is twice a scaling factor of Grid G_2, i.e., "[a] cell of grid size G_2 is half the size of a cell of grid G_1 (i.e., a ½ scaling factor or an octave of scale). See 200 Patent col. 17, lines 17-19.

Grid G_3 – a grid of cells over the antenna rectangle and is "obtained by subdividing each cell of grid G_2 into four cells, with each of the cells having a cell width (W_3) equal to one half (½) of the width of a cell of the second grid (W_2) (i.e., W_3=½×W_2); and a cell height (H_3) equal to one half (½) of the height of a cell of the second grid (H_2) (i.e., H_3=½×H_2). See 200 Patent col. 19, lines 62-67. Further "a cell of grid size G_3 is half the size of a cell of grid G_2, or one fourth the size of a cell of grid G_1 (i.e., a ¼ scaling factor or two octaves of scale)." See 200 Patent col. 17, lines 19-21.

B. 35 U.S.C. §112 (6th ¶)

The Examiners further find that because Patent claims 11 and 12 herein recite neither "step for" nor "means for," the claims fail Prong (A) as set forth in MPEP §2181 I. Because all examined claims fail Prong (A) as set forth in MPEP §2181 I., the Examiners conclude that all examined claims do not invoke 35 U.S.C. §112(f). See also *Ex parte Miyazaki*, 89 USPQ2d 1207, 1215-16 (B.P.A.I. 2008)(precedential)(where the Board did not invoke 35 U.S.C. §112(f) because "means for" was not recited and because applicant still possessed an opportunity to amend the claims).

C. Conclusion of Claim Interpretation

Because of the Examiners' findings above that Applicant is its own lexicographer, the Examiners find these definitions control. See MPEP §2111.01(IV). Examiners further find the no limitations in Patent Claims 11 and 12 invoke 35 U.S.C. §112 (6th ¶), and thus the remaining limitations that are not lexicographically defined will be given the broadest reasonable interpretation consistent with the specification since patentee has

an opportunity to amend claims. See MPEP §2258(I)(G), MPEP §2111, MPEP §2111.01 and *In re Yamamoto et al.*, 222 USPQ 934 (Fed. Cir. 1984). Under a broadest reasonable interpretation, words of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification. See MPEP §2111.01(I). It is further noted it is improper to import claim limitations from the specification, i.e., a particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment. See MPEP §2111.01(II).

V. CLAIM REJECTIONS – 35 U.S.C. §103

The following is a quotation of pre-AIA 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

A. Obviousness Rejection Applying Bolin and Langley

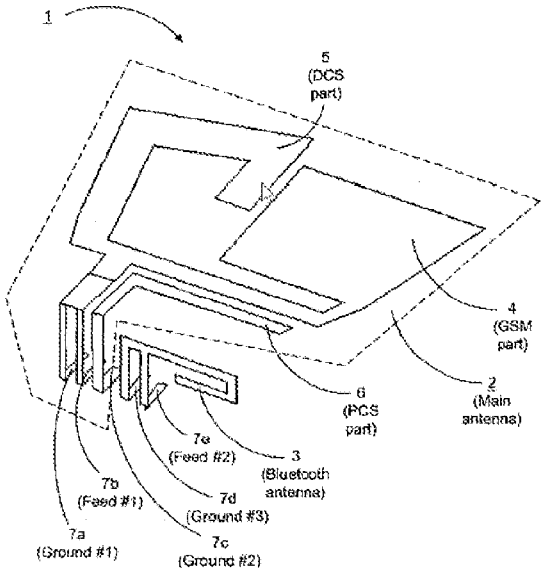
Claims 11 and 12 are rejected under pre-AIA 35 U.S.C. §103(a) as being unpatentable over Bolin in view of Langley.

Regarding **claim 11**, Bolin teaches **a wireless device comprising:**

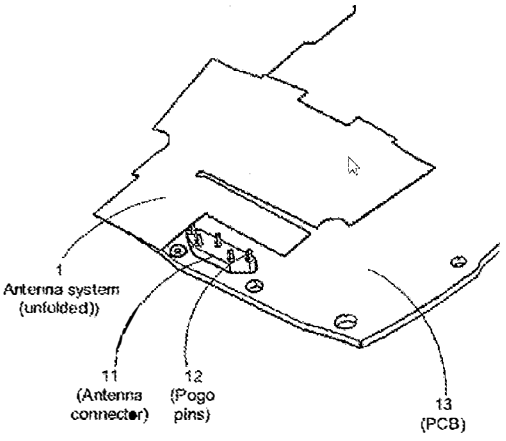
See Bolin ¶0001 which discloses its invention relates "to mobile telephones and similar types of portable communication devices that need several commercial frequency bands to communicate on" and "to a built-in, multi band, multi antenna system for such mobile telephones, etc."

an antenna system comprising a ground plane and at least two antennas within the wireless device, the antenna system comprising:

See Boling FIGS. 1 and 5, reprinted below, which disclose the antenna system comprises a first antenna (item 2) and a second antenna (item 3) within the wireless device. Furthermore, the antenna system comprises a ground plane (PCB 13), which is separated from the antenna system via a dielectric antenna carrier 9 and would be connected to the grounds 7a-7c. Further see FIG. 9, reprinted, below and ¶0034, which represents "alternative embodiments of the antenna system according to the invention in lieu of the shape shown in FIG. 1.



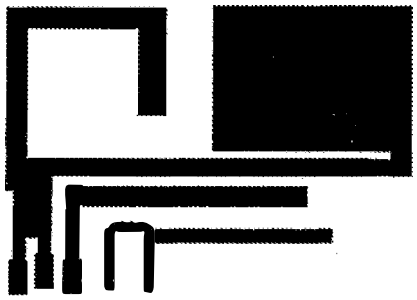
Bolin FIG. 1



Bolin FIG. 5

a first antenna configured to provide operation in at least three frequency bands being used by 4G communication standards, the first antenna defining an antenna contour comprising an entire perimeter of the first antenna,

See Bolin ¶0019 wherein the first antenna (item 2) provides three frequencies GSM/DCS/PCS. Further see alternative design for first antenna (item 2) shown in FIG. 9 below.



Bolin FIG. 9

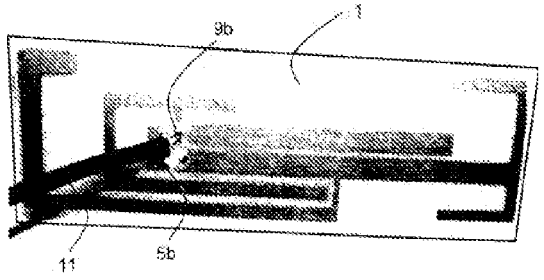
wherein the first antenna defines an antenna box that is a minimum-sized parallelepiped that completely encloses a volume of the first antenna and wherein each face of the minimum-sized parallelepiped is tangent to at least one point of the volume of the first antenna, an orthogonal projection of the antenna box along a normal to a face with a largest area of the first antenna defining an antenna rectangle, an aspect ratio of the antenna rectangle being defined as a ratio between a width and a height of the antenna rectangle, wherein the aspect ratio has a value of at least 2; and

See Bolin FIG. 1 above wherein the first antenna (item 2) defines a three-dimensional antenna box. Furthermore, when the antenna shape shown in FIG. 9 is used in lieu of that in FIG. 1 to define an antenna rectangle via the antenna box and the antenna rectangle has an aspect ratio of about 2.

a second antenna configured to provide operation in a first wireless service, the second antenna being proximate to a side of a ground plane rectangle enclosing the ground plane.

See Bolin FIGS. 1, 5 and 9 above, note second antenna (item 3) for communication over Bluetooth, which is located on a side of the antenna box, i.e., an edge of the antenna rectangle of the first antenna (item 2) provided above the ground plane (at PCB 13) which defines a ground plane rectangle. Since all items are within the wireless device, they would be proximately located.

However, while Bolin teaches an antenna structure with a general contour and having some general complexity, the Bolin antenna does not teach its first antenna having the antenna contour and complexity as recited and required in claim 11. Nevertheless, Langley discloses **a wireless device having an antenna system comprising a ground plane within the wireless device** (See Langley FIGS. 2 and 3, reprinted below),



Langley FIG. 3

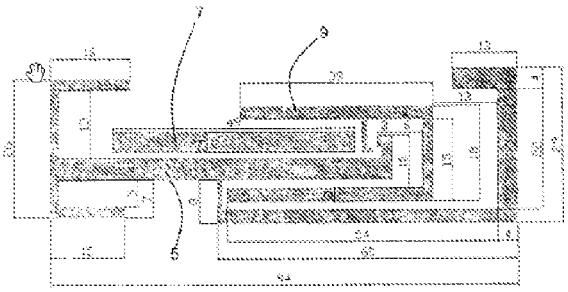


FIG. 2

the antenna system comprising:

a first antenna configured to provide operation in at multiple frequency bands being used by 4G communication standards,

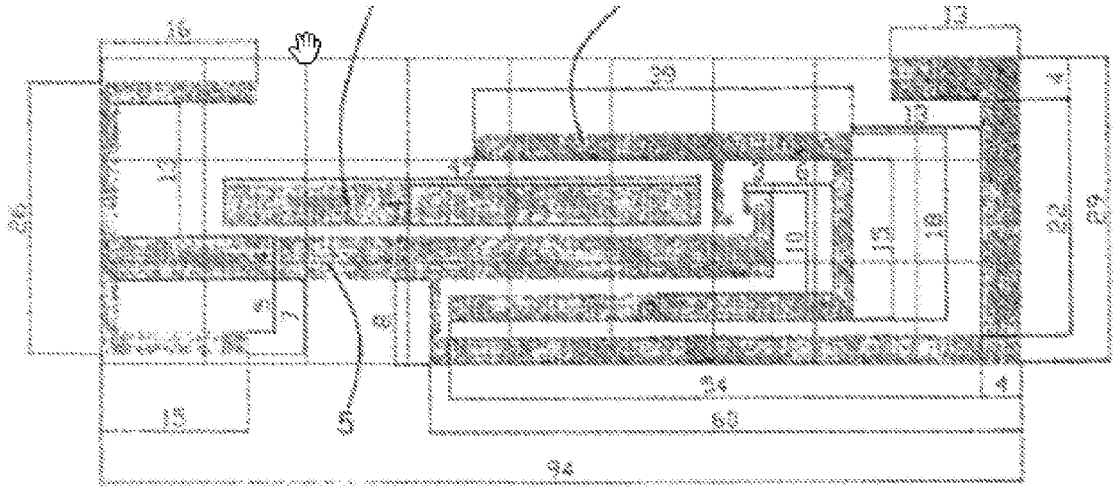
See Langley FIGS. 2 and 3 above and page 10, lines 23-25, antenna 1, comprises conductive traces on the upper side of a circuit board or other suitable surface. See also page 6, lines 21-30 wherein the antenna 1 may comprise two sets of conductors on each side of a circuit board. See further page 5, line 12 to page 6, line 13 wherein the antenna shown in FIG. 3 covers five commercially useful frequency bands. At least three of the noted frequencies of Langley fall within the 4G standards as stated by the 200 Patent at col. 10, lines 1-23 and col. 25, lines 14-23.

the first antenna defining an antenna contour comprising an entire perimeter of the first antenna, the antenna contour comprising at least twenty segments,

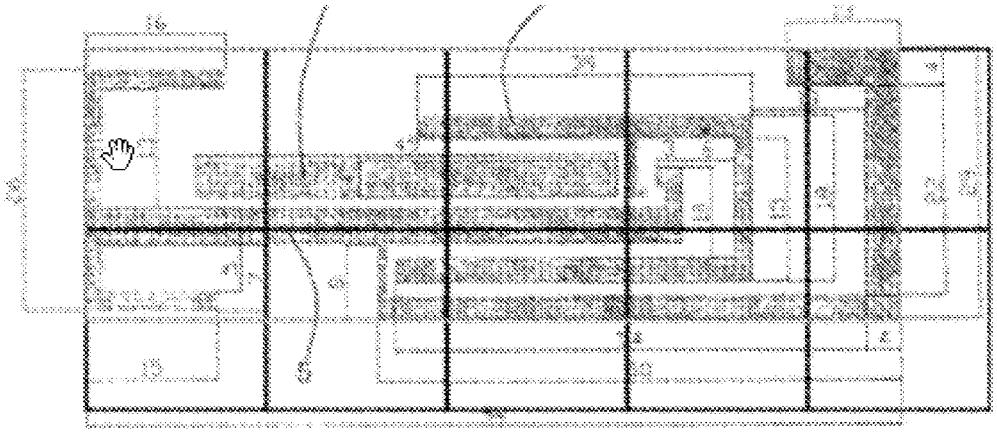
See Langley FIG. 2 above, note antenna 1 has an antenna contour as defined above and has at least twenty segments.

wherein the antenna contour has a level of complexity defined by complexity factor F_{21} having a value of at least 1.20 and complexity factor F_{32} having a value of at least 1.35, and

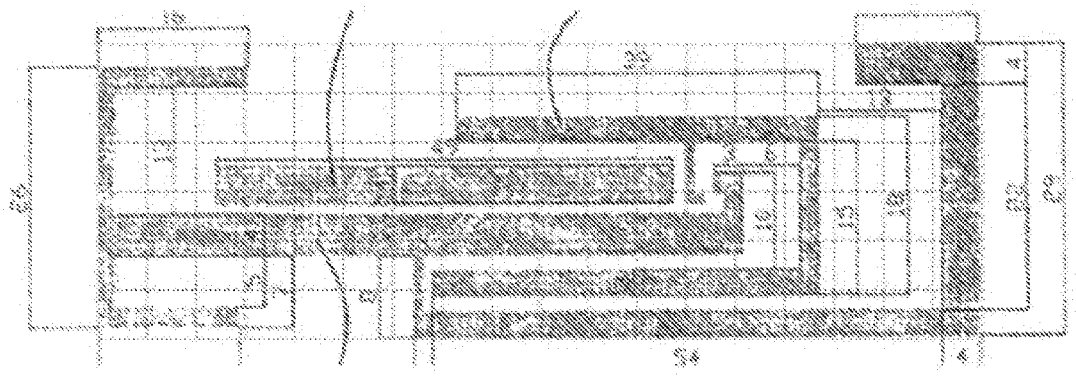
See the grid patterns Grid G_1, Grid G_2 and Grid G_2 for FIG. 2 of Langley as provided in the Request at pages 34-37 of Exhibit AA to the Request, reprinted below.



Grid G_2 for Langley FIG. 2 (annotated in the Request, page 34 of Exhibit AA)



Grid G_1 for Langley FIG. 2 (annotated in the Request, page 34 of Exhibit AA)



5

Grid G_3 for Langley FIG. 2 (annotated in the Request, page 37 of Exhibit AA)

As shown above, the Grid G_2 is made up of 9 columns by 3 rows fully tessellated over the antenna rectangle. Furthermore, as shown above Grid G_1 is made to have twice the scaling factor of Grid G_2. Finally, as shown above, Grid G_3 is made to have one-half the scaling factor of Grid G_2.

