AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
2:18-cv-137	4/9/2018	Eastern District of Texas

PLAINTIFF	DEFENDANT
Fractus, S.A.	T-Mobile US, Inc., T-Mobile USA, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	6,937,191	8/30/2005	Fractus, S.A.
2	7,250,918	7/31/2007	Fractus, S.A.
3	7,557,768	7/7/2009	Fractus, S.A.
4	7,932,870	4/26/2011	Fractus, S.A.
5	8,228,256	7/24/2012	Fractus, S.A.

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		*Patents listed above.
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
2:18-cv-135	4/9/2018	Eastern District of Texas

PLAINTIFF	DEFENDANT
Fractus, S.A.	AT&T Mobility LLC

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	6,937,191	8/30/2005	Fractus, S.A.
2	7,250,918	7/31/2007	Fractus, S.A.
3	7,557,768	7/7/2009	Fractus, S.A.
4	7,932,870	4/26/2011	Fractus, S.A.
5	8,228,256	7/24/2012	Fractus, S.A.

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DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		*Patents listed above.
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DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

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Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

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☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
2:18-cv-136	4/9/2018	Eastern District of Texas

PLAINTIFF	DEFENDANT
Fractus, S.A.	Sprint Communications Company, L.P., Sprint Spectrum, L.P., Sprint Solutions, Inc., Nextel Operations, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	6,937,191	8/30/2005	Fractus, S.A.
2	7,250,918	7/31/2007	Fractus, S.A.
3	7,557,768	7/7/2009	Fractus, S.A.
4	7,932,870	4/26/2011	Fractus, S.A.
5	8,228,256	7/24/2012	Fractus, S.A.

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		*Patents listed above.
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AO 120 (Rev. 08/10)

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☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
2:18-cv-138	4/9/2018	Eastern District of Texas

PLAINTIFF	DEFENDANT
Fractus, S.A.	Verizon Communications Inc. and Cellco Partnership d/b/a Verizon Wireless

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	6,937,191	8/30/2005	Fractus, S.A.
2	7,250,918	7/31/2007	Fractus, S.A.
3	7,557,768	7/7/2009	Fractus, S.A.
4	7,932,870	4/26/2011	Fractus, S.A.
5	8,228,256	7/24/2012	Fractus, S.A.

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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.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/044,831	07/24/2012	8228256	47005-P001WUSC5	1712

61060 7590 07/04/2012

WINSTEAD PC
P.O. BOX 131851
DALLAS, TX 75313

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Carles Puente Baliarda, Sant Cugat del Valles, SPAIN;
Jordi Romeu Robert, Sant Cugat del Valles, SPAIN;
Sebastian Blanch Boris, Barcelona, SPAIN;

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13044831
	Filing Date	2011-03-10
	First Named Inventor	Carles Puente Baliarda
	Art Unit	2821
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	47005-P001WUSC5

	20	4141016		1979-02-20	NELSON	
	21	4131893		1978-12-26	MUNSON ET AL	
	22	4024542		1977-05-17	IKAWA ET AL	
	23	3969730		1976-07-13	FUCHSER	
	24	3967276		1976-06-29	GOUBAU	
	25	3818490		1974-06-18	LEAHY	
	26	3683376		1972-08-08	PRONOVOST	
	27	3622890		1971-11-23	FUJIMOTO ET AL	
	28	3599214		1971-08-10	ALTMAYER	
	29	3521284		1970-07-21	SHELTON ET AL	
	30	H 0001631	H	1997-02-04	MONTGOMERY ET AL	

Change(s) applied to document.

/SRR/ 5/21/2012

EFS Web 2.1.17

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /MW/

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

61060 7590 03/30/2012
WINSTEAD PC
P.O. BOX 131851
DALLAS, TX 75313

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/044,831	03/10/2011	Carles Puente Baliarda	47005-P001WUSC5	1712

TITLE OF INVENTION: INTERLACED MULTIBAND ANTENNA ARRAYS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1740	$300	$0	$2040	07/02/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
WIMER, MICHAEL C	2821	343-844000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 Winstead PC
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)
PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: Fractus, S.A.
(B) RESIDENCE: (CITY and STATE OR COUNTRY): Barcelona, Spain

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 232426 (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)
☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date June 25, 2012
Typed or printed name Stanley R. Moore Registration No. 26,958

This collection of information is required by 37 CFR 1.311. 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 12 minutes 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Electronic Patent Application Fee Transmittal

Application Number:	13044831
Filing Date:	10-Mar-2011
Title of Invention:	INTERLACED MULTIBAND ANTENNA ARRAYS
First Named Inventor/Applicant Name:	Carles Puente Baliarda
Filer:	Ross Robinson/Brenda Brown
Attorney Docket Number:	47005-P001WUSC5

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Publ. Fee- early, voluntary, or normal	1504	1	300	300
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	1501	1	1740	1740

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**2040**

Electronic Acknowledgement Receipt	
EFS ID:	13092855
Application Number:	13044831
International Application Number:	
Confirmation Number:	1712
Title of Invention:	INTERLACED MULTIBAND ANTENNA ARRAYS
First Named Inventor/Applicant Name:	Carles Puente Baliarda
Customer Number:	61060
Filer:	Ross Robinson/Brenda Brown
Filer Authorized By:	Ross Robinson
Attorney Docket Number:	47005-P001WUSC5
Receipt Date:	25-JUN-2012
Filing Date:	10-MAR-2011
Time Stamp:	12:36:12
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$2040
RAM confirmation Number	10568
Deposit Account	232426
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	IssueFeeTransmittal47005P001WUSC5.pdf	219262 a795f817fe371bebb5058f192ed7998be834c7e9	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	31834 1e681f639eb36c761087312ed1c5e4e08b1fc529	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	251096		

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 a 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.

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

61060 7590 03/30/2012

WINSTEAD PC
P.O. BOX 131851
DALLAS, TX 75313

EXAMINER
WIMER, MICHAEL C

ART UNIT	PAPER NUMBER
2821	

DATE MAILED: 03/30/2012

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/044,831	03/10/2011	Carles Puente Baliarda	47005-P001WUSC5	1712

TITLE OF INVENTION: INTERLACED MULTIBAND ANTENNA ARRAYS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1740	$300	$0	$2040	07/02/2012

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

61060 7590 03/30/2012

WINSTEAD PC
P.O. BOX 131851
DALLAS, TX 75313

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/044,831	03/10/2011	Carles Puente Baliarda	47005-P001WUSC5	1712

TITLE OF INVENTION: INTERLACED MULTIBAND ANTENNA ARRAYS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1740	$300	$0	$2040	07/02/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
WIMER, MICHAEL C	2821	343-844000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

☐ Issue Fee

☐ Publication Fee (No small entity discount permitted)

☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

☐ A check is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. 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 12 minutes 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/044,831	03/10/2011	Carles Puente Baliarda	47005-P001WUSC5	1712

61060 7590 03/30/2012

WINSTEAD PC
P.O. BOX 131851
DALLAS, TX 75313

EXAMINER	
WIMER, MICHAEL C	
ART UNIT	PAPER NUMBER
2821	

DATE MAILED: 03/30/2012

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

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 disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
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 inspection 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.

Notice of Allowability	Application No.	Applicant(s)	
	13/044,831	BALIARDA ET AL.	
	Examiner	Art Unit	
	Michael C. Wimer	2821	

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

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *9/13/2011, 12/01/2011, 1/9/2012 & 3/19/2012*.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☐ The allowed claim(s) is/are _____.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some* c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached

1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.