Based on the above grids, Examiners find that Grid G_2 implies that $N_2 = 26$, Grid G_1 implies that $N_1 = 10$ and G_3 implies that $N_3 = 78$. When these values are entered into the equation for F_{21}, Examiners find that $F_{21} = 1.38$, which meets the recitation that F_{21} must be at least 1.20. Furthermore, when these values are entered into the equation for F_{32}, Examiners find that $F_{32} = 1.58$, which meets the recitation that F_{32} must be at least 1.35. See pages 34-37 of Exhibit AA to the Request for support herein which is incorporated in these findings.

wherein the first antenna defines an antenna box that is a minimum-sized parallelepiped that completely encloses a volume of the first antenna and wherein each face of the minimum-sized parallelepiped is tangent to at least one point of the volume of the first antenna, an orthogonal projection of the antenna box along a normal to a face with a largest area of the first antenna defining an antenna rectangle,

See Langley FIGS. 2 and 3 above, note antenna rectangle formed by antenna 1 when the antenna 1 is provided on both sides of a circuit board or other suitable surface would provide an antenna box as defined above and recited in the claim.

an aspect ratio of the antenna rectangle being defined as a ratio between a width and a height of the antenna rectangle, wherein the aspect ratio has a value of at least 2.

See Langley FIGS. 2 and 3 above and the annotate FIG. 2 showing grid pattern Grid G2 which illustrates an aspect ratio of at least two in the width to height of the antenna rectangle.

In view of these teachings of Bolin and Langley, Examiners find it would have been obvious at the time the invention was made to use the first antenna of Langley as the first antenna in the wireless device of Bolin. This combination would simply imply using the other structures of Bolin shown in FIG. 1 of Bolin, but merely replacing the first antenna (item 2) with the first antenna shown in FIGS. 2 and 3 of Langley. One having ordinary skill in the art would do so to increase the number of frequencies of the antenna for the wireless device. Compare the first antenna of Bolin which provides three frequency communication wherein the first antenna of Langley provides more than three frequencies (five frequencies) and is compact and efficient. See Langley page 1, lines 3-5, and page 2, lines 2:21-22. Further see Tentzeris Declaration, ¶102.

Furthermore, Examiners find this combination is merely the simple substitution of one known element for another to obtain predictable results. See MPEP §2143(I)(B). First, Examiners find that Bolin teaches the more salient features of the wireless device of claim 11 as evidenced above, specifically the use of a three-frequency antenna that defines an antenna rectangle. Furthermore, Bolin contemplates different antenna patterns for the antenna rectangle "depending on e.g. the amount of space available inside the portable communication device." See Bolin ¶0034 and FIGS. 9-12. Second,

Examiners find that Langley teaches an improvement of such antenna systems having a multifrequency antenna (more than three frequencies) also defining an antenna rectangle. Third, Examiners find that one having ordinary skill in the art could have substituted the antenna pattern of Langley for the antenna pattern in Bolin as such would merely be replacing the antenna pattern 2 of Bolin above with the antenna pattern shown in FIGS. 2 and 3 of Langley on the defined antenna rectangle, while retaining the other structures and operation of the wireless device of Bolin. Examiners further find that one having ordinary skill would apply the improvement of the multi-band antenna of Langley to Bolin to achieve the predictable result of a wireless device that is capable of operating on additional wireless bands while offering good isolation between its multi-band antenna and its Bluetooth antenna. See Tentzeris Declaration ¶111. Finally, Examiners do not find the general operation of Bolin would be affected by the proposed modification to use the antenna pattern of Langley, but rather would improve the operation of the antenna system of Bolin to operation by allowing it to communication over a wider band of frequencies. See Tentzeris Declaration ¶108.

Regarding claim 12, Bolin and Langley teach the wireless device of claim 11 as evidenced and found above and further wherein **the first antenna is configured to support at least four frequency bands.**

Note combination of Bolin and Langley provided and discussed above. Further see Langley pages 5-6 wherein the first antenna shown in FIGS. 2 and 3 operates over five commercial frequency bands.

B. Obviousness Rejection Applying Bolin, Langley and Rutfors

Claims 11 and 12 are rejected under pre-AIA 35 U.S.C. §103(a) as being unpatentable over Bolin in view of Langley and Rutfors. Examiners first find that Bolin and Langley teach the features of claims 11 and 12 as provided above and further the wireless device comprising an antenna system having a first and second antennas and a ground plane (PCB). However, Examiners do recognize that Bolin, while teaching a PCB does not use the phrase "ground plane" for this PCB. Nevertheless, Rutfors discloses that its PCB for the wireless device is the ground plane device. See Rutfors ¶0025 and claim 15. It would thus have been obvious and known at the time the invention was made that the PCB of Bolin would be a ground plane device forming a ground plane. One having ordinary skill in the art would know this in view of Rutfors, which discloses the ground plane device is the PCB of a wireless device and thus the ground plane would be part of this ground plane device. Furthermore, such would have been obvious in view of Bolin which discloses that the grounding lines for the antennas are connected to the PCB as evidenced above.

C. Obviousness Rejection Applying Ollikainen, Langley and Bolin

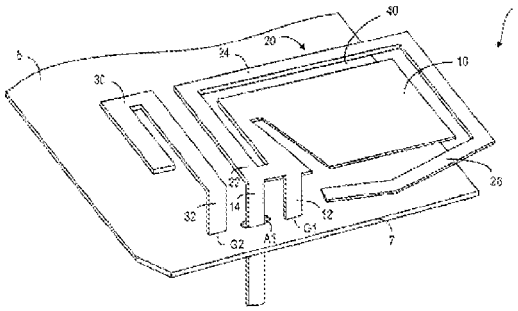
Claims 11 and 12 are rejected under pre-AIA 35 U.S.C. §103(a) as being unpatentable over Ollikainen in view of Langley and Bolin.

Regarding claim 11, Ollikainen teaches a wireless device, comprising:

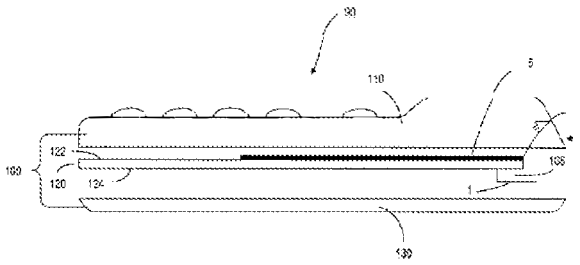
See Ollikainen ¶0001 which discloses its invention relates "an internal multi-band antenna for use in a hand-held telecommunication device, such as a mobile phone."

an antenna system comprising a ground plane and at least two antennas within the wireless device, the antenna system comprising:

See Ollikainen FIGS. 1 and 3, reprinted below, which disclose the antenna system comprises a first antenna (items 10/20/30) within the wireless device. Furthermore, the antenna system comprises a ground plane 5 located on a chassis 120.



Ollikainen FIG. 1



Ollikainen FIG. 3

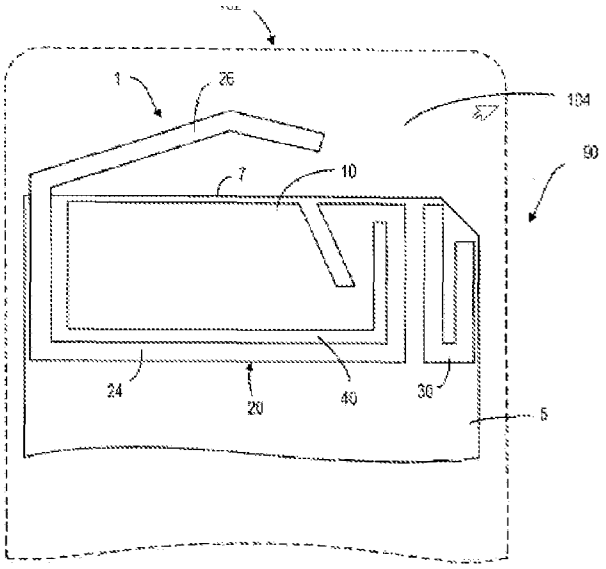
a first antenna configured to provide operation in at least three frequency bands being used by 4G communication standards, the first antenna defining an antenna contour comprising an entire perimeter of the first antenna,

See Ollikainen FIG. 1 above, first antenna comprising items 10 and 20 which operates at two frequencies, 1710-1880MHz and 880-960MHz and 1850-1990MHz. See Ollikainen ¶0016.

wherein the first antenna defines an antenna box that is a minimum-sized parallelepiped that completely encloses a volume of the first antenna and wherein each face of the minimum-sized parallelepiped is tangent to at least one point of the volume of the first antenna, an orthogonal projection of the antenna box along a normal to a face with a largest area of the first antenna defining an antenna rectangle, an aspect ratio of the antenna rectangle being defined as a

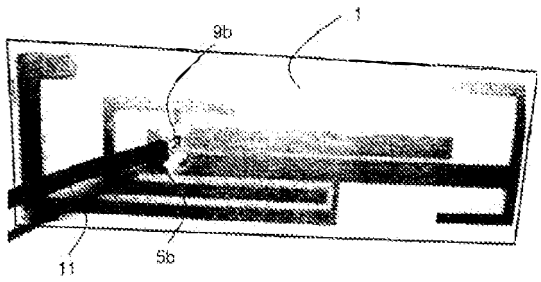
ratio between a width and a height of the antenna rectangle, wherein the aspect ratio has a value of at least 2; and

See Ollikainen FIGS. 1 and 3 above, and FIG. 2, reprinted below, wherein the first antenna (items 10/20/30) define a three-dimensional antenna box and the antenna rectangle has an aspect ratio of about 2.



Ollikainen FIG. 2

However, while Ollikainen teaches its first antenna having a general contour and complexity as shown above, Ollikainen does not teach its first antenna having the antenna contour and complexity as recited in claim 11. Nevertheless, Langley discloses **a wireless device having an antenna system comprising a ground plane within the wireless device** (See Langley FIGS. 2 and 3, reprinted below),



Langley FIG. 3

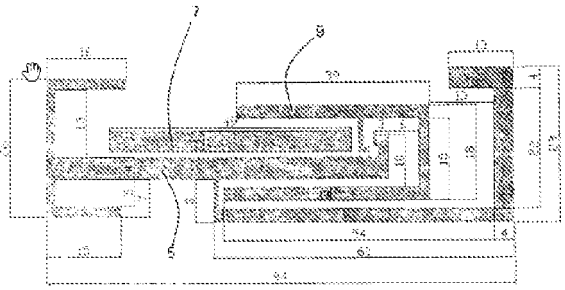


FIG. 2

the antenna system comprising:

a first antenna configured to provide operation in at multiple frequency bands being used by 4G communication standards,

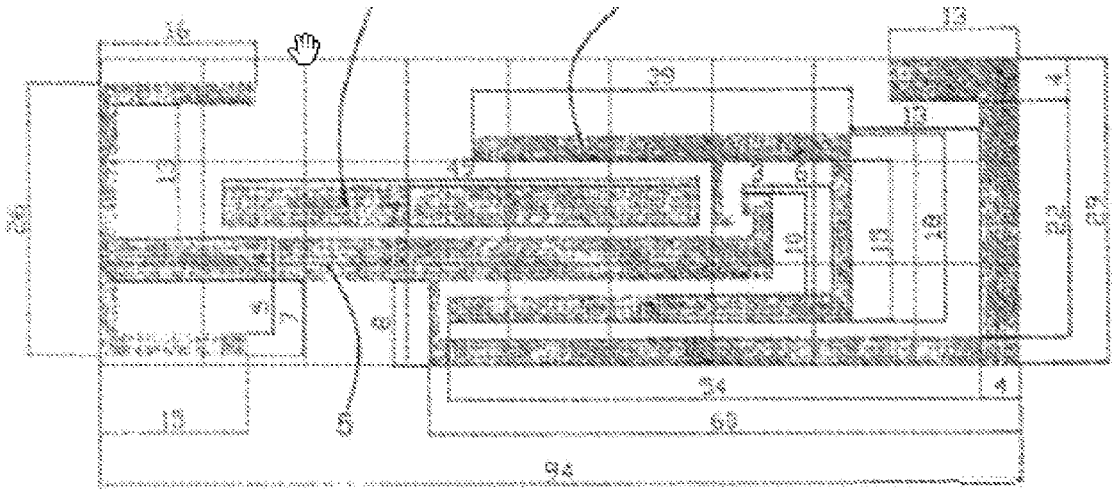
See Langley FIGS. 2 and 3 above and page 10, lines 23-25, antenna 1, comprises conductive traces on the upper side of a circuit board or other suitable surface. See also page 6, lines 21-30 wherein the antenna 1 may comprise two sets of conductors on each side of a circuit board. See further pages 5-6 wherein the antenna shown in FIG. 3 covers five commercially useful frequency bands. At least three of the noted frequencies of Langley fall within the 4G standards as stated by the 200 Patent at col. 10, lines 1-23 and col. 25, lines 14-23.

the first antenna defining an antenna contour comprising an entire perimeter of the first antenna, the antenna contour comprising at least twenty segments,

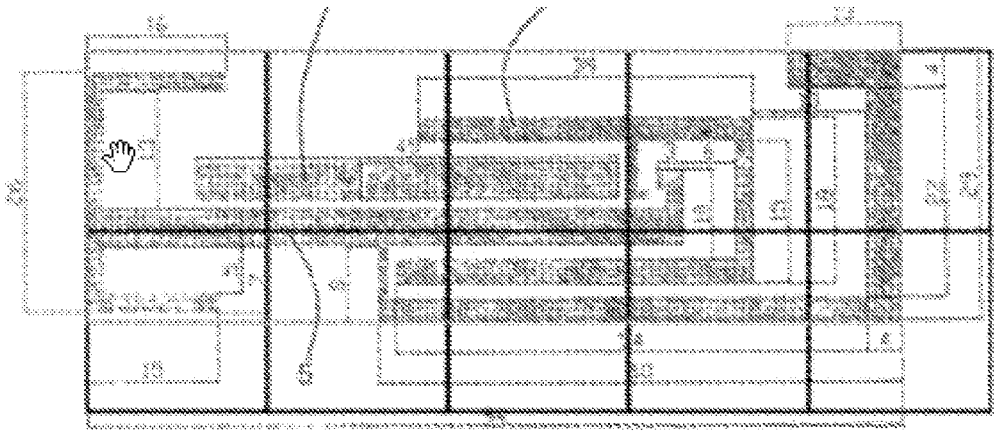
See Langley FIG. 2 above, note antenna 1 has an antenna contour as defined above and has at least twenty segments.

wherein the antenna contour has a level of complexity defined by complexity factor F_{21} having a value of at least 1.20 and complexity factor F_{32} having a value of at least 1.35, and

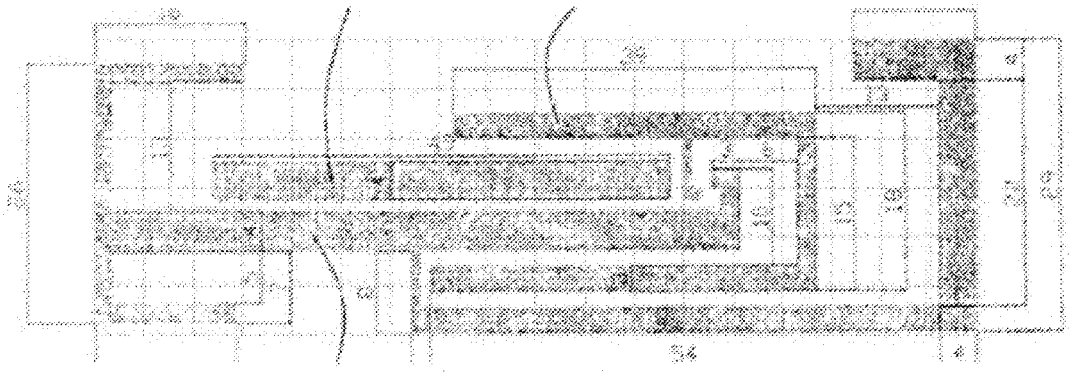
See the grid patterns Grid G_1, Grid G_2 and Grid G_2 for FIG. 2 of Langley as provided in the Request at pages 34-37 of Exhibit AA to the Request, reprinted below.