(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 9/13/2011, 12/1/2011 & 3/19/2012
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Michael C. Wimer/
Primary Examiner, Art Unit 2821

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13044831	BALIARDA ET AL.
	Examiner	**Art Unit**
	MICHAEL C WIMER	2821

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	06/27/2011	03/20/2012							
	1	-	-							
	2	✓	-							
	3	✓	-							
	4	✓	-							
	5	✓	-							
	6	✓	-							
	7	✓	-							
	8	✓	-							
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	10	✓	-							
	11	✓	-							
	12	✓	-							
	13	✓	-							
	14	✓	-							
	15	✓	-							
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10	31		=							
11	32		=							
12	33		=							
13	34		=							
14	35		=							
15	36		=							

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
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☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☒ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	06/27/2011	03/20/2012							
16	37		=							
17	38		=							
18	39		=							
19	40		=							
20	41		=							

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13044831	BALIARDA ET AL.
	Examiner	**Art Unit**
	MICHAEL C WIMER	2821

ORIGINAL		INTERNATIONAL CLASSIFICATION														
CLASS	SUBCLASS	CLAIMED						NON-CLAIMED								
343	844	H	0	1	Q	21 / 30 (2006.01.01)										
CROSS REFERENCE(S)																
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)															
343	853															

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

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		17	12	33										
	2		18	13	34										
	3		19	14	35										
	4		20	15	36										
	5		21	16	37										
	6	1	22	17	38										
	7	2	23	18	39										
	8	3	24	19	40										
	9	4	25	20	41										
	10	5	26												
	11	6	27												
	12	7	28												
	13	8	29												
	14	9	30												
	15	10	31												
	16	11	32												

NONE (Assistant Examiner) (Date)	**Total Claims Allowed:** 20	
/MICHAEL C WIMER/ Primary Examiner.Art Unit 2821 3/20/2012 (Primary Examiner) (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 2

PTO/SB/08a (01-10)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	13044831
Filing Date	2011-03-10
First Named Inventor	Carles Puente Baliarda et al.
Art Unit	2821
Examiner Name	M.C. Wimer
Attorney Docket Number	47005-P001WUSC5

U.S.PATENTS

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
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U.S.PATENT APPLICATION PUBLICATIONS

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
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	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]
	1							☐

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	First Named Inventor	Carles Puente Baliarda et al.
	Art Unit	2821
	Examiner Name	M.C. Wimer
	Attorney Docket Number	47005-P001WUSC5

	1	Misra , S. ; Chowdhury , S. K. , Study of impedance and radiation properties of a concentric microstrip triangular-ring antenna and Its modeling techniques using FDTD method, IEEE Transactions on Antennas and Propagation, Vol. 46, No. 4, April 1998	☐
	2	Misra , S. , Experimental investigations on the impedance and radiation properties of a three-element concentric microstrip square-ring antenna, Microwave and Optical TEchnology Letters, Vol. 11, No. 2, February 05, 1996	☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/Michael Wimer/	Date Considered	3/20/2012

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[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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First Named Inventor	Carles Puente Baliarda et al.
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13044831
	Filing Date	2011-03-10
	First Named Inventor	Carles Puente Baliarda et al.
	Art Unit	2821
	Examiner Name	M.C. Wimer
	Attorney Docket Number	47005-P001WUSC5

	1	Long , S. A. Rebuttal expert report of Dr. Stuart A. Long (redacted version). Fractus. February 16, 2011	☐

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EXAMINER SIGNATURE

Examiner Signature	/Michael Wimer/	Date Considered	3/20/2012

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /MW/

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

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)		
	Application Number	13044831
	Filing Date	2011-03-10
	First Named Inventor	Carles Puente Baliarda
	Art Unit	2821
	Examiner Name	Wimer, Michael C.
	Attorney Docket Number	47005-P001WUSC5

U.S.PATENTS

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
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U.S.PATENT APPLICATION PUBLICATIONS

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FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]i	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]
	1							☐

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NON-PATENT LITERATURE DOCUMENTS

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]

EFS Web 2.1.17

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /MW/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13044831
	Filing Date	2011-03-10
	First Named Inventor	Carles Puente Baliarda
	Art Unit	2821
	Examiner Name	Wimer, Michael C.
	Attorney Docket Number	47005-P001WUSC5

	1	Puente , C. Fractal design of multiband antenna arrays. University of Illinois at Urbana-Champaign - Universitat Politècnica de Catalunya. 1994	☐
	2	NA. Dual Band Networks. IIR's conference on Dual Band Networks. January 25, 1999.	☐

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EXAMINER SIGNATURE

Examiner Signature	/Michael Wimer/	Date Considered	3/20/2012

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /MW/

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	4	(("7932870") or ("7557768") or ("7250918") or ("6937191")).PN.	US-PGPUB; USPAT	OR	OFF	2012/03/23 18:02
L2	10	interlaced adj multiband adj antenna and single same element	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/23 18:21

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L3	6	interlaced adj multiband adj antenna and single same element	US-PGPUB; UPAD	OR	ON	2012/03/23 18:23

3/23/2012 6:24:53 PM

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13044831	BALIARDA ET AL.
	Examiner	Art Unit
	MICHAEL C WIMER	2821

SEARCHED			
Class	Subclass	Date	Examiner
343	700MS, 844, 853	3/20/2012	MCW

SEARCH NOTES		
Search Notes	Date	Examiner
Interference text search. See EAST history.	3/20/2012	MCW

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
343	700MS, 844, 853	3/20/2012	MCW

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www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
13/044,831	03/10/2011	2821	1090	47005-P001WUSC5	20	3

CONFIRMATION NO. 1712

CORRECTED FILING RECEIPT

61060
WINSTEAD PC
P.O. BOX 131851
DALLAS, TX 75313

OC000000053258884

Date Mailed: 03/23/2012

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Carles Puente Baliarda, Sant Cugat del Valles, SPAIN;
Jordi Romeu Robert, Sant Cugat del Valles, SPAIN;
Sebastian Blanch Boris, Barcelona, SPAIN;

Power of Attorney: The patent practitioners associated with Customer Number 61060

Domestic Priority data as claimed by applicant

This application is a CON of 12/476,308 06/02/2009 PAT 7932870
which is a CON of 11/803,782 05/16/2007 PAT 7557768
which is a CON of 10/988,261 11/12/2004 PAT 7250918
which is a CON of 10/135,019 04/23/2002 PAT 6937191
which is a CON of PCT/ES99/00343 10/26/1999

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)

If Required, Foreign Filing License Granted: 03/18/2011

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/044,831**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No

Title

INTERLACED MULTIBAND ANTENNA ARRAYS

Preliminary Class

343

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	13044831
Filing Date	2011-03-10
First Named Inventor	Carles Puente Baliarda et al.
Art Unit	2821
Examiner Name	M.C. Wimer
Attorney Docket Number	47005-P001WUSC5

U.S.PATENTS

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
	1					

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

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
	1					

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	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]
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NON-PATENT LITERATURE DOCUMENTS

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]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13044831
	Filing Date	2011-03-10
	First Named Inventor	Carles Puente Baliarda et al.
	Art Unit	2821
	Examiner Name	M.C. Wimer
	Attorney Docket Number	47005-P001WUSC5

	1	Long , S. A. Rebuttal expert report of Dr. Stuart A. Long (redacted version). Fractus. February 16, 2011	☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing system in accordance with § 1.6(a)(4).

Dated: March 19, 2012
Electronic Signature for Brenda I. Brown: /Brenda I. Brown/

Docket No.: 47005-P001WUSC5
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Carles Puente Baliarda et al.

Application No.: 13/044,831 Confirmation No.: 1712

Filed: March 10, 2011 Art Unit: 2821

For: INTERLACED MULTIBAND ANTENNA ARRAYS Examiner: M. C. Wimer

INFORMATION DISCLOSURE STATEMENT (IDS)

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

Dear Sir:

Pursuant to 37 CFR 1.56, 1.97 and 1.98, the attention of the Patent and Trademark Office is hereby directed to the references listed on the attached PTO/SB/08. It is respectfully requested that the information be expressly considered during the prosecution of this application, and that the references be made of record therein and appear among the "References Cited" on any patent to issue therefrom.

This Information Disclosure Statement is filed more than three months after the U.S. filing date, OR more than three months after the date of entry of the national stage of a PCT application, AND after the mailing date of the first Office Action on the merits, whichever occurs first, but before the mailing date of a Final Office Action or Notice of Allowance, as far as is known to the undersigned (37 CFR 1.97(c)).

Applicant has not submitted copies of each cited U.S. patent and U.S. patent application in accordance with 37 CFR 1.98(a)(2). Applicant submits herewith copies of any cited non-patent documents and foreign patent documents in accordance with 37 CFR 1.98(a)(2).

In accordance with 37 CFR 1.97(g), the filing of this Information Disclosure Statement shall not be construed to mean that a search has been made or that no other material information as defined in 37 CFR 1.56(a) exists. In accordance with 37 CFR 1.97(h), the filing of this Information Disclosure Statement shall not be construed to be an admission that any patent, publication or other information referred to therein is "prior art" for this invention unless specifically designated as such.

It is submitted that the Information Disclosure Statement is in compliance with 37 CFR 1.98 and the Examiner is respectfully requested to consider the listed references.

Please charge our Deposit Account No. 23-2426 in the amount of $180.00 covering the fee set forth in 37 CFR 1.17(p). The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 23-2426, under Order No. 47005-P001WUSC5.

Dated: March 19, 2012

Respectfully submitted,

Electronic signature: /Shoaib A. Mithani/
Shoaib A. Mithani
Registration No.: 61,654
WINSTEAD PC
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Dallas, Texas 75313
(214) 745-5400
Attorneys For Applicant

Electronic Patent Application Fee Transmittal	
Application Number:	13044831
Filing Date:	10-Mar-2011
Title of Invention:	INTERLACED MULTIBAND ANTENNA ARRAYS
First Named Inventor/Applicant Name:	Carles Puente Baliarda
Filer:	Ross Robinson/Brenda Brown
Attorney Docket Number:	47005-P001WUSC5
Filed as Large Entity	

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt	
EFS ID:	12331766
Application Number:	13044831
International Application Number:	
Confirmation Number:	1712
Title of Invention:	INTERLACED MULTIBAND ANTENNA ARRAYS
First Named Inventor/Applicant Name:	Carles Puente Baliarda
Customer Number:	61060
Filer:	Ross Robinson/Brenda Brown
Filer Authorized By:	Ross Robinson
Attorney Docket Number:	47005-P001WUSC5
Receipt Date:	19-MAR-2012
Filing Date:	10-MAR-2011
Time Stamp:	10:59:30
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	9533
Deposit Account	232426
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	LongSARebuttalexpertreportofDrStuartALongFeb162011.pdf	13259237 0b25745869a4ed248c489f76f1dde4b28e4a6ab2	no	140
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	IDSStatementByApplicant47005P001WUSC5.pdf	221122 0771952d0fec5eaaeeb2e9f064019ca2608c0969	no	2
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Transmittal Letter	IDS47005P001WUSC5.pdf	212328 eab808d3814a9314c90fb9d8d692163a3d6daeb9	no	2
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	30246 584463c8d1cae86bb5be224798f62a2275c39d0e	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	13722933		

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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 a 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.

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
	13/044,831	BALIARDA ET AL.	

Document Code - DISQ	Internal Document – DO NOT MAIL

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Date Filed : 01/09/12	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:

4/Td's approved.

Lawana Hixon

U.S. Patent and Trademark Office

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Dated: January 9, 2012
Electronic Signature for Shoaib A. Mithani: /Shoaib A. Mithani/

Docket No. 47005-P001WUSC5
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Carles Puente Baliarda et al.

Application No. 13/044,831 — Confirmation No. 1712

Filed: March 10, 2011 — Art Unit: 2821

For: INTERLACED MULTIBAND ANTENNA ARRAYS — Examiner: M. C. Wimer

AMENDMENT IN RESPONSE TO NON-FINAL OFFICE ACTION

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

Dear Sir:

INTRODUCTORY COMMENTS

In response to the Office Action dated July 13, 2011 for which a three-month extension of time accompanies this amendment, please amend the above-identified U.S. patent application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks/Arguments begin on page 7 of this paper.

AMENDMENTS TO THE CLAIMS

1-21. (Canceled)

22. (New) An interlaced multiband antenna array comprising:

a plurality of antenna elements;

wherein the interlaced multiband antenna array is configured to simultaneously cover a plurality of licensed cellular frequency bands;

wherein positions of the plurality of antenna elements result from juxtaposition of at least a first antenna array operating in a first frequency band, and a second antenna array operating in a second frequency band;

wherein the first antenna array comprises a plurality of first-band antenna elements, and the second antenna array comprises a plurality of second-band antenna elements;

wherein the plurality of licensed frequency bands of the interlaced multiband antenna array includes said first frequency band and said second frequency band;

wherein the interlaced multiband antenna array employs a single multiband antenna element in positions where said first-band antenna element and said second-band antenna element come together; and

wherein the single multiband antenna element simultaneously covers at least said first frequency band and said second frequency band.

23. (New) The interlaced multiband antenna array of claim 22, wherein a number of the plurality of antenna elements, a spatial distribution of the plurality of antenna elements relative to wavelength, and a current phase and amplitude of the plurality of antenna elements is adjusted to shape a first radiation pattern specific to said first frequency band and to shape a second radiation pattern specific to said second frequency band.

24. (New) The interlaced multiband antenna array of claim 22, wherein a number of the plurality of antenna elements, a spatial distribution of the plurality of antenna elements relative to wavelength, and a current phase and amplitude of the plurality of antenna elements is adjusted

to shape a radiation pattern common to said first frequency band and said second frequency band.

25. (New) The interlaced multiband antenna array of claim 22, wherein a first distribution network is employed to excite all of the plurality of antenna elements of the interlaced multiband antenna array operating in said first frequency band, and a second distribution network is employed to excite all of the plurality of antenna elements of the interlaced multiband antenna array operating in said second frequency band.

26. (New) The interlaced multiband antenna array of claim 22, wherein a distribution network is employed to excite all of the plurality of antenna elements operating in said first frequency band and said second frequency band.

27. (New) The interlaced multiband antenna array of claim 22, wherein a spacing between antenna elements operating in the first band is less than 0.9 wavelength.

28. (New) The interlaced multiband antenna array of claim 22, wherein a spacing between antenna elements operating in said second band is less than one wavelength.

29. (New) The interlaced multiband antenna array of claim 22, wherein the interlaced multiband antenna array has double linear polarization at +45 degree and -45 degree with respect to a longitudinal axis of the interlaced multiband antenna array.

30. (New) The interlaced multiband antenna array of claim 29, wherein an independent distribution network is employed to excite all of the plurality of antenna elements of each of the polarizations.

31. (New) The interlaced multiband antenna array of claim 29, wherein an independent distribution network is employed to excite all of the plurality of antenna elements of the

interlaced multiband antenna array at each of said first frequency band and said second frequency band and polarizations.

32. (New) The interlaced multiband antenna array of claim 22, wherein at least one first-band antenna element of the first antenna array is repositioned to coincide with a nearest second-band antenna element of the second antenna array.

33. (New) The interlaced multiband antenna array of claim 22, wherein a geometrical arrangement of the plurality of first-band antenna elements of the first antenna array defines a first length along a first direction;

wherein a geometrical arrangement of the plurality of second-band antenna elements of the second antenna array defines a second length along said first direction; and

wherein a ratio between the second length and the first length is not inversely proportional to a ratio between a central frequency of said second frequency band and a central frequency of said first frequency band.

34. (New) The interlaced multiband antenna array of claim 22, wherein a first operating frequency for said first frequency band is situated around 900 MHz, and a second operating frequency for said second frequency band is situated around 1800 MHz.

35. (New) The interlaced multiband antenna array of claim 22, wherein a first operating frequency for said first frequency band is situated around 850 MHz, and a second operating frequency for said second frequency band is situated around 1900 MHz.

36. (New) The interlaced multiband antenna array of claim 22, wherein a first operating frequency for said first frequency band is situated around 1800 MHz, and a second operating frequency for said second frequency band is situated around 2100 MHz.

37. (New) The interlace multiband antenna array of claim 22, wherein a first operating band of said first frequency band is an operating band of a GSM service and a second operating band of said second frequency band is an operating band of a UMTS service.

38. (New) An interlaced multiband antenna array comprising:

a plurality of antenna elements;

wherein the interlaced multiband antenna array is configured to simultaneously cover a plurality of licensed cellular frequency bands;

wherein positions of the plurality of antenna elements result from juxtaposition of at least a first antenna array operating in a first frequency band, a second antenna array operating in a second frequency band, and a third antenna array operating in a third frequency band;

wherein the first antenna array comprises a plurality of first-band antenna elements, the second antenna array comprises a plurality of second-band antenna elements, and the third antenna array comprises a plurality of third-band antenna elements;

wherein the plurality of licensed frequency bands of the interlaced multiband antenna array include said first frequency band, said second frequency band, and said third frequency band;

wherein the interlaced multiband antenna array employs a single multiband antenna element in positions where at least two of said first-band antenna element, said second-band antenna element and said third-band antenna element come together; and

wherein the multiband antenna element simultaneously covers at least two of said first frequency band, said second frequency band and said third frequency band.

39. (New) An interlaced multiband antenna array of claim 38, wherein a number of the plurality of antenna elements, a spatial distribution of the plurality of antenna elements relative to wavelength, and a current phase and amplitude of the plurality of antenna elements is adjusted to shape a radiation pattern common to said first frequency band, said second frequency band and said third frequency band.