Grid G_2 for Langley FIG. 2 (annotated in the Request, page 34 of Exhibit AA)



Grid G_1 for Langley FIG. 2 (annotated in the Request, page 34 of Exhibit AA)



Grid G_3 for Langley FIG. 2 (annotated in the Request, page 37 of Exhibit AA)

As shown above, the Grid G_2 is made up of 9 columns by 3 rows fully tessellated over the antenna rectangle. Furthermore, as shown above Grid G_1 is made to have twice the scaling factor of Grid G_2. Finally, as shown above, Grid G_3 is made to have one-half the scaling factor of Grid G_2.

Based on the above grids, Examiners find that Grid G_2 implies that $N_2 = 26$, Grid G_1 implies that $N_1 = 10$ and G_3 implies that $N_3 = 78$. When these values are entered into the equation for F_{21}, Examiners find that $F_{21} = 1.38$, which meets the recitation that F_{21} must be at least 1.20. Furthermore, when these values are entered into the equation for F_{32}, Examiners find that $F_{32} = 1.58$, which meets the recitation that F_{32} must be at least 1.35. See pages 34-37 of Exhibit AA to the Request for support herein which is incorporated in these findings.

wherein the first antenna defines an antenna box that is a minimum-sized parallelepiped that completely encloses a volume of the first antenna and wherein each face of the minimum-sized parallelepiped is tangent to at least one point of the volume of the first antenna, an orthogonal projection of the antenna box

along a normal to a face with a largest area of the first antenna defining an antenna rectangle,

See Langley FIGS. 2 and 3 above, note antenna rectangle formed by antenna 1 when the antenna 1 is provided on both sides of a circuit board or other suitable surface would provide an antenna box as defined above and recited in the claim.

an aspect ratio of the antenna rectangle being defined as a ratio between a width and a height of the antenna rectangle, wherein the aspect ratio has a value of at least 2.

See Langley FIGS. 2 and 3 above and the annotate FIG. 2 showing grid pattern Grid G2 which illustrates an aspect ratio of at least two in the width to height of the antenna rectangle.

In view of these teachings of Ollikainen and Langley, Examiners find it would have been obvious at the time the invention was made to use the first antenna of Langley as the first antenna in the wireless device of Ollikainen. This combination would simply imply using the other structures of Ollikainen shown in FIGS. 1-3 of Ollikainen, but merely replacing the first antenna (items 10/20/30) with the first antenna shown in FIGS. 2 and 3 of Langley. One having ordinary skill in the art would do so to increase the number of frequencies of the antenna for the wireless device. Compare the first antenna of Ollikainen which provides three frequency communication wherein the first antenna of Langley provides more than three frequencies (five frequencies) and is compact and efficient. See Langley page 1, lines 3-5, and page 2, lines 2:21-22.

Furthermore, Examiners find this combination is merely the simple substitution of one known element for another to obtain predictable results. See MPEP §2143(I)(B).

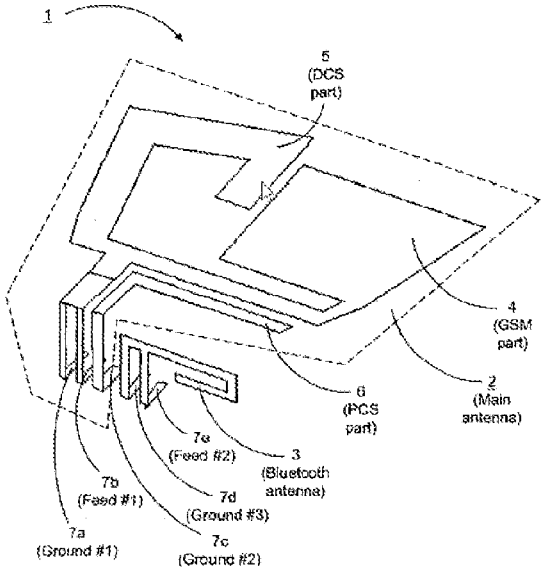
First, Examiners find that Ollikainen teaches the noted features of the wireless device of claim 11 as evidenced above, specifically the use of a three-frequency antenna that defines an antenna rectangle. Second, Examiners find that Langley teaches an improvement of such antenna systems having a multifrequency antenna (more than three frequencies) also defining an antenna rectangle. Third, Examiners find that one having ordinary skill in the art could have substituted the antenna pattern of Langley for the antenna pattern in Ollikainen as such would merely be replacing the antenna pattern 10/20/30 of Ollikainen above with the antenna pattern shown in FIGS. 2 and 3 of Langley on the defined antenna rectangle, while retaining the other structures and operation of the wireless device of Ollikainen. Examiners further find that one having ordinary skill would apply the improvement of the multi-band antenna of Langley to Ollikainen to achieve the predictable result of a wireless device that is capable of operating on additional wireless bands. Finally, Examiners do not find the general operation of Ollikainen would be affected by the proposed modification to use the antenna pattern of Langley, but rather would improve the operation of the antenna system of Bolin to operation by allowing it to communication over a wider band of frequencies. See Tentzeris Declaration ¶153-162.

Furthermore, Examiners in view of this combination of Ollikainen and Langley teaches that the particular five frequencies of operation would be centered around frequencies of 900MHz, 1800MHz, 2000MHz, 2400MHz and 5400MHz. See Langley pages 5-6. However, Examiner do not find this combination would include a separate Bluetooth antenna, which operates around 1900MHz. Nevertheless, Bolin teaches **a wireless device comprising:**

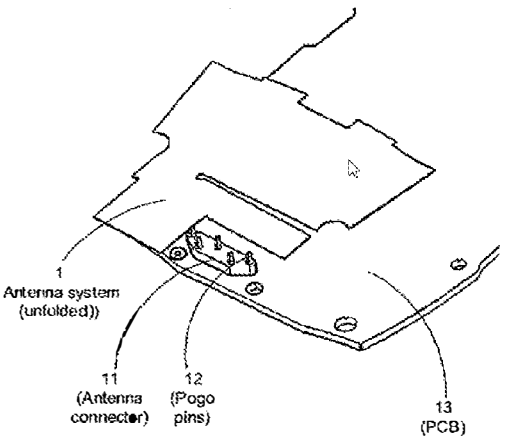
See Bolin ¶0001 which discloses its invention relates "to mobile telephones and similar types of portable communication devices that need several commercial frequency bands to communicate on" and "to a built-in, multi band, multi antenna system for such mobile telephones, etc."

an antenna system comprising a ground plane and at least two antennas within the wireless device, the antenna system comprising:

See Bolin FIGS. 1 and 5, reprinted below, which disclose the antenna system comprises a first antenna (item 2) and a second antenna (item 3) within the wireless device.



Bolin FIG. 1



Bolin FIG. 5

a first antenna configured to provide operation in at least three frequency bands being used by 4G communication standards, the first antenna defining an antenna contour comprising an entire perimeter of the first antenna,

See Bolin ¶0019 wherein the first antenna (item 2) provides three frequencies GSM/DCS/PCS. Further see alternative design for first antenna (item 2) shown in FIG. 9 above.

a second antenna configured to provide operation in a first wireless service, the second antenna being proximate to a side of a ground plane rectangle enclosing the ground plane.

See Bolin FIGS. 1, 5 and 9 above, note second antenna (item 3) for communication over Bluetooth, which is located on a side of the antenna box, i.e., an edge of the antenna rectangle of the first antenna (item 2) provided above the ground plane (at PCB 13) which defines a ground plane rectangle. Since all items are within the wireless device, they would be proximately located.

It would have thus additionally be obvious to further modify the combination of Ollikainen and Langley with the additional second antenna as taught by Bolin. This combination would simply imply providing an additional Bluetooth antenna as taught by Bolin on a side end surface of the antenna box as taught by Ollikainen and Langley. One having ordinary skill in the art would do so to provide an additional antenna to the wireless device to operate over Bluetooth, which is lacking in the combination of Ollikainen and Langley, while providing a size reduction in the arrangement. See Bolin ¶0021.

Furthermore, Examiners find the proposed combination of teachings of Ollikainen and Langley with Bolin is merely combining prior art elements according to known methods to yield predictable results. See MPEP §2143(I)(A). Examiners first find that Ollikainen and Langley teach the features of claim 11 as evidenced and found above,

except for a second antenna element. Examiners second find that Bolin teaches a combination of a multi-band first antenna element along with a Bluetooth second antenna element in a wireless device. Third, Examiners find that one having ordinary skill in the art could have combined the wireless device of the combination of Ollikainen and Langley having a multi-band frequency with an additional Bluetooth second antenna as taught by Bolin. Examiners further find that this combination would be predictable because the combination would not affect the operation of Ollikainen or Langley, but rather would increase the operational frequencies thereto to further include Bluetooth. See Tentzeris Declaration ¶¶159 and 161.

Regarding claim 12, Ollikainen, Langley and Bolin teach the wireless device of claim 11 as evidenced and found above and further wherein **the first antenna is configured to support at least four frequency bands.**

Note combination of Ollikainen, Langley and Bolin provided and discussed above. Further see Langley page 8 wherein the first antenna shown in FIGS. 2 and 3 operates over six commercial frequency bands.

VI. DOUBLE PATENTING REJECTIONS

The non-statutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A non-statutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference

claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 C.F.R. §1.321(c) or §1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP §717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP §2159. See MPEP §2146 *et seq.* for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The filing of a terminal disclaimer by itself is not a complete reply to a nonstatutory double patenting (NSDP) rejection. A complete reply requires that the terminal disclaimer be accompanied by a reply requesting reconsideration of the prior Office action. Even where the NSDP rejection is provisional the reply must be complete. See MPEP §804, subsection I.B.1. For a reply to a non-final Office action, see 37 C.F.R. §1.111(a). For a reply to final Office action, see 37 C.F.R. §1.113(c). A request for reconsideration while not provided for in 37 C.F.R. §1.113(c) may be filed after final for consideration. See MPEP §706.07(e) and §714.13.

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The actual filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/apply/applying-online/eterminal-disclaimer.

The issue of double patenting, over prior art patents or non-prior art patents, is appropriate for consideration in reexamination under 35 U.S.C. §302, both as a basis for ordering reexamination under 35 U.S.C. §304 and during subsequent examination on the merits. See MPEP §2258(I)(D). The issue of double patenting is to be considered during the examination stage of reexamination proceeding. In the examination stage, the examiner should determine whether a rejection based on double patenting is appropriate. Following a review of Patent Owner's patents related to the 200 Patent, Examiners find the following double patenting rejections are appropriate.

A. Double Patenting Rejection over 810 Patent and Langley

Claims 11 and 12 are rejected on the ground of non-statutory double patenting as being unpatentable over claim 8 of the 810 Patent in view of Langley.

Regarding **claim 11**, claim 8 of the 801 Patent reads on **a wireless device comprising:**

See claim 8 of the 810 Patent which recites "[a] wireless device…"

an antenna system comprising a ground plane and at least two antennas within the wireless device, the antenna system comprising:

See claim 8 of the 810 Patent which recites "a ground plane layer," "a first antenna …," and "a second antenna …."

a first antenna configured to provide operation in at least three frequency bands, the first antenna defining an antenna contour comprising an entire perimeter of the first antenna, wherein the antenna contour has a level of complexity defined by complexity factor F.sub.21 having a value of at least 1.20 and complexity factor F.sub.32 having a value of at least 1.35, and wherein the first antenna defines an antenna box that is a minimum-sized parallelepiped that completely encloses a volume of the first antenna and wherein each face of the minimum-sized parallelepiped is tangent to at least one point of the volume of the first antenna, an orthogonal projection of the antenna box along a normal to a face with a largest area of the first antenna defining an antenna rectangle, and

See claim 8 of the 810 Patent which recites:

> a first antenna configured to support first, second, and third radiation modes respectively providing first, second, and third paths for current respectively associated with first, second, and third frequencies bands, the first, the second, and the third radiation modes overlapping at least partially with each other, the first frequency band being contained within a first frequency region of an electromagnetic spectrum, the second frequency band being contained within a second frequency region of the electromagnetic spectrum that is higher in frequency than the first frequency region, wherein a perimeter of the first antenna defines a first antenna contour having a level of complexity defined by first complexity factor F21 having a value of at least 1.20 and first complexity factor F32 having a value less than 1.75

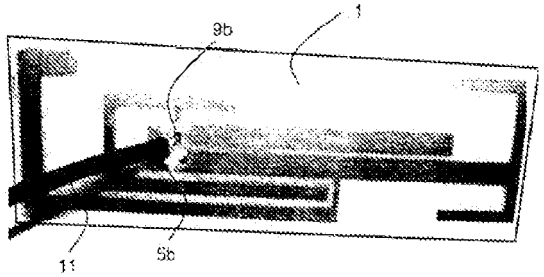
Thus, claim 8 of the 810 Patent reads on a first antenna covering at least three frequency bands and having an antenna contour with a complexity reading on the

claimed complexity. Furthermore, the antenna contour would imply an antenna box and further would imply an antenna rectangle.

a second antenna configured to provide operation in a first wireless service, the second antenna being proximate to a side of a ground plane rectangle enclosing the ground plane.

See claim 8 of the 810 Patent which recites "a second antenna configured to operate in the first and second frequency bands, the first and second frequency bands corresponding to a 4G service, ... , wherein the first and the second antennas are within the wireless device." Thus, Examiners find the second antenna operates in a wireless service and further since it is within the wireless device, it would be proximate to the ground plane.