40. (New) The interlaced multiband antenna array of claim 38, wherein a distribution network is employed to excite all of the plurality of antenna elements operating in said first frequency band, said second frequency band and said third frequency band.

41. (New) The interlaced multiband antenna array of claim 38, wherein the interlaced multiband antenna array has double linear polarization at +45 degree and -45 degree with respect to a longitudinal axis of the interlaced multiband antenna array.

REMARKS

Claims 22-41 are currently pending in the application. Claims 2-21 have been canceled. New claims 22-41 have been added. Applicant respectfully submits that no new matter has been added. Applicant respectfully requests reconsideration of the application in view of the foregoing amendments and the following remarks.

IV. Double Patenting Rejection

Claims 2-21 stand rejected on the grounds of nonstatutory obviousness-type double patenting as unpatantable over claims 1-19 of U.S. Patent No. 6,937,191, claims 1-40 of U.S. Patent No. 7,250,918, claims 1-42 of U.S. Patent No. 7,557,768, and claims 1-38 of U.S. Patent No. 7,932,870. Claims 2-21 have been canceled, thus rendering the rejection thereof moot.

With respect to newly added claims 22-41, Applicant submits herewith terminal disclaimers with respect to U.S. Patent No. 6,937,191, U.S. Patent No. 7,250,918, U.S. Patent No. 7,557,768, and U.S. Patent No. 7,932,870. It is respectfully submitted that the terminal disclaimers are not being submitted in response to a non-statutory obviousness-type double patenting rejection but are instead submitted to expedite prosecution of the application.

In view of the above, Applicant respectfully submits that the present application is in condition for allowance. A Notice to that effect is respectfully requested.

Dated: January 9, 2012

Respectfully submitted,

Electronic signature: /Shoaib A. Mithani/
Shoaib A. Mithani
Registration No.: 61,654
WINSTEAD PC
P.O. Box 50784
Dallas, Texas 75201
(214) 745-5400
Attorneys For Applicant

PTO/SB/26 (08-11)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) 47005-P001WUSC5

In re Application of: Carles Puente Baliarda et al.

Application No.: 13/044,831-Conf. #1712

Filed: March 10, 2011

For: INTERLACED MULTIBAND ANTENNA ARRAYS

The owner*, Fractus, S.A. , of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 7,932,870

as the term of said **prior patent** is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

expires for failure to pay a maintenance fee;
is held unenforceable;
is found invalid by a court of competent jurisdiction;
is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
has all claims canceled by a reexamination certificate;
is reissued; or
is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ For submissions on behalf of a business/organization (e.g., corporation, partnership, university, government agency, etc.), the undersigned is empowered to act on behalf of the business/organization.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 26,958

/Stanley R. Moore/ — Signature
January 9, 2012 — Date

Stanley R. Moore — Typed or printed name

(214) 745-5110 — Telephone Number

☒ Terminal disclaimer fee under 37 CFR 1.20(d) is included.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner). Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing system in accordance with § 1.6(a)(4).

Dated: January 9, 2012 Electronic Signature for Shoaib A. Mithani: /Shoaib A. Mithani/

Electronic Patent Application Fee Transmittal

Application Number:	13044831
Filing Date:	10-Mar-2011
Title of Invention:	INTERLACED MULTIBAND ANTENNA ARRAYS
First Named Inventor/Applicant Name:	Carles Puente Baliarda
Filer:	Shoaib Amirali Mithani
Attorney Docket Number:	47005-P001WUSC5

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 3 months with $0 paid	1253	1	1270	1270

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Statutory or terminal disclaimer	1814	4	160	640
		Total in USD ($)		**1910**

Electronic Acknowledgement Receipt	
EFS ID:	11785010
Application Number:	13044831
International Application Number:	
Confirmation Number:	1712
Title of Invention:	INTERLACED MULTIBAND ANTENNA ARRAYS
First Named Inventor/Applicant Name:	Carles Puente Baliarda
Customer Number:	61060
Filer:	Shoaib Amirali Mithani
Filer Authorized By:	
Attorney Docket Number:	47005-P001WUSC5
Receipt Date:	09-JAN-2012
Filing Date:	10-MAR-2011
Time Stamp:	09:53:58
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1910
RAM confirmation Number	8416
Deposit Account	232426
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees) Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)					
File Listing:					
Document Number	**Document Description**	**File Name**	**File Size(Bytes)/ Message Digest**	**Multi Part /.zip**	**Pages (if appl.)**
1	Amendment/Req. Reconsideration-After Non-Final Reject	47005P001Response.pdf	34233 f40506622e859d7e254b6a2f5c0fc04a70a2843c	no	7
Warnings:					
Information:					
2	Terminal Disclaimer Filed	Disclaimer1.pdf	21858 b57e775d38864c0347175258324e78607bd1b6fb	no	1
Warnings:					
Information:					
3	Terminal Disclaimer Filed	Disclaimer2.pdf	21873 0f7dffc3b9c87610d10e52325d37d27b9cc3491d	no	1
Warnings:					
Information:					
4	Terminal Disclaimer Filed	Disclaimer3.pdf	21872 92a6f685d4feffd221163356269889f8defe5dde	no	1
Warnings:					
Information:					
5	Terminal Disclaimer Filed	Disclaimer4.pdf	21867 c7e4e80955514562e9633b4ddcbdeb147a94716f	no	1
Warnings:					
Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	32073 cdfc7894d3661fe6b3a3cdaa7d5331bb84c7b0cf	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	153776		

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 a 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.

PTO/SB/26 (08-11)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) 47005-P001WUSC5

In re Application of: Carles Puente Baliarda et al.

Application No.: 13/044,831-Conf. #1712

Filed: March 10, 2011

For: INTERLACED MULTIBAND ANTENNA ARRAYS

The owner*, Fractus, S.A. , of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 6,937,191

as the term of said **prior patent** is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **prior patent**, "as the term of said **prior patent** is presently shortened by any terminal disclaimer," in the event that said **prior patent** later:

expires for failure to pay a maintenance fee;
is held unenforceable;
is found invalid by a court of competent jurisdiction;
is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
has all claims canceled by a reexamination certificate;
is reissued; or
is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ For submissions on behalf of a business/organization (e.g., corporation, partnership, university, government agency, etc.), the undersigned is empowered to act on behalf of the business/organization.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

2. ☒ The undersigned is an attorney or agent of record. Reg. No. 26,958

/Stanley R. Moore/ — Signature
January 9, 2012 — Date

Stanley R. Moore — Typed or printed name

(214) 745-5110 — Telephone Number

☒ Terminal disclaimer fee under 37 CFR 1.20(d) is included.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

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I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing system in accordance with § 1.6(a)(4).

Dated: January 9, 2012 Electronic Signature for Shoaib A. Mithani: /Shoaib A. Mithani/

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TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) 47005-P001WUSC5

In re Application of: Carles Puente Baliarda et al.

Application No.: 13/044,831-Conf. #1712

Filed: March 10, 2011

For: INTERLACED MULTIBAND ANTENNA ARRAYS

The owner*, Fractus, S.A. , of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 7,250,918

as the term of said **prior patent** is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

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is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
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2. ☒ The undersigned is an attorney or agent of record. Reg. No. 26,958

/Stanley R. Moore/ — Signature
January 9, 2012 — Date

Stanley R. Moore — Typed or printed name

(214) 745-5110 — Telephone Number

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Dated: January 9, 2012 Electronic Signature for Shoaib A. Mithani: /Shoaib A. Mithani/

PTO/SB/26 (08-11)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) 47005-P001WUSC5

In re Application of: Carles Puente Baliarda et al.