However, while claim 8 of the 810 Patent teaches an antenna structure and the specific complexity, the antenna of claim 8 of the 810 Patent does not imply a specific antenna and further the recited aspect ratio. Nevertheless, Langley discloses **a wireless device having an antenna system comprising a ground plane within the wireless device** (See Langley FIGS. 2 and 3, reprinted below),



Langley FIG. 3

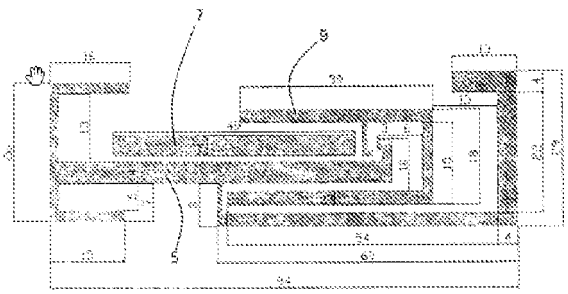


FIG. 2

the antenna system comprising:

a first antenna configured to provide operation in at multiple frequency bands being used by 4G communication standards,

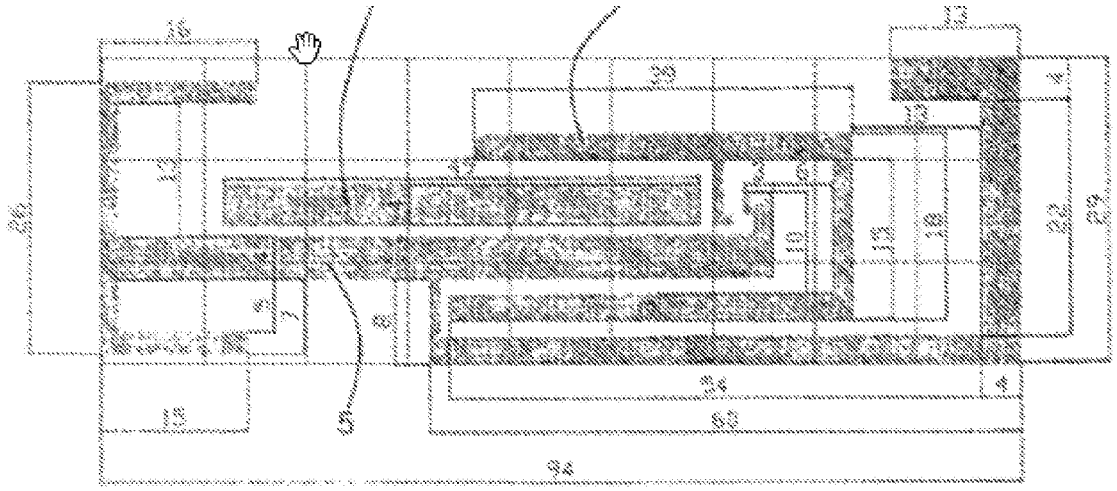
See Langley FIGS. 2 and 3 above and page 10, lines 23-25, antenna 1, comprises conductive traces on the upper side of a circuit board or other suitable surface. See also page 6, lines 21-30 wherein the antenna 1 may comprise two sets of conductors on each side of a circuit board. See further page 5, line 12 to page 6, line 13 wherein the antenna shown in FIG. 3 covers five commercially useful frequency bands. At least three of the noted frequencies of Langley fall within the 4G standards as stated by the 200 Patent at col. 10, lines 1-23 and col. 25, lines 14-23.

the first antenna defining an antenna contour comprising an entire perimeter of the first antenna, the antenna contour comprising at least twenty segments,

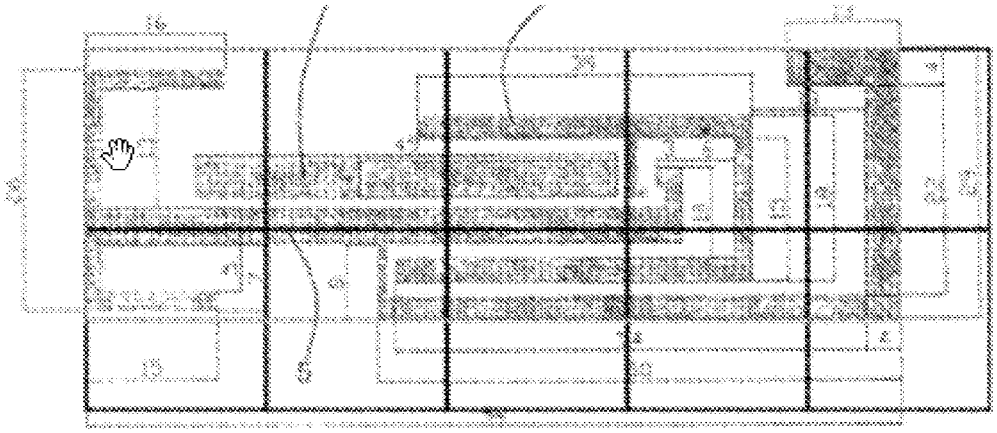
See Langley FIG. 2 above, note antenna 1 has an antenna contour as defined above and has at least twenty segments.

wherein the antenna contour has a level of complexity defined by complexity factor F_{21} having a value of at least 1.20 and complexity factor F_{32} having a value of at least 1.35, and

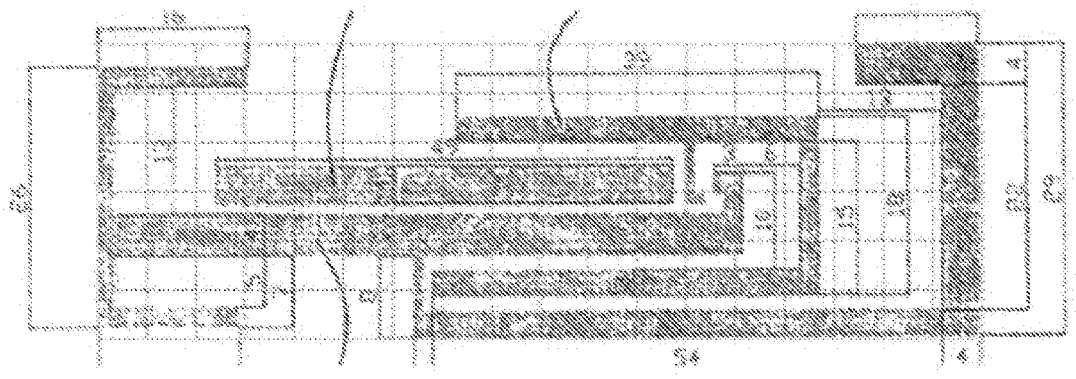
See the grid patterns Grid G_1, Grid G_2 and Grid G_2 for FIG. 2 of Langley as provided in the Request at pages 34-37 of Exhibit AA to the Request, reprinted below.



Grid G_2 for Langley FIG. 2 (annotated in the Request, page 34 of Exhibit AA)



Grid G_1 for Langley FIG. 2 (annotated in the Request, page 34 of Exhibit AA)



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Grid G_3 for Langley FIG. 2 (annotated in the Request, page 37 of Exhibit AA)

As shown above, the Grid G_2 is made up of 9 columns by 3 rows fully tessellated over the antenna rectangle. Furthermore, as shown above Grid G_1 is made to have twice the scaling factor of Grid G_2. Finally, as shown above, Grid G_3 is made to have one-half the scaling factor of Grid G_2.

Based on the above grids, Examiners find that Grid G_2 implies that $N_2 = 26$, Grid G_1 implies that $N_1 = 10$ and G_3 implies that $N_3 = 78$. When these values are entered into the equation for F_{21}, Examiners find that $F_{21} = 1.38$, which meets the recitation that F_{21} must be at least 1.20. Furthermore, when these values are entered into the equation for F_{32}, Examiners find that $F_{32} = 1.58$, which meets the recitation that F_{32} must be at least 1.35. See pages 34-37 of Exhibit AA to the Request for support herein which is incorporated in these findings.

wherein the first antenna defines an antenna box that is a minimum-sized parallelepiped that completely encloses a volume of the first antenna and wherein each face of the minimum-sized parallelepiped is tangent to at least one point of the volume of the first antenna, an orthogonal projection of the antenna box along a normal to a face with a largest area of the first antenna defining an antenna rectangle,

See Langley FIGS. 2 and 3 above, note antenna rectangle formed by antenna 1 when the antenna 1 is provided on both sides of a circuit board or other suitable surface would provide an antenna box as defined above and recited in the claim.

an aspect ratio of the antenna rectangle being defined as a ratio between a width and a height of the antenna rectangle, wherein the aspect ratio has a value of at least 2.

See Langley FIGS. 2 and 3 above and the annotate FIG. 2 showing grid pattern Grid G2 which illustrates an aspect ratio of at least two in the width to height of the antenna rectangle.

In view of these teachings of claim 8 of the 810 Patent and Langley, Examiners find it would have been obvious at the time the invention was made to use the first antenna of Langley as the first antenna in the wireless device of claim 8 of the 810 Patent. This combination would simply imply using the other structures of claim 8 of the 810 Patent as recited therein, but merely replacing the first antenna recited with the first antenna shown in FIGS. 2 and 3 of Langley. One having ordinary skill in the art would do so to increase the number of frequencies of the antenna for the wireless device and to provide frequencies within the 4G wireless ranges. Compare the first antenna of claim 8 of the 810 Patent which provides three general frequencies of communication whereas the first antenna of Langley provides more than three frequencies (five frequencies) and is compact and efficient. See Langley page 1, lines 3-5, and page 2, lines 2:21-22.

Furthermore, Examiners find this combination is merely the simple substitution of one known element for another to obtain predictable results. See MPEP §2143(I)(B). First, Examiners find that claim 8 of the 810 Patent reads on the more salient features of the wireless device of claim 11 as evidenced above, specifically the use of a three-frequency antenna that defines an antenna rectangle. Second, Examiners find that

Langley teaches an improvement of such antenna systems having a multifrequency antenna (more than three frequencies) also defining an antenna rectangle. Third, Examiners find that one having ordinary skill in the art could have substituted the antenna pattern of Langley for the antenna pattern of the first antenna of claim 8 of the 810 Patent as such would merely be replacing the recited first antenna with the antenna pattern shown in FIGS. 2 and 3 of Langley on the defined antenna rectangle, while retaining the other recited structures and operation of the wireless device of claim 8 of the 810 Patent. Examiners further find that one having ordinary skill would apply the improvement of the multi-band antenna of Langley to claim 8 of the 810 Patent to achieve the predictable result of a wireless device that is capable of operating on additional wireless bands while offering good isolation between its multi-band antenna and its Bluetooth antenna. See Tentzeris Declaration ¶111 discussing the interchangeability of antennas in such devices. Finally, Examiners do not find the general operation of claim 8 of the 810 Patent would be affected by the proposed modification to use the antenna pattern of Langley, but rather would improve the operation of the antenna system of claim 8 of the 810 Patent by allowing it to communication over a wider band of frequencies. See Tentzeris Declaration ¶108 discussing the interchangeability of antennas in such devices and the predictability thereof.

Regarding claim 12, claim 8 of the 810 Patent and Langley teach the wireless device of claim 11 as evidenced and found above and further wherein **the first antenna is configured to support at least four frequency bands.**

Note combination of claim 8 of the 810 Patent and Langley provided and discussed above. Further see Langley pages 5-6 wherein the first antenna shown in FIGS. 2 and 3 operates over five commercial frequency bands.

B. Double Patenting Rejection over 523 Application and Langley

Claims 11 and 12 are provisionally rejected on the ground of non-statutory double patenting as being unpatentable over claim 6 of the 523 Application, as amended on May 24, 2024, in view of Langley. Examiners note this rejection is provisional since the 523 Application has not issued as a patent.

Regarding **claim 11**, claim 6 of the 523 Application reads on **a wireless device comprising:**

See claim 6 of the 523 Application which recites "[a] wireless device..."

an antenna system comprising a ground plane and at least two antennas within the wireless device, the antenna system comprising:

See claim 6 of the 523 Application which recites "a ground plane layer," "a first planar antenna element ...," and "a second planar antenna element ...."

a first antenna configured to provide operation in at least three frequency bands, the first antenna defining an antenna contour comprising an entire perimeter of the first antenna, wherein the antenna contour has a level of complexity defined by complexity factor F.sub.21 having a value of at least 1.20 and complexity factor F.sub.32 having a value of at least 1.35, and wherein the first antenna defines an antenna box that is a minimum-sized parallelepiped that completely encloses a volume of the first antenna and wherein each face of the

minimum-sized parallelepiped is tangent to at least one point of the volume of the first antenna, an orthogonal projection of the antenna box along a normal to a face with a largest area of the first antenna defining an antenna rectangle, and

See claim 6 of the 523 Application which recites:

> a first planar antenna element proximate to a first side of ground plane enclosing the ground plane, the first planar antenna element being configured to support at least three frequency band of the electromagnetic spectrum, the first planar antenna element defining a first contour, wherein the first contour has a level of complexity defined by complexity factor F21 having a value of at least 1.20 and complexity factor F32 having a value of at least 1.35.

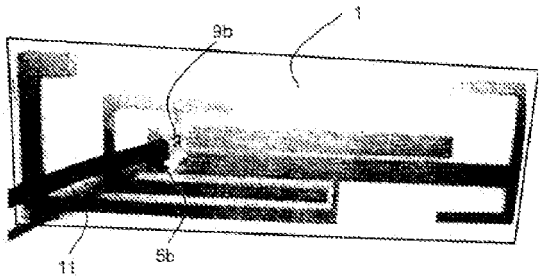
Thus, claim 6 of the 523 Application reads on a first antenna covering at least three frequency bands and having an antenna contour with a complexity reading on the claimed complexity. Furthermore, the antenna contour would imply an antenna box and further would imply an antenna rectangle.

a second antenna configured to provide operation in a first wireless service, the second antenna being proximate to a side of a ground plane rectangle enclosing the ground plane.

See claim 6 of the 523 Application which recites the wireless device "comprising a third antenna element configured to operate in at least two frequency bands that are different from the at least three frequency bands." Thus, Examiners find the second antenna operates in a wireless service and further since it is part of the wireless device, it would be proximate to the ground plane.

However, while claim 6 of the 523 Application reads on an antenna structure and the specific complexity, the antenna of claim 6 of the 523 Application does not imply a specific antenna and further the recited aspect ratio. Nevertheless, Langley discloses **a**

wireless device having an antenna system comprising a ground plane within the wireless device (See Langley FIGS. 2 and 3, reprinted below),



Langley FIG. 3

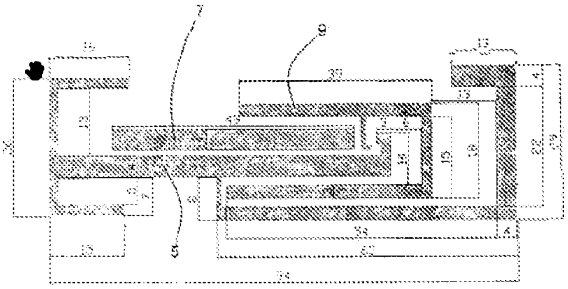


FIG. 2

the antenna system comprising:

a first antenna configured to provide operation in at multiple frequency bands being used by 4G communication standards,

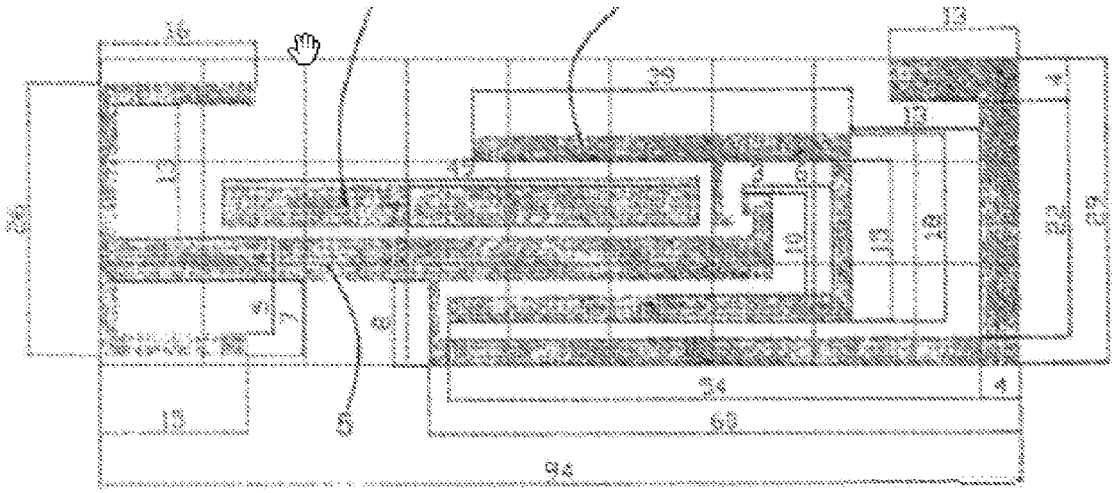
See Langley FIGS. 2 and 3 above and page 10, lines 23-25, antenna 1, comprises conductive traces on the upper side of a circuit board or other suitable surface. See also page 6, lines 21-30 wherein the antenna 1 may comprise two sets of conductors on each side of a circuit board. See further page 5, line 12 to page 6, line 13 wherein the antenna shown in FIG. 3 covers five commercially useful frequency bands. At least three of the noted frequencies of Langley fall within the 4G standards as stated by the 200 Patent at col. 10, lines 1-23 and col. 25, lines 14-23.

the first antenna defining an antenna contour comprising an entire perimeter of the first antenna, the antenna contour comprising at least twenty segments,

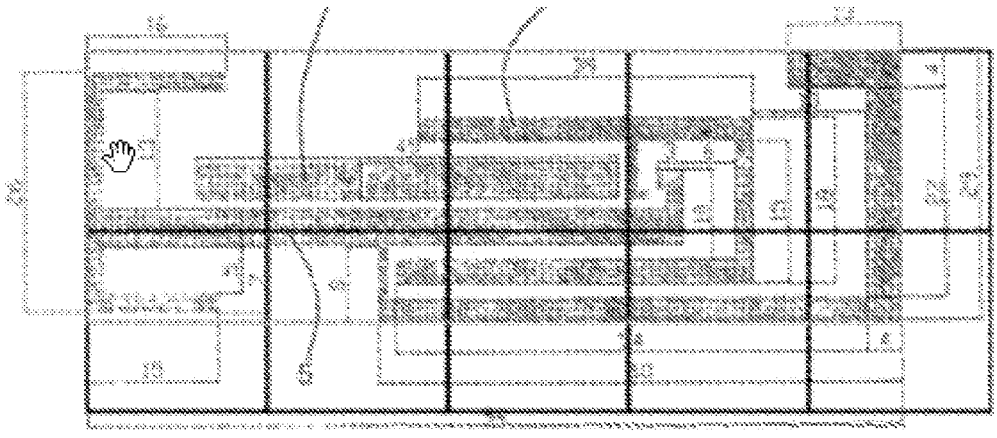
See Langley FIG. 2 above, note antenna 1 has an antenna contour as defined above and has at least twenty segments.

wherein the antenna contour has a level of complexity defined by complexity factor F_{21} having a value of at least 1.20 and complexity factor F_{32} having a value of at least 1.35, and

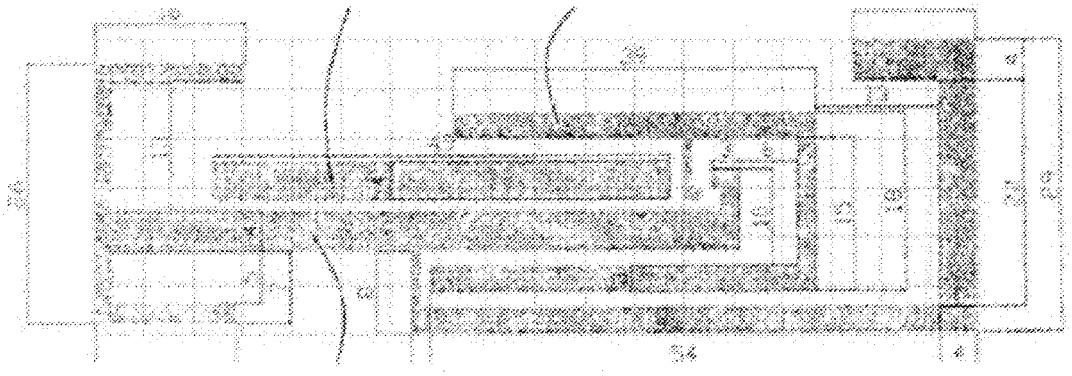
See the grid patterns Grid G_1, Grid G_2 and Grid G_2 for FIG. 2 of Langley as provided in the Request at pages 34-37 of Exhibit AA to the Request, reprinted below.



Grid G_2 for Langley FIG. 2 (annotated in the Request, page 34 of Exhibit AA)



Grid G_1 for Langley FIG. 2 (annotated in the Request, page 34 of Exhibit AA)



Grid G_3 for Langley FIG. 2 (annotated in the Request, page 37 of Exhibit AA)

As shown above, the Grid G_2 is made up of 9 columns by 3 rows fully tessellated over the antenna rectangle. Furthermore, as shown above Grid G_1 is made to have twice the scaling factor of Grid G_2. Finally, as shown above, Grid G_3 is made to have one-half the scaling factor of Grid G_2.

Based on the above grids, Examiners find that Grid G_2 implies that $N_2 = 26$, Grid G_1 implies that $N_1 = 10$ and G_3 implies that $N_3 = 78$. When these values are entered into the equation for F_{21}, Examiners find that $F_{21} = 1.38$, which meets the recitation that F_{21} must be at least 1.20. Furthermore, when these values are entered into the equation for F_{32}, Examiners find that $F_{32} = 1.58$, which meets the recitation that F_{32} must be at least 1.35. See pages 34-37 of Exhibit AA to the Request for support herein which is incorporated in these findings.

wherein the first antenna defines an antenna box that is a minimum-sized parallelepiped that completely encloses a volume of the first antenna and wherein each face of the minimum-sized parallelepiped is tangent to at least one point of the volume of the first antenna, an orthogonal projection of the antenna box

along a normal to a face with a largest area of the first antenna defining an antenna rectangle,

See Langley FIGS. 2 and 3 above, note antenna rectangle formed by antenna 1 when the antenna 1 is provided on both sides of a circuit board or other suitable surface would provide an antenna box as defined above and recited in the claim.

an aspect ratio of the antenna rectangle being defined as a ratio between a width and a height of the antenna rectangle, wherein the aspect ratio has a value of at least 2.

See Langley FIGS. 2 and 3 above and the annotate FIG. 2 showing grid pattern Grid G2 which illustrates an aspect ratio of at least two in the width to height of the antenna rectangle.

In view of these teachings of claim 6 of the 523 Application and Langley, Examiners find it would have been obvious at the time the invention was made to use the first antenna of Langley as the first antenna in the wireless device of claim 6 of the 523 Application. This combination would simply imply using the other structures of claim 6 of the 523 Application as recited therein, but merely replacing the first antenna recited with the first antenna shown in FIGS. 2 and 3 of Langley. One having ordinary skill in the art would do so to increase the number of frequencies of the antenna for the wireless device and to provide frequencies within the 4G wireless ranges. Compare the first antenna of claim 6 of the 523 Application which provides three general frequencies of communication whereas the first antenna of Langley provides more than three frequencies (five frequencies) and is compact and efficient. See Langley page 1, lines 3-5, and page 2, lines 2:21-22.

Furthermore, Examiners find this combination is merely the simple substitution of one known element for another to obtain predictable results. See MPEP §2143(I)(B). First, Examiners find that claim 6 of the 523 Application reads on the more salient features of the wireless device of claim 11 as evidenced above, specifically the use of a three-frequency antenna that defines an antenna rectangle. Second, Examiners find that Langley teaches an improvement of such antenna systems having a multifrequency antenna (more than three frequencies) also defining an antenna rectangle. Third, Examiners find that one having ordinary skill in the art could have substituted the antenna pattern of Langley for the antenna pattern of the first antenna of claim 6 of the 523 Application as such would merely be replacing the recited first antenna with the antenna pattern shown in FIGS. 2 and 3 of Langley on the defined antenna rectangle, while retaining the other recited structures and operation of the wireless device of claim 6 of the 523 Application. Examiners further find that one having ordinary skill would apply the improvement of the multi-band antenna of Langley to claim 6 of the 523 Application to achieve the predictable result of a wireless device that is capable of operating on additional wireless bands while offering good isolation between its multi-band antenna and its Bluetooth antenna. See Tentzeris Declaration ¶111 discussing the interchangeability of antennas in such devices. Finally, Examiners do not find the general operation of claim 6 of the 523 Application would be affected by the proposed modification to use the antenna pattern of Langley, but rather would improve the operation of the antenna system of claim 6 of the 523 Application to operation by allowing it to communication over a wider band of frequencies. See Tentzeris

Declaration ¶108 discussing the interchangeability of antennas in such devices and the predictability thereof.

Regarding claim 12, claim 6 of the 523 Application and Langley teach the wireless device of claim 11 as evidenced and found above and further wherein **the first antenna is configured to support at least four frequency bands.**

Note combination of claim 6 of the 523 Application and Langley provided and discussed above. Further see Langley pages 5-6 wherein the first antenna shown in FIGS. 2 and 3 operates over five commercial frequency bands.

VII. RELATED PROCEEDINGS/LITIGATION

Examiners are currently aware of the following related proceedings and litigation affecting the 855 Patent.

(a) Inter Partes Review 2024-00088 (hereinafter "**IPR2024-00088**"). Petitioner Vivant, Inc. sought cancellation of claims 1-4, 6, 7, 9-13, 15 and 17-20 of the 200 Patent over prior art. Proceeding was terminated February 20, 2024 based on a Joint Motion to Terminate.

(b) Fractus, S.A. v. ADT LLC d/b/a ADT Security Services, 2:22-cv-00412 (E.D. Tex. 2022). Litigation filed October 21, 2022. Examiners are unaware of the current status of this litigation.

(c) Fractus, S.A. v. Vivint, Inc., 2:22-cv-00413 (E.D. Tex. 2022). Litigation filed October 21, 2022. Examiners are unaware of the current status of this litigation.

While the Examiners are aware of the above related proceedings and litigation involving the 200 Patent, the Patent Owner is reminded of the continuing responsibility under 37 C.F.R. §1.565(a) to apprise the Office of any litigation activity, or other prior or concurrent proceeding, throughout the course of this reexamination proceeding involving the 200 Patent. The third-party requester is also reminded of the ability to similarly apprise the Office of any such activity or proceeding throughout the course of this reexamination proceeding. See MPEP §§2207, 2282 and 2286.

VIII. CONCLUDING REMARKS

Claims 11 and 12 are subject to reexamination herein.

Claims 11 and 12 are rejected herein.

Extensions of time under 37 C.F.R. §1.136(a) do not apply in reexamination proceedings. The provisions of 37 C.F.R. §1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Further, in 35 U.S.C. 305 and in 37 CFR 1.550(a), it is required that reexamination proceedings "will be conducted with special dispatch within the Office."

Extensions of time in reexamination proceedings are provided for in 37 C.F.R. §1.550(c). A request for extension of time must specify the requested period of extension and it must be accompanied by the petition fee set forth in 37 C.F.R. §1.17(g). Any request for an extension in a third party requested ex parte reexamination must be filed on or before the day on which action by the patent owner is due, and the mere filing of a request will not effect any extension of time. A request for an extension of time in a third party requested ex parte reexamination will be granted only for

sufficient cause, and for a reasonable time specified. Any request for extension in a patent owner requested ex parte reexamination (including reexamination ordered under 35 U.S.C. §257) for up to two months from the time period set in the Office action must be filed no later than two months from the expiration of the time period set in the Office action. A request for an extension in a patent owner requested ex parte reexamination for more than two months from the time period set in the Office action must be filed on or before the day on which action by the patent owner is due, and the mere filing of a request for an extension for more than two months will not effect the extension. The time for taking action in a patent owner requested ex parte reexamination will not be extended for more than two months from the time period set in the Office action in the absence of sufficient cause or for more than a reasonable time.

The filing of a timely first response to this final rejection will be construed as including a request to extend the shortened statutory period for an additional two months. In no event, however, will the statutory period for response expire later than SIX MONTHS from the mailing date of the final action. See MPEP §2265.