Application No.: 13/044,831-Conf. #1712

Filed: March 10, 2011

For: INTERLACED MULTIBAND ANTENNA ARRAYS

The owner*, Fractus, S.A. , of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 7,557,768

as the term of said **prior patent** is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

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/Stanley R. Moore/ — Signature
January 9, 2012 — Date

Stanley R. Moore — Typed or printed name

(214) 745-5110 — Telephone Number

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Dated: January 9, 2012 Electronic Signature for Shoaib A. Mithani: /Shoaib A. Mithani/

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/044,831	Filing Date 03/10/2011	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	01/09/2012	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0	X $ =		OR	X $60=	0
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $ =		OR	X $250=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	**0**

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/LINDA BADIE/

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

PTO/SB/08a (01-10)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	13044831
	Filing Date	2011-03-10
	First Named Inventor	Carles Puente Baliarda et al.
	Art Unit	2821
	Examiner Name	M.C. Wimer
	Attorney Docket Number	47005-P001WUSC5

U.S.PATENTS

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
	1					

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U.S.PATENT APPLICATION PUBLICATIONS

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
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FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	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]
	1							☐

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NON-PATENT LITERATURE DOCUMENTS

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]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13044831
	Filing Date	2011-03-10
	First Named Inventor	Carles Puente Baliarda et al.
	Art Unit	2821
	Examiner Name	M.C. Wimer
	Attorney Docket Number	47005-P001WUSC5

	1	Misra , S. ; Chowdhury , S. K. , Study of impedance and radiation properties of a concentric microstrip triangular-ring antenna and Its modeling techniques using FDTD method, IEEE Transactions on Antennas and Propagation, Vol. 46, No. 4, April 1998	☐
	2	Misra , S. , Experimental investigations on the impedance and radiation properties of a three-element concentric microstrip square-ring antenna, Microwave and Optical TEchnology Letters, Vol. 11, No. 2, February 05, 1996	☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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Dated: December 1, 2011
Electronic Signature for Brenda I. Brown: /Brenda I. Brown/

Docket No.: 47005-P001WUSC5
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Carles Puente Baliarda et al.

Application No.: 13/044,831 Confirmation No.: 1712

Filed: March 10, 2011 Art Unit: 2821

For: INTERLACED MULTIBAND ANTENNA ARRAYS Examiner: M. C. Wimer

INFORMATION DISCLOSURE STATEMENT (IDS)

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

Dear Sir:

Pursuant to 37 CFR 1.56, 1.97 and 1.98, the attention of the Patent and Trademark Office is hereby directed to the references listed on the attached PTO/SB/08. It is respectfully requested that the information be expressly considered during the prosecution of this application, and that the references be made of record therein and appear among the "References Cited" on any patent to issue therefrom.

This Information Disclosure Statement is filed more than three months after the U.S. filing date, OR more than three months after the date of entry of the national stage of a PCT application, AND after the mailing date of the first Office Action on the merits, whichever occurs first, but before the mailing date of a Final Office Action or Notice of Allowance, as far as is known to the undersigned (37 CFR 1.97(c)).

Applicant has not submitted copies of each cited U.S. patent and U.S. patent application in accordance with 37 CFR 1.98(a)(2). Applicant submits herewith copies of any cited non-patent documents and foreign patent documents in accordance with 37 CFR 1.98(a)(2).

In accordance with 37 CFR 1.97(g), the filing of this Information Disclosure Statement shall not be construed to mean that a search has been made or that no other material information as defined in 37 CFR 1.56(a) exists. In accordance with 37 CFR 1.97(h), the filing of this Information Disclosure Statement shall not be construed to be an admission that any patent, publication or other information referred to therein is "prior art" for this invention unless specifically designated as such.

It is submitted that the Information Disclosure Statement is in compliance with 37 CFR 1.98 and the Examiner is respectfully requested to consider the listed references.

Please charge our Deposit Account No. 23-2426 in the amount of $180.00 covering the fee set forth in 37 CFR 1.17(p). The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 23-2426, under Order No. 47005-P001WUSC5.

Dated: December 1, 2011

Respectfully submitted,

Electronic signature: /Shoaib A. Mithani/
Shoaib A. Mithani
Registration No.: 61,654
WINSTEAD PC
P.O. Box 50784
Dallas, Texas 75201
(214) 745-5400
Attorneys For Applicant

Electronic Patent Application Fee Transmittal	
Application Number:	13044831
Filing Date:	10-Mar-2011
Title of Invention:	INTERLACED MULTIBAND ANTENNA ARRAYS
First Named Inventor/Applicant Name:	Carles Puente Baliarda
Filer:	Ross Robinson/Brenda Brown
Attorney Docket Number:	47005-P001WUSC5
Filed as Large Entity	

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt	
EFS ID:	11518315
Application Number:	13044831
International Application Number:	
Confirmation Number:	1712
Title of Invention:	INTERLACED MULTIBAND ANTENNA ARRAYS
First Named Inventor/Applicant Name:	Carles Puente Baliarda
Customer Number:	61060
Filer:	Ross Robinson/Brenda Brown
Filer Authorized By:	Ross Robinson
Attorney Docket Number:	47005-P001WUSC5
Receipt Date:	01-DEC-2011
Filing Date:	10-MAR-2011
Time Stamp:	10:19:42
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	10550
Deposit Account	232426
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	MisraSChowdhurySKStudyofimpedanceandradiationApril41998.pdf	8634351 65fc8447032bb13ff53f0f854fea38ff87565a5c	no	7
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	IDSStatementByApplicant47005P001WUSC5.pdf	237340 e37b956caa478fab7866cc6d057ec77093a0cf8c	no	2
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Transmittal Letter	IDS47005P001WUSC5.pdf	214703 6e128b2de06bce89e06e900cb6e45b01a0d36eeb	no	2
Warnings:					
Information:					
4	Non Patent Literature	MisraSExperimentalinvestigationsontheimpedanceandradiationFeb051996.pdf	6541252 415019ca2a2d907d932039a79ff9ec0b943f7da7	no	4
Warnings:					
Information:					
5	Fee Worksheet (SB06)	fee-info.pdf	30247 80a7010d2e5f666de15684b1aa2c1c64f121a1df	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	15657893		

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

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	Application Number	13044831
	Filing Date	2011-03-10
	First Named Inventor	Carles Puente Baliarda
	Art Unit	2821
	Examiner Name	Wimer, Michael C.
	Attorney Docket Number	47005-P001WUSC5

U.S.PATENTS

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
	1					

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

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
	1					

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]i	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]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

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]

EFS Web 2.1.17

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13044831
	Filing Date	2011-03-10
	First Named Inventor	Carles Puente Baliarda
	Art Unit	2821
	Examiner Name	Wimer, Michael C.
	Attorney Docket Number	47005-P001WUSC5

	1	Puente , C. Fractal design of multiband antenna arrays. University of Illinois at Urbana-Champaign - Universitat Politècnica de Catalunya. 1994	☐
	2	NA. Dual Band Networks. IIR's conference on Dual Band Networks. January 25, 1999.	☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

Electronic Patent Application Fee Transmittal	
Application Number:	13044831
Filing Date:	10-Mar-2011
Title of Invention:	INTERLACED MULTIBAND ANTENNA ARRAYS
First Named Inventor/Applicant Name:	Carles Puente Baliarda
Filer:	Ross Robinson/Brenda Brown
Attorney Docket Number:	47005-P001WUSC5
Filed as Large Entity	

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt	
EFS ID:	10932834
Application Number:	13044831
International Application Number:	
Confirmation Number:	1712
Title of Invention:	INTERLACED MULTIBAND ANTENNA ARRAYS
First Named Inventor/Applicant Name:	Carles Puente Baliarda
Customer Number:	61060
Filer:	Ross Robinson/Brenda Brown
Filer Authorized By:	Ross Robinson
Attorney Docket Number:	47005-P001WUSC5
Receipt Date:	13-SEP-2011
Filing Date:	10-MAR-2011
Time Stamp:	10:22:24
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	9386
Deposit Account	232426
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	IDS47005P001WUSC5.pdf	206423 903b16c0eef74be198850ec0380f7914ac379d99	no	2
Warnings:					
Information:					
2	Non Patent Literature	NADualBandNetworksJanuary251999.pdf	24810167 3b0d6471e438945a365fed9080b7a6c3f26b3aa5	no	249
Warnings:					
Information:					
3	Non Patent Literature	PuenteCFractaldesignofmultibandantennaarrays1994.pdf	10057895 9813e0573e3f669db2ccd489070187e5b8507eb0	no	122
Warnings:					
Information:					
4	Information Disclosure Statement (IDS) Form (SB08)	IDSStatementbyApplicant47005P001WUSC5.pdf	222252 fa277b16548886f5d647dfd70d6bc9c6c47b5cb0	no	2
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
5	Fee Worksheet (SB06)	fee-info.pdf	30246 9eac1adba90b1b380a7dea758675a5b303c4b0b0	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	35326983		

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 a 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.

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing system in accordance with § 1.6(a)(4).

Dated: September 13, 2011
Electronic Signature for Brenda I. Brown: /Brenda I. Brown/

Docket No.: 47005-P001WUSC5
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Carles Puente Baliarda et al.