All correspondence relating to this ex parte reexamination proceeding should be directed as follows:

By U.S. Postal Service Mail to:
Mail Stop Ex Parte Reexam
ATTN: Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to:
(571) 273-9900
Central Reexamination Unit

By hand to:

Customer Service Window Randolph Building
401 Dulany St.
Alexandria, VA 22314

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Any inquiry concerning this communication or earlier communications from the Reexamination Legal Advisor or Examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

Signed:

/KENNETH WHITTINGTON/
Primary Examiner, Art Unit 3992

Conferees:

/Stephen J. Ralis/
Primary Examiner, Art Unit 3992

/H.B.P/
Hetul Patel
Supervisory Patent Reexamination Specialist, Art Unit 3992

Notice of References Cited

Application/Control No.	Applicant(s)/Patent Under Reexamination
90/019,275	11349200
Examiner	**Art Unit**
KENNETH WHITTINGTON	3992

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Name	CPC Classification	US Classification
*	A	US-11735810-B2	2023-08-22	Puente Baliarda; Carles	H01Q5/40	343/702
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in YYYY-MM-DD format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90/019,275	11349200
	Examiner	Art Unit
	KENNETH WHITTINGTON	3992

CPC - Searched*		
Symbol	Date	Examiner

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
PE2E search regarding documents cited in Request	05/23/2024	KJW
Litigation search.	10/18/2023	KJW
Inventor name search.	11/02/2023	KJW
P-TACTS for AIA proceedings.	11/02/2023	KJW
Reviewed IPR2024-00088 documents.	11/02/2023	KJW
Searched PDP for continuity data.	11/02/2023	KJW
Reviewed file wrapper for proceeding no. 90/010275 and application no. 17/246,192.	05/23/2024	KJW

/KENNETH WHITTINGTON/
Primary Examiner, Art Unit 3992

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90/019,275	11349200
	Examiner	Art Unit
	KENNETH WHITTINGTON	3992

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/KENNETH WHITTINGTON/
Primary Examiner, Art Unit 3992

Reexamination

Application/Control No.	Applicant(s)/Patent Under Reexamination
90/019,275	11349200
Certificate Date	**Certificate Number**

Requester Correspondence Address: ☐ **Patent Owner** ☑ **Third Party**

Christopher J. Coulson
SKADDEN, ARPS, SLATE, MEAGHER & FLOM, LLP
ONE MANHATTAN WEST
30TH FLOOR
NEW YORK, NEW YORK 10001

LITIGATION REVIEW ☐

Case Name	(examiner initials)	(date)	Director Initials
	KJW	23 May 2024	

Fractus, SA v. ADT, LLC, 2:22-cv-00412 (E.D. Texas 2022)
Fractus, SA v. Vivint, Inc., 2:22-cv-00413 (E.D. Texas 2022)

COPENDING OFFICE PROCEEDINGS

TYPE OF PROCEEDING	NUMBER
Inter Partes Review	IPR2024-00088 (petitioner Vivint, Inc.)

/KENNETH WHITTINGTON/
Primary Examiner, Art Unit 3992

Reexamination

Application/Control No.	Applicant(s)/Patent Under Reexamination
90/019,275	11349200
Certificate Date	**Certificate Number**

Requester Correspondence Address: ☐ **Patent Owner** ☑ **Third Party**

Christopher J. Coulson
SKADDEN, ARPS, SLATE, MEAGHER & FLOM, LLP
ONE MANHATTAN WEST
30TH FLOOR
NEW YORK, NEW YORK 10001

LITIGATION REVIEW ☐

KJW	03 November 2023
(examiner initials)	(date)
Case Name	Director Initials

Fractus, SA v. ADT, LLC, 2:22-cv-00412 (E.D. Texas 2022)

Fractus, SA v. Vivint, Inc., 2:22-cv-00413 (E.D. Texas 2022)

COPENDING OFFICE PROCEEDINGS

TYPE OF PROCEEDING	NUMBER
Inter Partes Review	IPR2024-00088 (petitioner Vivint, Inc.)

/KENNETH WHITTINGTON/
Primary Examiner, Art Unit 3992

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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/019,275	10/12/2023	11349200	SKAD002	7433

27896 7590 01/10/2024
EDELL, SHAPIRO & FINNAN, LLC
9801 Washingtonian Blvd.
Suite 750
Gaithersburg, MD 20878

EXAMINER
WHITTINGTON, KENNETH

ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
01/10/2024	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

Christopher J. Coulson
SKADDEN, ARPS, SLATE, MEAGHER & FLOM, LLP
ONE MANHATTAN WEST
30TH FLOOR
NEW YORK, NEW YORK 10001

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/019,275* .

PATENT UNDER REEXAMINATION *11349200* .

ART UNIT *3992* .

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

PTOL-465 (Rev.07-04)

Order Granting Request For Ex Parte Reexamination	Control No.	Patent Under Reexamination	
	90/019,275	11349200	
	Examiner	Art Unit	AIA (FITF) Status
	KENNETH WHITTINGTON	3992	No

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

The request for *ex parte* reexamination filed 10/12/2023 has been considered and a determination has been made. An identification of the claims, the references relied upon, and the rationale supporting the determination are attached.

Attachments: a)☑ PTO-892, b)☐ PTO/SB/08, c)☐ Other: ____

1. ☑ The request for *ex parte* reexamination is GRANTED.

RESPONSE TIMES ARE SET AS FOLLOWS:

For Patent Owner's Statement (Optional): TWO MONTHS from the mailing date of this communication (37 CFR 1.530 (b)). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).**

For Requester's Reply (optional): TWO MONTHS from the **date of service** of any timely filed Patent Owner's Statement (37 CFR 1.535). **NO EXTENSION OF THIS TIME PERIOD IS PERMITTED.** If Patent Owner does not file a timely statement under 37 CFR 1.530(b), then no reply by requester is permitted.

/KENNETH WHITTINGTON/
Primary Examiner, Art Unit 3992

cc:Requester (if third party requester)

ORDER GRANTING EX PARTE REEXAMINATION

Ex parte reexamination has been requested for Patent Claims 11 and 12 of United States Patent No. 11,349,200 to Carles Puente Baliarda et al., entitled MULTIPLE-BODY-CONFIGURATION MULTIMEDIA AND SMARTPHONE MULTIFUNCTION WIRELESS DEVICES (hereinafter the "**200 Patent**"). Substantial new questions of patentability (SNQs) affecting Patent Claims 11 and 12 of the 200 Patent are raised by the request for *ex parte* reexamination filed October 12, 2023 (hereinafter the "**Request**"). Accordingly, reexamination is **GRANTED**.

I. RELATED PROCEEDINGS/LITIGATION

Examiners are currently aware of the following related proceedings and litigation affecting the 855 Patent.

(a) Inter Partes Review 2024-00088 (hereinafter "**IPR2024-00088**"). Petitioner Vivant, Inc. sought cancellation of claims 1-4, 6, 7, 9-13, 15 and 17-20 of the 200 Patent over prior art. Proceeding was filed October 24, 2023 and no decision regarding institution has been made.

(b) Fractus, S.A. v. ADT LLC d/b/a ADT Security Services, 2:22-cv-00412 (E.D. Tex. 2022). Litigation filed October 21, 2022. Examiners are unaware of the current status of this litigation.

(c) Fractus, S.A. v. Vivint, Inc., 2:22-cv-00413 (E.D. Tex. 2022). Litigation filed October 21, 2022. Examiners are unaware of the current status of this litigation.

While the Examiners are aware of the above related proceedings and litigation involving the 200 Patent, the Patent Owner is reminded of the continuing responsibility under 37 C.F.R. §1.565(a) to apprise the Office of any litigation activity, or other prior or concurrent proceeding, throughout the course of this reexamination proceeding involving the 200 Patent. The third-party requester is also reminded of the ability to similarly apprise the Office of any such activity or proceeding throughout the course of this reexamination proceeding. See MPEP §§2207, 2282 and 2286.

II. REFERENCES/DOCUMENTS CITED HEREIN

(a) U.S. Patent Application Publication No. 2004/0137950 to Thomas Bolin et al. published on July 15, 2004 (hereinafter "**Bolin**").

(b) United Kingdom Patent Application Publication No. GB2416625 to Richard Langley et al., published on February 1, 2006 (hereinafter "**Langley**").

(c) U.S. Patent Application Publication No. 2004/0051669 to Thomas Rutfors et al., published on March 18, 2004 (hereinafter "**Rutfors**").

(d) European Patent Application Publication No. EP1294049 to Jani Ollikainen et al., published on March 19, 2003 (hereinafter "**Ollikainen**").

III. ACKNOWLEDGEMENTS

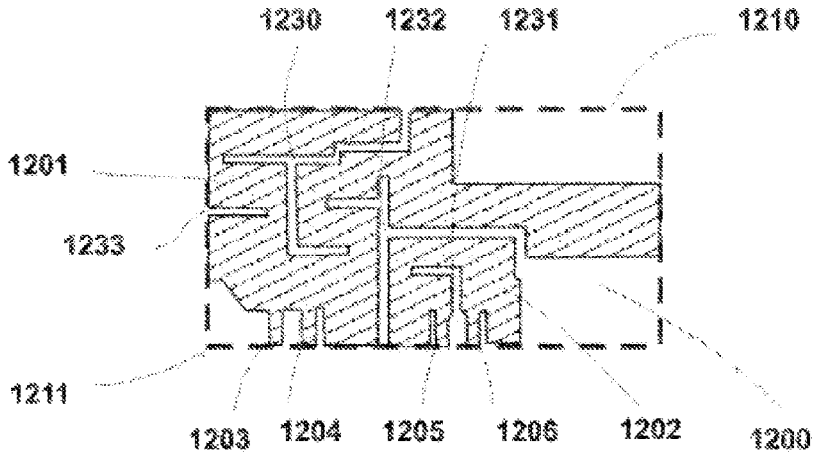
References (a) – (d) noted above have been asserted in the Request as providing disclosures and/or teachings relevant to the claims of the 200 Patent. The Request and all its accompanying documents and evidence have been fully considered in the Examiners' determinations and findings discussed below.

IV. PRIORITY

After careful review of the prosecution history of the 200 Patent, Examiners find that the 200 Patent resulted from U.S. Patent Application No. 17/246,192, filed April 30, 2021 (hereinafter the "192 Application"), which is a continuation from U.S. Patent Application No. 16/832,820, filed March 27, 2020, now U.S. Patent No. 11,031,677, which is a continuation from U.S. Patent Application No. 15/856,626, filed December 28, 2017, now U.S. Patent No. 10,644,380, which is a continuation from U.S. Patent Application No. 14/738,090 filed June 12, 2015, now U.S. Patent No. 9,899,727, which is a continuation from U.S. Patent Application No. 14/246,491 filed on April 7, 2014, now U.S. Patent No. 9,099,773, which is a continuation from U.S. Patent Application No. 11/614,429, filed December 21, 2006, now U.S. Patent No. 8,738,103, which claims the benefit of U.S. Provisional Patent Application No. 60/856,410 filed on November 3, 2006 and U.S. Provisional Patent Application No. 60/83 1,544 filed on July 18, 2006. Based on a review of these prior patents and applications, Examiners find the earliest claimed priority date for the 200 Patent is July 18, 2006.

V. RELEVANT BACKGROUND AND PROSECUTION HISTORY

The 200 Patent, particularly those claims under reexamination herein, is generally directed to a wireless device for communication over multiple frequency bands. With regard to Patent Claims 11 and 12, the wireless device, comprises a pair of antennas, as shown in FIG. 12A, reprinted below. The first antenna 1201 provides



200 Patent FIG. 12A

operation at three or more frequency bands. Furthermore, the second antenna 1202 provides operations for connection to a wireless service. Both these antennae are provided in a three-dimensional manner and define an abstract antenna box, each side of which intersections with a portion of the antennas structure as shown in FIG. 3 of the 200 Patent. Furthermore, the antennae have an antenna contour that has a specified level of complexity based on complexity factors F_{21} and F_{32}.

The following are Examiners' findings of pertinent facts for this proceeding:

04/30/2021 The 192 Application was filed with 20 claims.

08/02/2021 A preliminary amendment was filed cancelling claims 1-20 and adding new claims 21-40.

03/17/2022 The original examiner issued a first action Notice of Allowance, which allowed claims 21-40 over the prior art of record therein (hereinafter the "**2022 Allowance**"). Regarding claims 31 and 32 of importance in this proceeding, the original examiner reprinted claim 31 as follows:

> 31. A wireless device comprising:

> an antenna system comprising a ground plane and at least two antennas within the wireless device, the antenna system comprising:
>
> a first antenna configured to provide operation in at least three frequency bands being used by 4G communication standards, the first antenna defining an antenna contour comprising an entire perimeter of the first antenna, the antenna contour comprising at least twenty segments, wherein the antenna contour has a level of complexity defined by complexity factor F_{21} having a value of at least 1.20 and complexity factor F_{32} having a value of at least 1.35, and wherein the first antenna defines an antenna box that is a minimum-sized parallelepiped that completely encloses a volume of the first antenna and wherein each face of the minimum-sized parallelepiped is tangent to at least one point of the volume of the first antenna, an orthogonal projection of the antenna box along a normal to a face with a largest area of the first antenna defining an antenna rectangle, an aspect ratio of the antenna rectangle being defined as a ratio between a width and a height of the antenna rectangle, wherein the aspect ratio has a value of at least 2; and
>
> a second antenna configured to provide operation in a first wireless service, the second antenna being proximate to a side of a ground plane rectangle enclosing the ground plane.
>
> [underlining provided by the original examiner]

Furthermore, the original examiner noted the closest prior art of record and specifically stated that the underlined limitation was not disclosed by any of the prior art of record. See 2022 Allowance pages 4-7.

03/25/2022 Patent Owner filed an amendment under 37 C.F.C. §1.312 to correct a minor typographical error, but did not otherwise comment on the original examiner's reasons for allowance.

05/22/2022 The 192 Application issued as the 200 Patent. Original claims 31 and 32 were renumbered as Patent Claims 11 and 12.

VI. SUBSTANTIAL NEW QUESTIONS OF PATENTABILITY

For a substantial new question of patentability (SNQ) to be present, it is only necessary that: (A) the prior art patents and/or printed publications raise a substantial

question of patentability regarding at least one claim, i.e., the teaching of the (prior art) patents and printed publications is such that a reasonable examiner would consider the teaching to be important in deciding whether or not the claim is patentable; and (B) the same question of patentability as to the claim has not been decided by the Office in a previous examination or pending reexamination of the patent or in a final holding of invalidity by the Federal Courts in a decision on the merits involving the claim. See MPEP §2242. Furthermore, "[i]t must first be demonstrated that a patent or printed publication that is relied upon in a proposed rejection presents a new, non-cumulative technological teaching that was not previously considered and discussed on the record during the prosecution of the application that resulted in the patent for which reexamination is requested, and during the prosecution of any other prior proceeding involving the patent for which reexamination is requested." See MPEP §2216.

Based on the forgoing Examiners' findings of fact related to the prosecution history of the Patent Claims requested for reexamination, Examiners make the following determinations:

ED-1 Examiners determine that the 200 Patent was allowed on first action and thus no substantial prosecution has occurred before issuance.

ED-2 Examiners further determine that the original examiner allowed claims 31 and 32 of the 192 Application (issued as Patent Claims 11 and 12 of the 200 Patent) on the basis of the complexity factors recited in claim 31 (now Patent Claim 11) as underlined above.

Based on the above, Examiners finally determine herein that the technological features that overcame the prior art were those features identified above related to the

complexity factors for the antenna. In view of these findings and determinations, Examiners conclude that if the Request presents a new reference or combination of references that discloses or teaches the following the technological **Feature** (i.e., the combination of elements specified in the claims):

Feature [1] "wherein the antenna contour has a level of complexity defined by complexity factor F21 having a value of at least 1.20 and complexity factor F32 having a value of at least 1.35" as required and recited in Patent Claims 11 and 12, then Examiners would find that new reference or combination of references would be important to an examiner as such teachings would be directed to the technological features for which the respective Patent Claims were allowed over the prior art. Thus, the new reference or combination of references disclosing **Feature [1]** would raise a substantial new question of patentability (SNQ) for the noted Patent Claims.