Application No.: 13/044,831 Confirmation No.: 1712

Filed: March 10, 2011 Art Unit: 2821

For: INTERLACED MULTIBAND ANTENNA ARRAYS Examiner: M. C. Wimer

INFORMATION DISCLOSURE STATEMENT (IDS)

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

Dear Sir:

Pursuant to 37 CFR 1.56, 1.97 and 1.98, the attention of the Patent and Trademark Office is hereby directed to the references listed on the attached PTO/SB/08. It is respectfully requested that the information be expressly considered during the prosecution of this application, and that the references be made of record therein and appear among the "References Cited" on any patent to issue therefrom.

This Information Disclosure Statement is filed more than three months after the U.S. filing date, OR more than three months after the date of entry of the national stage of a PCT application, AND after the mailing date of the first Office Action on the merits, whichever occurs first, but before the mailing date of a Final Office Action or Notice of Allowance, as far as is known to the undersigned (37 CFR 1.97(c)).

Applicant has not submitted copies of each cited U.S. patent and U.S. patent application in accordance with 37 CFR 1.98(a)(2). Applicant submits herewith copies of any cited non-patent documents and foreign patent documents in accordance with 37 CFR 1.98(a)(2).

In accordance with 37 CFR 1.97(g), the filing of this Information Disclosure Statement shall not be construed to mean that a search has been made or that no other material information as defined in 37 CFR 1.56(a) exists. In accordance with 37 CFR 1.97(h), the filing of this Information Disclosure Statement shall not be construed to be an admission that any patent, publication or other information referred to therein is "prior art" for this invention unless specifically designated as such.

It is submitted that the Information Disclosure Statement is in compliance with 37 CFR 1.98 and the Examiner is respectfully requested to consider the listed references.

Please charge our Deposit Account No. 23-2426 in the amount of $180.00 covering the fee set forth in 37 CFR 1.17(p). The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 23-2426, under Order No. 47005-P001WUSC5.

Dated: September 13, 2011

Respectfully submitted,

Electronic signature: /Shoaib A. Mithani/
Shoaib A. Mithani
Registration No.: 61,654
WINSTEAD PC
P.O. Box 50784
Dallas, Texas 75201
(214) 745-5400
Attorneys For Applicant

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.
13/044,831	03/10/2011	Carles Puente Baliarda	47005-P001WUSC5	1712

61060 7590 07/13/2011

WINSTEAD PC
P.O. BOX 50784
DALLAS, TX 75201

EXAMINER	
WIMER, MICHAEL C	
ART UNIT	PAPER NUMBER
2821	

MAIL DATE	DELIVERY MODE
07/13/2011	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.

Office Action Summary	Application No.	Applicant(s)	
	13/044,831	BALIARDA ET AL.	
	Examiner	Art Unit	
	MICHAEL C. WIMER	2821	

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance 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.

Disposition of Claims

4)☒ Claim(s) 2-21 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 2-21 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 6/23/2011.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Double Patenting

1. The nonstatutory 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 nonstatutory obviousness-type 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); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 2-21 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claims 1-19 of U.S. Patent No. 6937191, Claim s 1-40 of U.S. Patent No. 7250918, Claims 1-42 of U.S. Patent No. 7557768 and Claims 1-38 of U.S. Patent No. 7932870. Although the conflicting claims are not identical, they are not patentably distinct from each other because the use of “electromagnetically-coupled portions” of any of the antenna elements within the array would have been obvious to the skilled artisan as a way of feeding the elements. The positioning of the antenna elements with respect to each other and therefore the frequency of design/operation in particular government-allocated bands of service, would have been obvious to the skilled artisan since proper, wavelength dimension, spacing is essential in reducing interference and sidelobes in respective radiation patterns of a multi-band array.

3. The patent to Speciale (5347287) is cited as of interest teaching a multiband antenna array

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL C. WIMER whose telephone number is (571)272-1833. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jacob Y. Choi can be reached on (571) 272-2367. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MICHAEL C. WIMER/
Primary Examiner, Art Unit 2821

MCW
6/27/2011

Notice of References Cited	Application/Control No. 13/044,831	Applicant(s)/Patent Under Reexamination BALIARDA ET AL.	
	Examiner MICHAEL C. WIMER	Art Unit 2821	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,347,287	09-1994	Speciale, Ross A.	342/375
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	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 MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13044831	BALIARDA ET AL.
	Examiner	**Art Unit**
	MICHAEL C WIMER	2821

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

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

CLAIM		DATE								
Final	Original	06/27/2011								
	1	-								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
	9	✓								
	10	✓								
	11	✓								
	12	✓								
	13	✓								
	14	✓								
	15	✓								
	16	✓								
	17	✓								
	18	✓								
	19	✓								
	20	✓								
	21	✓								

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13044831	BALIARDA ET AL.
	Examiner	Art Unit
	MICHAEL C WIMER	2821

SEARCHED			
Class	Subclass	Date	Examiner
343	700MS, 844, 853	6/27/2011	MCW

SEARCH NOTES		
Search Notes	Date	Examiner

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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

BIB DATA SHEET

CONFIRMATION NO. 1712

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
13/044,831	03/10/2011	343	2821	47005-P001WUSC5

APPLICANTS

Carles Puente Baliarda, Residence Not Provided;
Jordi Romeu Robert, Residence Not Provided;
Sebastian Blanch Boris, Residence Not Provided;

**** CONTINUING DATA **************************

This application is a CON of 12/476,308 06/02/2009 PAT 7,932,870
which is a CON of 11/803,782 05/16/2007 PAT 7,557,768
which is a CON of 10/988,261 11/12/2004 PAT 7,250,918
which is a CON of 10/135,019 04/23/2002 PAT 6,937,191
which is a CON of PCT/ES99/00343 10/26/1999

**** FOREIGN APPLICATIONS **************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

03/18/2011

Foreign Priority claimed	35 USC 119(a-d) conditions met	Verified and Acknowledged	Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
☐ Yes ☑ No	☐ Yes ☑ No	/MICHAEL C WIMER/ Examiner's Signature	☐ Initials	SPAIN	12	20	3

ADDRESS

WINSTEAD PC
P.O. BOX 50784
DALLAS, TX 75201
UNITED STATES

TITLE

INTERLACED MULTIBAND ANTENNA ARRAYS

FILING FEE RECEIVED		
1090	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

BIB (Rev. 05/07).

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	13044831
Filing Date	2011-03-10
First Named Inventor	Carles Puente Baliarda
Art Unit	2821
Examiner Name	Not Yet Assigned
Attorney Docket Number	47005-P001WUSC5

FORM 1

U.S.PATENTS						
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
	1	7250918		2007-07-31	PUENTE	
	2	6943732		2005-09-13	GÖTTL ET AL	
	3	6937191		2005-08-30	PUENTE	
	4	6819300		2004-11-16	GÖTTL	
	5	6795020		2004-09-21	SREENIVAS ET AL	
	6	6741210		2004-05-25	BRACHAT ET AL	
	7	6552690		2003-04-22	VEERASAMY	
	8	6552687		2003-04-22	RAWNICK ET AL	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /MW/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13044831
	Filing Date	2011-03-10
	First Named Inventor	Carles Puente Baliarda
	Art Unit	2821
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	47005-P001WUSC5

	9	6525691		2003-02-25	VARADAN ET AL	
	10	6476766		2002-11-05	COHEN	
	11	6452553		2002-09-17	COHEN	
	12	6452549		2002-09-17	LO	
	13	6445352		2002-09-03	COHEN	
	14	6431712		2002-08-13	TURNBULL	
	15	6417810		2002-07-09	HUELS ET AL	
	16	6407710		2002-06-18	KEILEN ET AL	
	17	6367939		2002-04-09	CARTER ET AL	
	18	6329954		2001-12-11	FUCHS ET AL	
	19	6329951		2001-12-11	WEN ET AL	

EFS Web 2.1.17

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /MW/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	First Named Inventor	Carles Puente Baliarda
	Art Unit	2821
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	47005-P001WUSC5

	20	6307519		2001-10-23	LIVINGSTON ET AL	
	21	6307511		2001-10-23	YING ET AL	
	22	6295028		2001-09-25	JONSSON ET AL	
	23	6281846		2001-08-28	PUENTE ET AL	
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	25	6236372		2001-05-22	LINDENMEIER ET AL	
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	27	6211841		2001-04-03	SMITH ET AL	
	28	6211824		2001-04-03	HOLDEN ET AL	
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	30	6172618		2001-01-09	HAKOZAKI ET AL	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /MW/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	First Named Inventor	Carles Puente Baliarda
	Art Unit	2821
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	Attorney Docket Number	47005-P001WUSC5

	31	6160513		2000-12-12	DAVIDSON ET AL	
	32	6154180		2000-11-28	PADRICK	
	33	6140975		2000-10-31	COHEN	
	34	6140969		2000-10-31	LINDENMEIER ET AL	
	35	6133882		2000-10-17	LAFLEUR ET AL	
	36	6131042		2000-10-10	LEE ET AL	
	37	6127977		2000-10-03	COHEN	
	38	6104349		2000-08-15	COHEN	
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13044831
	Filing Date	2011-03-10
	First Named Inventor	Carles Puente Baliarda
	Art Unit	2821
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	47005-P001WUSC5

	1					

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FORM 3

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/044,831	03/10/2011	Carles Puente Baliarda	47005-P001WUSC5

CONFIRMATION NO. 1712

61060
WINSTEAD PC
P.O. BOX 50784
DALLAS, TX 75201

PUBLICATION NOTICE

OC000000048523896

Title:INTERLACED MULTIBAND ANTENNA ARRAYS

Publication No.US-2011-0156986-A1
Publication Date:06/30/2011

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	Application Number	13044831
	Filing Date	2011-03-10
	First Named Inventor	Carles Puente Baliarda
	Art Unit	2821
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	47005-P001WUSC5

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13044831
	Filing Date	2011-03-10
	First Named Inventor	Carles Puente Baliarda
	Art Unit	2821
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	47005-P001WUSC5

	20	1267438	EP		2002-12-18	URIU ET AL		☐
	21	1237224	EP		2002-09-04	HUBER ET AL		☐
	22	1198027	EP		2002-04-17	WASHIRO ET AL		☐
	23	1148581	EP		2001-10-24	BAE		☐
	24	1096602	EP		2001-05-02	ISOHATALA ET AL		☐
	25	1094545	EP		2001-04-25	ANNAMAA ET AL		☐
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13044831
	Filing Date	2011-03-10
	First Named Inventor	Carles Puente Baliarda
	Art Unit	2821
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	47005-P001WUSC5

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13044831
	Filing Date	2011-03-10
	First Named Inventor	Carles Puente Baliarda
	Art Unit	2821
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	47005-P001WUSC5

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If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

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]
	1	Puente , C. ; Romeu , J. ; Cardama, A. , The Koch monopole - a small fractal antenna , Antennas and Propagation, IEEE Transactions on , November 1, 2000	☐
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13044831
	Filing Date	2011-03-10
	First Named Inventor	Carles Puente Baliarda
	Art Unit	2821
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	47005-P001WUSC5

	5	Romeu , J. ; Blanch , S. , A three dimensional hilbert antenna , Antennas and Propagation Society International Symposium, 2002. IEEE , June 16, 2002	☐
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Filing Date	2011-03-10
	First Named Inventor	Carles Puente Baliarda
	Art Unit	2821
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	47005-P001WUSC5

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13044831
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	First Named Inventor	Carles Puente Baliarda
	Art Unit	2821
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	47005-P001WUSC5

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If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

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[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	13044831
Filing Date	2011-03-10
First Named Inventor	Carles Puente Baliarda
Art Unit	2821
Examiner Name	Not Yet Assigned
Attorney Docket Number	47005-P001WUSC5

FORM 3

U.S.PATENTS

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
	1	4907011		1990-03-06	KUO	
	2	4894663		1990-01-16	URBISH ET AL	
	3	4890114		1989-12-26	EGASHIRA	
	4	4857939		1989-08-15	SHIMAZAKI	
	5	4849766		1989-07-18	INABA ET AL	
	6	4847629		1989-07-11	SHIMAZAKI	
	7	4843468		1989-06-27	DREWERY	
	8	4839660		1989-06-13	HADZOGLOU	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	First Named Inventor	Carles Puente Baliarda
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	Examiner Name	Not Yet Assigned
	Attorney Docket Number	47005-P001WUSC5

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13044831
	Filing Date	2011-03-10
	First Named Inventor	Carles Puente Baliarda
	Art Unit	2821
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	47005-P001WUSC5

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	Attorney Docket Number	47005-P001WUSC5

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U.S.PATENT APPLICATION PUBLICATIONS

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
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	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]
	1							☐

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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]
	1		☐

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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06-24-11 TJW

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the U.S. Postal Service as Express Mail, Airbill No. EM023199845 US, on the date shown below in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Dated: June 23, 2011 Signature: (Brenda I. Brown)

Docket No.: 47005-P001WUSC5
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Carles Puente Baliarda et al.

Application No.: 13/044,831 Confirmation No.: 1712

Filed: March 10, 2011 Art Unit: 2821

For: INTERLACED MULTIBAND ANTENNA ARRAYS Examiner: Not Yet Assigned

INFORMATION DISCLOSURE STATEMENT (IDS)

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

Dear Sir:

Pursuant to 37 CFR 1.56, 1.97 and 1.98, the attention of the Patent and Trademark Office is hereby directed to the references listed on the attached PTO/SB/08 (facsimile). It is respectfully requested that the information be expressly considered during the prosecution of this application, and that the references be made of record therein and appear among the "References Cited" on any patent to issue therefrom.

This Information Disclosure Statement is filed before the mailing date of a first Office Action on the merits, as far as is known to the undersigned (37 CFR 1.97(b)(3)).

Applicant has not submitted copies of each cited U.S. patent and U.S. patent application in accordance with 37 CFR 1.98(a)(2). Applicant submits herewith copies of any cited non-patent documents and foreign patent documents in accordance with 37 CFR 1.98(a)(2).

No documents cited herein other than non-patent literature documents nos. 23-27 listed in the attached Form 2 PTO/SB/08 are being supplied because the documents other than nos. 23-27

on Form 2 PTO/SB/08 have been previously cited by or submitted to the Office in prior application number 12/476,308, which application was filed June 2, 2009 and has been relied upon in this application for an earlier filing date under 35 U.S.C. 120. **The non-patent literature documents nos. 23-27 listed in Form 2 PTO/SB/08 are being supplied because they were not previously cited by or submitted to the Office in prior application number 12/476,308.**

In accordance with 37 CFR 1.97(g), the filing of this Information Disclosure Statement shall not be construed to mean that a search has been made or that no other material information as defined in 37 CFR 1.56(a) exists. In accordance with 37 CFR 1.97(h), the filing of this Information Disclosure Statement shall not be construed to be an admission that any patent, publication or other information referred to therein is "prior art" for this invention unless specifically designated as such.

It is submitted that the Information Disclosure Statement is in compliance with 37 CFR 1.98 and the Examiner is respectfully requested to consider the listed references.

The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 23-2426, under Order No. 47005-P001WUSC5.

Dated: June 23, 2011

Respectfully submitted,

By _____
Shoaib A. Mithani
Registration No.: 61,654
WINSTEAD PC
P.O. Box 50784
Dallas, Texas 75201
(214) 745-5400
Attorneys For Applicant

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing system in accordance with § 1.6(a)(4).

Dated: April 20, 2011
Electronic Signature for Brenda I. Brown: /Brenda I. Brown/

Docket No.: 47005-P001WUSC5
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Carles Puente Baliarda et al.

Application No.: 13/044,831 Confirmation No.: 1712

Filed: March 10, 2011 Art Unit: 2821

For: INTERLACED MULTIBAND ANTENNA ARRAYS Examiner: Not Yet Assigned

REQUEST FOR CORRECTED FILING RECEIPT

Office of Initial Patent Examination's Filing Receipt Corrections
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Applicant hereby submits an Application Data Sheet in order to correct the residences of each inventor. Applicant states that the residences are the only corrections requested. Applicant requests that a corrected Filing Receipt be issued in the above-identified patent application. The official Filing Receipt received by Applicant, a copy of which is attached hereto, has the following errors:

The inventor residences are not listed on the filing receipt. Please insert the inventor residences on the filing receipt. The residences are listed below:

Carles Puente Baliarda: Sant Cugat del Valles, Spain

Jordi Romeu Robert: Sant Cugat del Valles, Spain

Sebastian Blanch Boris: Barcelona, Spain

Applicant additionally requests that all pertinent U.S. Patent and Trademark Office records relating to the subject application be changed to reflect this correction.