VII. SUMMARY OF PROPOSED SNQS OUTLINED IN THE REQUEST

Issue 1 - The Request submits that Bolin taken with Langley raises an SNQ for Patent Claims 11 and 12 of the 200 Patent. See Request pages 19-38.

Issue 2 – The Request submits that Bolin taken with Langley and Rutfors raises an SNQ for Patent Claims 11 and 12 of the 200 Patent. See Request pages 38-48.

Issue 3 – The Request submits that Ollikainen taken with Langley and Bolin raises an SNQ for Patent Claims 11 and 12 of the 200 Patent. See Request pages 49-56.

VIII. CLAIM INTERPRETATION

A. Lexicographic Definitions

After careful review of the original specification, the prosecution history, and unless expressly noted otherwise by the Examiners, the Examiners find that they are able to locate several lexicographic definitions (either express or implied) with the required clarity, deliberateness, and precision which are necessary to interpret the patent claims. See MPEP §2111.01 IV. Each such definition is as follows:

antenna box – "[a]n antenna box for the MFWD 100 is herein defined as being the minimum-sized parallelepiped of square or rectangular faces that completely encloses the antenna volume of space and wherein each one of the faces of the minimum-sized parallelepiped is tangent to at least one point of the volume. Moreover, each possible pair of faces of the minimum-size parallelepiped shares an edge forming an inner angle of 90°." See 200 Patent col. 11, lines 35-42.

antenna rectangle – "an antenna rectangle is defined as being the orthogonal projection of the antenna box along the normal to the face with largest area of the antenna box." See 200 Patent col. 14, lines 21-24.

aspect ratio – "[t]he aspect ratio of the antenna rectangle is defined as the ratio between the width and the height of the antenna rectangle." See 200 Patent col. 14, lines 34-36.

antenna contour – "[t]he antenna contour of the antenna system is a set of joined and/or disjointed segments comprising: the perimeter of one or more antenna elements placed in the antenna rectangle, the perimeter of closed slots and/or closed apertures defined within the antenna elements, and/or the orthogonal projection onto the antenna

rectangle of perimeters of antenna elements, or perimeters of or parts of antenna elements that are placed in the antenna box but not in the antenna rectangle." See 200 Patent col. 15, lines 16-26.

Complexity factor F21 -

$$F_{21} = -\frac{\log(N_2) - \log(N_1)}{\log(1/2)}$$

Complexity factor F32 -

$$F_{32} = -\frac{\log(N_3) - \log(N_2)}{\log(1/2)}$$

Wherein

N_1 – the number of cells of the grid G_1 that are at least partially inside the antenna rectangle and include at least a point of the antenna contour. See 200 Patent col. 19, lines12-17.

N_2 – the number of cells of the grid G_2 that are completely inside the antenna rectangle and include at least a point of the antenna contour. See 200 patent col. 19, lines 17-19 and col. 20, lines 5-8.

N3 – the number of cells of the grid G_3 that are completely inside the antenna rectangle and include at least a point of the antenna contour. See 200 Patent at col. 20, lines 8-11.

Wherein N1, N2 and N3 are determined using the following grids:

Grid G_2 – a grid of cells drawn over the antenna rectangle such that "the size of a cell and its aspect ratio (i.e., the ratio between the width and the height of the cells) are first chosen so that the antenna rectangle is perfectly tessellated with an odd number of

columns and an odd number of rows." See 200 Patent col. 17, lines 28-32. "[C]olumns of cells are associated with the longer side of an antenna rectangle, while rows of cells are associated with a shorter side of the antenna rectangle." See 200 Patent col. 17, lines 33-36.

Grid G_1 – a grid of cells over the antenna rectangle and is "obtained by combining four (4) cells of the grid G_2." See 200 Patent col. 18, lines 12-13. Thus, the Grid G_1 is twice a scaling factor of Grid G_2, i.e., "[a] cell of grid size G_2 is half the size of a cell of grid G_1 (i.e., a ½ scaling factor or an octave of scale). See 200 Patent col. 17, lines 17-19.

Grid G_3 – a grid of cells over the antenna rectangle and is "obtained by subdividing each cell of grid G_2 into four cells, with each of the cells having a cell width (W_3) equal to one half (½) of the width of a cell of the second grid (W_2) (i.e., W_3=½×W_2); and a cell height (H_3) equal to one half (½) of the height of a cell of the second grid (H_2) (i.e., H_3=½×H_2). See 200 Patent col. 19, lines 62-67. Further "a cell of grid size G_3 is half the size of a cell of grid G_2, or one fourth the size of a cell of grid G_1 (i.e., a ¼ scaling factor or two octaves of scale)." See 200 Patent col. 17, lines 19-21.

B. 35 U.S.C. §112 (6th ¶)

The Examiners further find that because Patent claims 11 and 12 herein recite neither "step for" nor "means for," the claims fail Prong (A) as set forth in MPEP §2181 I. Because all examined claims fail Prong (A) as set forth in MPEP §2181 I., the Examiners conclude that all examined claims do not invoke 35 U.S.C. §112(f). See also *Ex parte Miyazaki*, 89 USPQ2d 1207, 1215-16 (B.P.A.I. 2008)(precedential)(where the

Board did not invoke 35 U.S.C. §112(f) because "means for" was not recited and because applicant still possessed an opportunity to amend the claims).

C. Conclusion of Claim Interpretation

Because of the Examiners' findings above that Applicant is its own lexicographer, the Examiners find these definitions control. See MPEP §2111.01(IV). Examiners further find the no limitations in Patent Claims 11 and 12 invoke 35 U.S.C. §112 (6th ¶), and thus the remaining limitations that are not defined will be given the broadest reasonable interpretation consistent with the specification since patentee has an opportunity to amend claims. See MPEP §2258(I)(G), MPEP §2111, MPEP §2111.01 and *In re Yamamoto et al*., 222 USPQ 934 (Fed. Cir. 1984). Under a broadest reasonable interpretation, words of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification. See MPEP §2111.01(I). It is further noted it is improper to import claim limitations from the specification, i.e., a particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment. See MPEP §2111.01(II).

IX. DISCUSSION OF PROPOSED SNQS

Issue 1 Boling and Langley raises SNQs for Patent Claims 11 and 12.

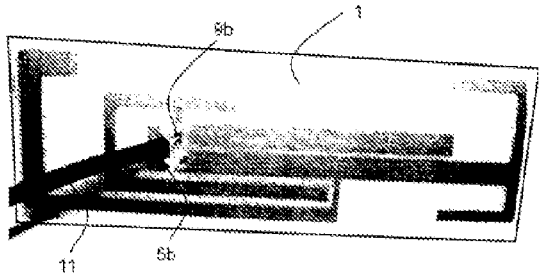
The Request submits that Bolin taken with Langley raises SNQs for Patent Claims 11 and 12. Examiners agree as follows.

First, Examiners find herein that Bolin is U.S. patent publication and that Langley is a British patent application publication (See MPEP §2210 and §2244--SNQs must be

based on patents and printed publications) and are self-authenticating published documents. Furthermore, Examiners find that each reference has either a publication date or filing date before the earliest priority date of the 200 Patent and thus qualify as prior art patent publications under one or more sections of 35 U.S.C. §102.

Second, Examiners find that Bolin and Langley alone and/or in combination were not cited or considered during prosecution of the 192 Application that led to the 200 Patent. Accordingly, Examiners conclude an SNQ may be based on the proposed combination of these references. See MPEP §2216.

Third Examiners find that Bolin taken with Langley disclose or teach sufficient features to raise SNQs for Patent Claims 11 and 12. Specifically, Examiners find that Langley discloses **an antenna system comprising a ground plane within the wireless device** (See Langley FIGS. 2 and 3, reprinted below),



Langley FIG. 3

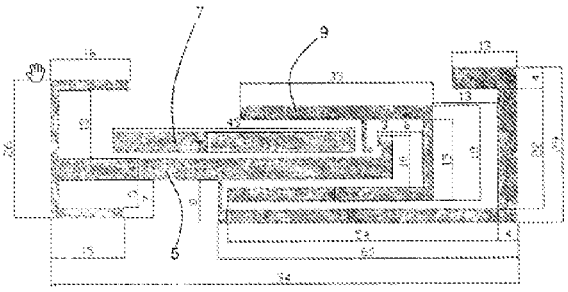


FIG. 2

the antenna system comprising:

a first antenna configured to provide operation in at multiple frequency bands being used by 4G communication standards,

See FIGS. 2 and 3 above and page 10, lines 23-25, antenna 1, comprises conductive traces on the upper side of a circuit board or other suitable surface. See

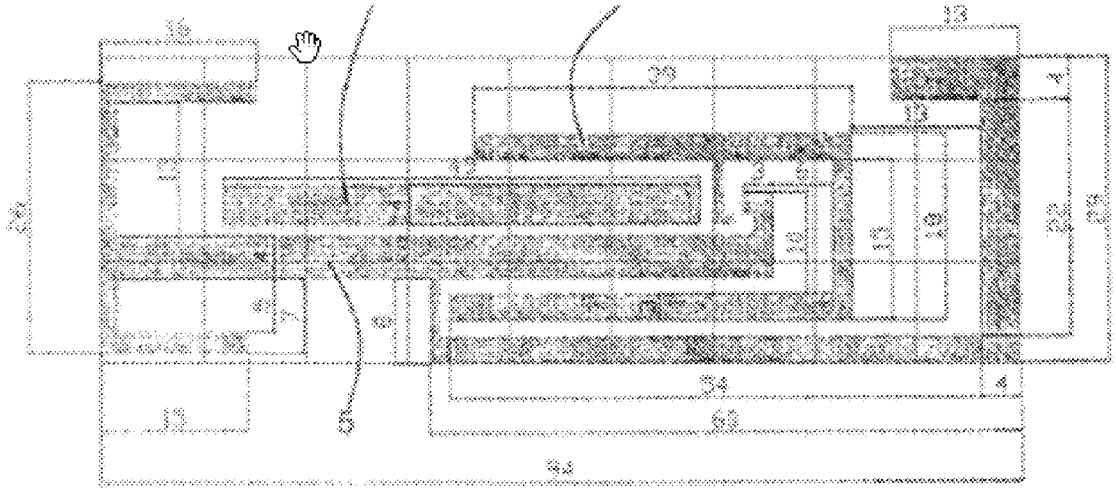
also page 6, lines 21-30 wherein the antenna 1 may comprise two sets of conductors on each side of a circuit board. See further page 8, lines 8-13 wherein the antenna shown in FIG. 3 covers six commercially useful frequency bands. At least three of the noted frequencies of Langley fall within the 4G standards as stated by the 200 Patent at col. 10, lines 1-23 and col. 25, lines 14-23.

the first antenna defining an antenna contour comprising an entire perimeter of the first antenna, the antenna contour comprising at least twenty segments,

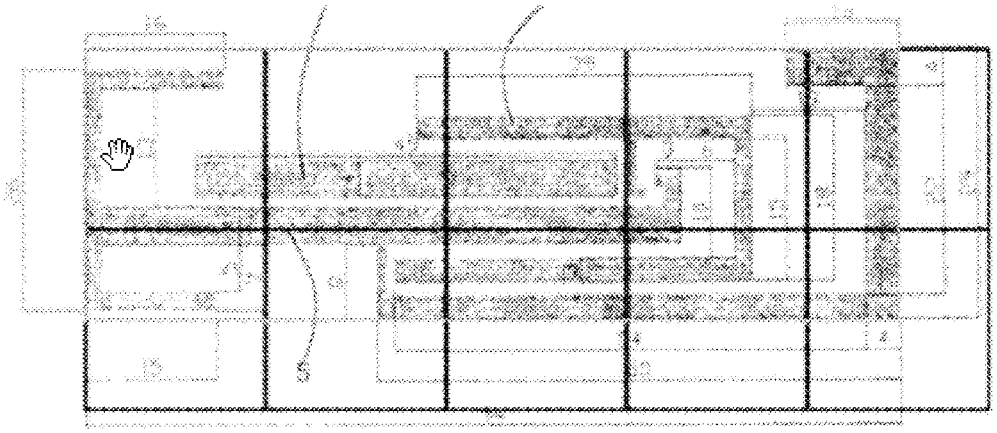
See FIG. 2 above, note antenna 1 has an antenna contour as defined above and has at least twenty segments.

wherein the antenna contour has a level of complexity defined by complexity factor F_{21} having a value of at least 1.20 and complexity factor F_{32} having a value of at least 1.35, and

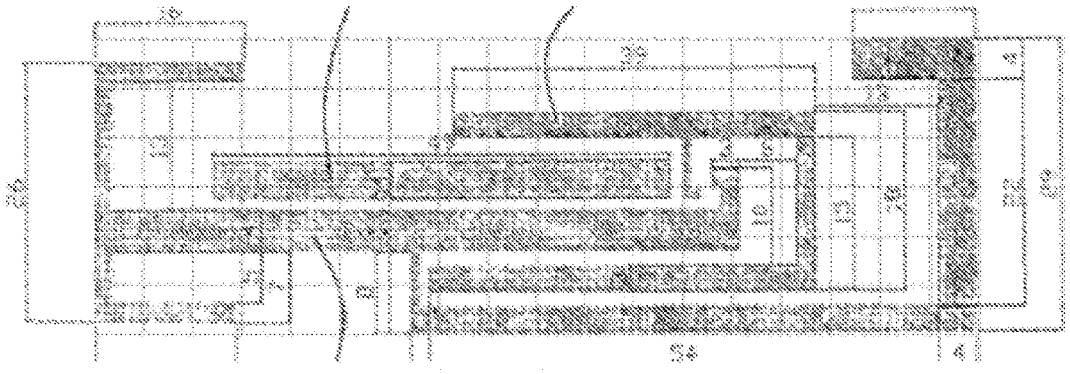
See the grid patterns Grid G_1, Grid G_2 and Grid G_2 for FIG. 2 of Langley as provided in the Request at pages 34-37 of Exhibit AA to the Request, reprinted below.



Grid G_2 for Langley FIG. 2 (annotated in the Request, page 34 of Exhibit AA)



Grid G_1 for Langley FIG. 2 (annotated in the Request, page 34 of Exhibit AA)



Grid G_3 for Langley FIG. 2 (annotated in the Request, page 37 of Exhibit AA)

As shown above, the Grid G_2 is made up of 9 columns by 3 rows fully tessellated over the antenna rectangle. Furthermore, as shown above Grid G_1 is made to have twice the scaling factor of Grid G_2. Finally, as shown above, Grid G_3 is made to have one-half the scaling factor of Grid G_2.

Based on the above grids, Examiners find that Grid G_2 implies that $N_2 = 26$, Grid G_1 implies that $N_1 = 10$ and G_3 implies that $N_3 = 78$. When these values are entered into the equation for F_{21}, Examiners find that $F_{21} = 1.38$, which meets the recitation that F_{21} must be at least 1.20. Furthermore, when these values are entered into the

equation for F_{32}, Examiners find that F_{32} = 1.58, which meets the recitation that F_{32} must be at least 1.35. See pages 34-37 of Exhibit AA to the Request for support herein which is incorporated in these findings.

wherein the first antenna defines an antenna box that is a minimum-sized parallelepiped that completely encloses a volume of the first antenna and wherein each face of the minimum-sized parallelepiped is tangent to at least one point of the volume of the first antenna, an orthogonal projection of the antenna box along a normal to a face with a largest area of the first antenna defining an antenna rectangle,

See FIGS. 2 and 3 above, note antenna rectangle formed by antenna 1 when the antenna 1 is provided on both sides of a circuit board or other suitable surface would provide an antenna box as defined above and recited in the claim.

an aspect ratio of the antenna rectangle being defined as a ratio between a width and a height of the antenna rectangle, wherein the aspect ratio has a value of at least 2.

See FIGS. 2 and 3 above and the annotate FIG. 2 showing grid pattern Grid G2 which illustrates an aspect ratio of at least two in the width to height of the antenna rectangle.

In addition to the above findings, Examiners further agree with an incorporate Exhibit AA to the Request as support for the teachings that Bolin and Langley discloses the features of Patent Claims 11 and 12. Therefore, in view of the forgoing findings, by the Examiners herein and in those asserted in the Request, Examiners further find with regard specifically to **Feature [1]**, that Bolin taken with Langley discloses “wherein the

antenna contour has a level of complexity defined by complexity factor F21 having a value of at least 1.20 and complexity factor F32 having a value of at least 1.35" as required and recited in Patent Claims 11 and 12. Such is shown via the annotated figures of Langley using the guidance and definitions provided in the 200 Patent.

Based on the forgoing, Examiners find that Bolin and Langley provides technological teachings taken together to arrive at **Feature [1]** that a reasonable examiner would consider important in determining the patentability of Patent Claims 11 and 12. Examiners further find the combined teachings of these references as discussed herein are not cumulative to any written discussion on the record of the teachings of the prior art, was not previously considered nor addressed in this manner during a prior examination, and the same questions were not the subject of a final holding of invalidity in the Federal Courts. Accordingly, Examiners conclude herein that Bolin and Langley raise an SNQ for Patent Claims 11 and 12.

Issue 2 Boling, Langley and Rutfors raises SNQs for Patent Claims 11 and 12.

The Request submits that Bolin taken with Langley and Rutfors raises SNQs for Patent Claims 11 and 12. Examiners agree as follows.

First, Examiners find herein that Bolin and Rutfors are U.S. patent publications and that Langley is a British patent application publication (See MPEP §2210 and §2244--SNQs must be based on patents and printed publications) and are self-authenticating published documents. Furthermore, Examiners find that each reference has either a publication date or filing date before the earliest priority date of the 200

Patent and thus qualify as prior art patent publications under one or more sections of 35 U.S.C. §102.

Second, Examiners find that Bolin, Langley and Rutfors alone and/or in combination were not cited or considered during prosecution of the 192 Application that led to the 200 Patent. Accordingly, Examiners conclude an SNQ may be based on the proposed combination of these references. See MPEP §2216.

Third Examiners find that Bolin, Langley and Rutfors disclose or teach sufficient features to raise SNQs for Patent Claims 11 and 12. As discussed above for Issue 1, Examiners have already concluded that Bolin taken with Langley raise SNQs for Patent Claims 11 and 12 based on the disclosure of Langley. Furthermore, Examiners find that the Request supplements the findings of Bolin and Langley with Rutfors to teach the nature of the ground plane and a shield between antenna elements. See Exhibit BB to the Request, pages 4, 10-12 and 23. Thus, Examiners find that Langley disclose **Feature [1]**, even with the additional teachings of Bolin and Rutfors, for the same reasons as for Issue 1.

In addition to the above findings, Examiners further agree with an incorporate Exhibit BB to the Request as support that Bolin taken with Langley and Rutfors discloses the features of Patent Claims 11 and 12. Therefore, in view of the forgoing findings, by the Examiners herein and in those asserted in the Request, Examiners further find with regard specifically to **Feature [1]**, that Bolin taken with Langley and Rutfors discloses "wherein the antenna contour has a level of complexity defined by complexity factor F21 having a value of at least 1.20 and complexity factor F32 having a value of at least 1.35" as required and recited in Patent Claims 11 and 12. Such is

shown via the annotated figures of Langley using the guidance and definitions provided in the 200 Patent.

Based on the forgoing, Examiners find that Bolin taken Langley and Rutfors provides technological teachings taken together to arrive at **Feature [1]** that a reasonable examiner would consider important in determining the patentability of Patent Claims 11 and 12. Examiners further find the combined teachings of these references as discussed herein are not cumulative to any written discussion on the record of the teachings of the prior art, was not previously considered nor addressed in this manner during a prior examination, and the same questions were not the subject of a final holding of invalidity in the Federal Courts. Accordingly, Examiners conclude herein that Bolin taken with Langley and Rutfors raise SNQs for Patent Claims 11 and 12.

Issue 3 Ollikainen taken with Bolin and Langley raises SNQs for Patent Claims 11 and 12.

The Request submits that Ollikainen taken with Bolin and Langley raises SNQs for Patent Claims 11 and 12. Examiners agree as follows.

First, Examiners find herein that Bolin is a U.S. patent application publication, Ollikainen is a European patent application publication and Langley is a British patent application publication (See MPEP §2210 and §2244--SNQs must be based on patents and printed publications) and are self-authenticating published documents. Furthermore, Examiners find that each reference has either a publication date or filing date before the earliest priority date of the 200 Patent and thus qualify as prior art patent publications under one or more sections of 35 U.S.C. §102.

Second, Examiners find that Ollikainen taken with Bolin and Langley alone and/or in combination were not cited or considered during prosecution of the 192 Application that led to the 200 Patent. Accordingly, Examiners conclude an SNQ may be based on the proposed combination of these references. See MPEP §2216.

Third Examiners find that Ollikainen taken with Bolin, Langley disclose or teach sufficient features to raise SNQs for Patent Claims 11 and 12. As discussed above for Issue 1, Examiners have already concluded that Bolin taken with Langley raises SNQs for Patent Claims 11 and 12 based on the disclosure of Langley. Furthermore, Examiners find that the Request supplements the findings of Ollikainen with the teachings of Bolin and Langley. See Exhibit CC to the Request. Thus, Examiners find for Issue 3, for same reasons as Issue 1 above, Langley disclose **Feature [1]**, even with the additional teachings of Ollikainen and Bolin.

In addition to the above findings, Examiners further agree with an incorporate Exhibit CC to the Request as support for the teachings that Ollikainen taken with Bolin and Langley discloses the features of Patent Claims 11 and 12. Therefore, in view of the forgoing findings, by the Examiners herein and in those asserted in the Request, Examiners further find with regard specifically to **Feature [1]**, that Ollikainen taken with Bolin and Langley discloses "wherein the antenna contour has a level of complexity defined by complexity factor F21 having a value of at least 1.20 and complexity factor F32 having a value of at least 1.35" as required and recited in Patent Claims 11 and 12. Such is shown via the annotated figures of Langley using the guidance and definitions provided in the 200 Patent.

Based on the forgoing, Examiners find that Ollikainen taken with Bolin and Langley provides technological teachings taken together to arrive at **Feature [1]** that a reasonable examiner would consider important in determining the patentability of Patent Claims 11 and 12. Examiners further find the combined teachings of these references as discussed herein are not cumulative to any written discussion on the record of the teachings of the prior art, was not previously considered nor addressed in this manner during a prior examination, and the same questions were not the subject of a final holding of invalidity in the Federal Courts. Accordingly, Examiners conclude herein that Ollikainen taken with Bolin and Langley raise an SNQ for Patent Claims 11 and 12.

X. SCOPE OF REEXAMINATION

On the basis of the findings above, Examiners agree that Issues 1-3 raise SNQs for Patent Claims 11 and 12 of the 200 Patent. Accordingly, Patent Claims 11 and 12 of the 200 Patent is ORDERED will be reexamined as requested in this reexamination proceeding.

XI. 35 U.S.C. §325(d)

35 U.S.C. §325(d) states in part that "[i]n determining whether to institute or order a proceeding under this chapter, chapter 30, or chapter 31, 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." Thus, in order for the Director to exercise discretion as to whether to Order a reexamination proceeding under chapter 30, the request must first be determined to be based on the

same or substantially the same prior art or arguments that previously were presented to the Office.

A review of the post grant history for the 200 patent indicates that the patent is the subject of a pending later filed Office post grant challenge.

On October 24, 2023, after the filing of the present *ex parte* reexamination, Vivint, Inc. filed a petition requesting *inter partes* review of Patent Claims 1-4, 6-7, 9-13, 15 and 17-20 of the 200 Patent (IPR2024-00088), which asserted the following grounds as raising a reasonable likelihood of prevailing (RLP):

Ground #	Challenged Claims	Ground
1	1-4, 6-7, 9-13, 15, and 17-20	Ramaswamy renders the Challenged Claims unpatentable.

[See Petition in IPR2024-00088, page 3]

As of the mailing date of this Order, the Patent Trial and Appeal Board (PTAB) has yet to make to a determination on whether to institute to the IPR proceeding,

A comparison between the instant request for *ex parte* reexamination of the 200 patent indicates that 1) the Request is not based on the same or substantially the same prior art or arguments that are being presented in the pending IPR petition, and 2) the prior art and arguments presented in the IPR2024-00088 petition, were not previously presented to the Office with the meaning of the statute, as the IPR petition was filed after the filing of the instant reexamination Request, and 3) the there is no evidence of record that the identified Third Party Requester (Unified Patents, LLC) is a real party-in-interest to the Petitioner (Vivint, Inc) of the pending IPR Petition.

As stated above, the Request asserts the following grounds as raising a substantial new question of patentability (SNQ) to claims 11 and 12 of the '200 patent.

SNQ	Claims Challenged	35 USC §	References
1	11 and 12	103(a)	Bolin, Langley
2	11 and 12	103(a)	Bolin, Langley, Rutfors
3	11 and 12	103(a)	Ollikainen, Bolin, Langley

As an initial matter, none of the grounds presented as raising a substantial new question of patentability of the 200 patent are the same or contain any of same the prior art references as presented in the pending non-instituted IPR petition. A review of these references indicates they have different disclosures and provide similar but different teachings relative to claims 11 and 12 of the '200 as compared to Ramaswamy. Thus, the prior art and arguments are not the same or substantially the same as those being presented in the pending IPR petition. Further, even if the art and arguments were determined to be substantially the same as those in the presented in the IPR petition, they were not previously presented to the Office as the IPR petition was filed after the filing of the current reexamination request.

Accordingly, the statutory threshold for the Director to exercise discretion to reject the request pursuant to 35 U.S.C. §325(d) has not been met, because the art and arguments are not the same or substantially the same as the art and arguments presented in the co-pending IPR and were not previously presented to the Office.

Reexamination is thus Ordered based on the determination discussed above that the Request raises SNQs to the claims of the 200 Patent.

XI. CONCLUDING REMARKS

Reexamination of Patent Claims 11 and 12 is ordered herein.

Extensions of time under 37 C.F.R. §1.136(a) will not be permitted in these proceedings because the provisions of 37 C.F.R. §1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. §305 requires that reexamination proceedings "will be conducted with special dispatch" (37 C.F.R. §1.550(a)). Extension of time in reexamination proceedings are provided for in 37 C.F.R. §1.550(c). After the filing of a request for reexamination by a third-party requester, any document filed by either the patent owner of the third party requester must be served on the other party (or parties where two or more third-party-requester proceedings are merged) in the reexamination proceeding in the manner provided in 37 C.F.R. §1.248. See 37 C.F.R. §1.550(f).

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to KENNETH WHITTINGTON whose telephone number is

(571) 272-2264. The examiner can normally be reached 8:30am - 5:00pm, Monday - Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hetul Patel, can be reached on (571) 272-4184.

Signed:

/KENNETH WHITTINGTON/
Primary Examiner, Art Unit 3992

Conferees:

/Stephen J. Ralis/
Primary Examiner, Art Unit 3992

/H.B.P/
Supervisory Patent Reexamination Specialist, Art Unit 3992

PTO/SB/08b (07-09)
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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	Ex Parte Re-Exam of 11,349,200
Filing Date	October 12, 2023
First Named Inventor	Puente Baliarda, Carles
Art Unit	
Examiner Name	
Attorney Docket Number	SKAD002

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
/K.W/	Ex. 1009	Declaration of Manos M. Tentzeris, Ph.D.	
/K.W/	Ex. 1010	Curriculum Vitae of Manos M. Tentzeris, Ph.D.	
/K.W/	Ex. 1015	Ang, et al., Compact Internal Quad-Band Antenna for Mobile Phones, Microwave and Optical Technology Letters, Vol. 38, No. 3 (Aug. 5, 2003)	
/K.W/	Ex. 1016	ETSI TS 136 104 V8.8.0 (2010-02) Technical Specification	
/K.W/	Ex. 1017	Rohde & Schwarz, LTE Release 9, Technology Introduction White Paper, 1MA191	
/K.W/	Ex. AA	Claim chart comparing claims 11-12 of Patent No. 11,349,200 to Bolin and Langley	
/K.W/	Ex. BB	Claim chart comparing claims 11-12 of Patent No. 11,349,200 to Bolin, Langley, and Rutfors	
/K.W/	Ex. CC	Claim chart comparing claims 11-12 of Patent No. 11,349,200 to Ollikainen, Bolin, and Langley	

Examiner Signature	/KENNETH WHITTINGTON/	Date Considered	11/02/2023

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

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PTO/SB/08a (07-09)
Approved for use through 05/31/2024. OMB 0651-0031
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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known

Application Number	Ex Parte Re-Exam of 11,349,200
Filing Date	October 12, 2023
First Named Inventor	Puente Baliarda, Carles
Art Unit	
Examiner Name	
Attorney Docket Number	SKAD002

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/K.W/	Ex. 1011	US- 2004/0134795	01-14-2004	Bolin, Thomas	
/K.W/	Ex. 1014	US- 2004/0051669	09-25-2003	Rutfors, Tomas	
		US-			
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FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
/K.W/	Ex. 1012	GB2416625A	02-01-2006	Langley, Richard		
/K.W/	Ex. 1013	EP1294049A1	03-19-2003	Ollikainen, Jani		

Examiner Signature	/KENNETH WHITTINGTON/	Date Considered	11/02/2023

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

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PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	8	"11349200"	(US-PGPUB; USPAT)	OR	ON	ON	2023/10/25 10:22 AM
L2	1	"20040137950".pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/10/25 10:00 PM
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L12	20	L10 AND ("ground plane" WITH antenna)	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2023/10/27 04:53 PM
L13	1	"1294049"	(EPO)	OR	ON	ON	2023/11/02 09:31 AM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.