Dated: April 20, 2011

Respectfully submitted,

Electronic signature: /Shoaib A. Mithani/
Shoaib A. Mithani
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WINSTEAD PC
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(214) 745-5400
Attorneys For Applicant

Application Data Sheet

Application Information

Application number::	13/044,831
Filing Date::	03/10/11
Application Type::	Regular
Subject Matter::	Utility
Suggested Group Art Unit::	2821
CD-ROM or CD-R?::	None
Sequence submission?::	None
Computer Readable Form (CRF)?::	No
Title::	INTERLACED MULTIBAND ANTENNA ARRAYS
Attorney Docket Number::	47005-P001WUSC5
Request for Early Publication?::	No
Request for Non-Publication?::	No
Small Entity?::	No
Petition included?::	No
Secrecy Order in Parent Appl.?::	No

Applicant Information

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City of mailing address::	Barcelona
Country of mailing address::	Spain
Postal or Zip Code of mailing address::	08013

Correspondence Information

Correspondence Customer Number::	61060

Representative Information

Representative Customer Number::	61060

Domestic Priority Information

Application::	Continuity Type::	Parent Application::	Parent Filing Date::
This Application	Continuation of	12/476,308	06/02/09
12/476,308	Continuation of	11/803,782	05/16/07
11/803,782	Continuation of	10/988,261	11/12/04
10/988,261	Continuation of	10/135,019	04/23/2002
10/135,019	Continuation of	PCT/ES99/00343	10/26/1999

Foreign Priority Information

Assignee Information

Assignee name::	Fractus, S.A.
Street of mailing address::	C. Alcalde Barnils, 64-68
	Edificio Testa - Modulo C, 3º
	Parque Empresarial Sant Joan
	Sant Cugat Del Valles
City of mailing address::	Barcelona
Country of mailing address::	Spain
Postal or Zip Code of mailing address::	E-08190

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5662073v.1 47005/P001WUSC5

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
13/044,831	03/10/2011	2821	1090	47005-P001WUSC5	20	3

CONFIRMATION NO. 1712

61060
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P.O. BOX 50784
DALLAS, TX 75201

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OC000000046677151

Date Mailed: 03/22/2011

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Carles Puente Baliarda, ~~Residence Not Provided~~; SANT CUGAT del VALLES, SPAIN
Jordi Romeu Robert, ~~Residence Not Provided~~; SANT CUGAT del VALLES, SPAIN
Sebastian Blanch Boris, ~~Residence Not Provided~~; BARCELONA, SPAIN

Power of Attorney: The patent practitioners associated with Customer Number 61060

Domestic Priority data as claimed by applicant

This application is a CON of 12/476,308 06/02/2009
which is a CON of 11/803,782 05/16/2007 PAT 7,557,768
which is a CON of 10/988,261 11/12/2004 PAT 7,250,918
which is a CON of 10/135,019 04/23/2002 PAT 6,937,191
which is a CON of PCT/ES99/00343 10/26/1999

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If Required, Foreign Filing License Granted: 03/18/2011

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/044,831**

Projected Publication Date: 06/30/2011

Non-Publication Request: No

Early Publication Request: No

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MAR 30 2011
By:

Electronic Acknowledgement Receipt	
EFS ID:	9917349
Application Number:	13044831
International Application Number:	
Confirmation Number:	1712
Title of Invention:	INTERLACED MULTIBAND ANTENNA ARRAYS
First Named Inventor/Applicant Name:	Carles Puente Baliarda
Customer Number:	61060
Filer:	Ross Robinson/Brenda Brown
Filer Authorized By:	Ross Robinson
Attorney Docket Number:	47005-P001WUSC5
Receipt Date:	20-APR-2011
Filing Date:	10-MAR-2011
Time Stamp:	12:15:07
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	RequestForCorrectedFilingReceipt47005P001WUSC5.pdf	188460 a8a522a1ecf0574facd6c579f248ca6e08869a3a	no	8

Warnings:
Information:

Total Files Size (in bytes):	188460

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If a new application is being filed and the application includes the necessary components for a 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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United States Patent and Trademark Office
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
13/044,831	03/10/2011	2821	1090	47005-P001WUSC5	20	3

CONFIRMATION NO. 1712

61060
WINSTEAD PC
P.O. BOX 50784
DALLAS, TX 75201

FILING RECEIPT

OC00000046677151

Date Mailed: 03/22/2011

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Carles Puente Baliarda, Residence Not Provided;
Jordi Romeu Robert, Residence Not Provided;
Sebastian Blanch Boris, Residence Not Provided;

Power of Attorney: The patent practitioners associated with Customer Number 61060

Domestic Priority data as claimed by applicant

This application is a CON of 12/476,308 06/02/2009
which is a CON of 11/803,782 05/16/2007 PAT 7,557,768
which is a CON of 10/988,261 11/12/2004 PAT 7,250,918
which is a CON of 10/135,019 04/23/2002 PAT 6,937,191
which is a CON of PCT/ES99/00343 10/26/1999

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)

If Required, Foreign Filing License Granted: 03/18/2011

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/044,831**

Projected Publication Date: 06/30/2011

Non-Publication Request: No

Early Publication Request: No

Title

INTERLACED MULTIBAND ANTENNA ARRAYS

Preliminary Class

343

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

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For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/044,831	03/10/2011	Carles Puente Baliarda	47005-P001WUSC5

CONFIRMATION NO. 1712

61060
WINSTEAD PC
P.O. BOX 50784
DALLAS, TX 75201

NOTICE

OC000000046677152

Date Mailed: 03/22/2011

NOTICE OF INFORMAL APPLICATION

This application is considered to be informal since it does not comply with the regulations for the reason(s) indicated below. The period within to correct the informalities noted below and avoid abandonment is set in the accompanying Office action.

Items Required To Avoid Processing Delays:

The item(s) indicated below are also required and should be submitted with any reply to this notice to avoid further processing delays.

A new oath or declaration, identifying this application number, or, if appropriate, an application data sheet (37 CFR 1.76), is required. The oath or declaration does not comply with 37 CFR 1.63 in that it:

- does not identify the residence (e.g., city and either state or foreign country) of each inventor.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 13/044,831

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	330
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	540
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	220
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	*			OR	x 52 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	*				x 220 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $270 ($135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1090

APPLICATION AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

PTO/SB/05 (08-08)
Approved for use through 09/30/2010. OMB 0651-0032
U.S. Patent and Trademark Office. U.S. DEPARTMENT OF COMMERCE
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UTILITY PATENT APPLICATION TRANSMITTAL

(ONLY FOR NEW NONPROVISIONAL APPLICATIONS UNDER 37 CFR 1.53(B))

Attorney Docket No.	47005-P001WUSC5
First Inventor	Carles Puente Baliarda
Title	INTERLACED MULTIBAND ANTENNA ARRAYS
Express Mail Label No.	

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: **Commissioner for Patents**
P.O. Box 1450
Alexandria, VA 22313-1450

1. [ ] **Fee Transmittal Form** (e.g., PTO/SB/17)
2. [ ] **Applicant claims small entity status.** See 37 CFR 1.27.
3. [X] **Specification** [*Total Pages* 25]
   Both the claims and abstract must start on a new page
   (For information on the preferred arrangement, see MPEP 608.01(a))
4. [X] **Drawing(s)** *(35 U.S.C. 113)* [*Total Sheets* 12]
5. **Oath or Declaration** [*Total Sheets* 4]
   a. [ ] Newly executed (original or copy)
   b. [X] A copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional with Box 18 completed)*
      i. [ ] DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. [ ] **Application Data Sheet.** See 37 CFR 1.76
7. [ ] **CD-ROM or CD-R** in duplicate, large table or Computer Program *(Appendix)*
   [ ] Landscape Table on CD
8. **Nucleotide and/or Amino Acid Sequence Submission** *(if applicable, items a. – c. are required)*
   a. [ ] Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. [ ] CD-ROM or CD-R (2 copies); or ii. [ ] Paper
   c. [ ] Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

9. [ ] **Assignment Papers** (cover sheet & document(s))
   Name of Assignee
10. [ ] **37 CFR 3.73(b) Statement** *(when there is an assignee)* [ ] **Power of Attorney**
11. [ ] **English Translation Document** *(if applicable)*
12. [ ] **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
    [ ] Copies of citations attached
13. [X] **Preliminary Amendment**
14. [ ] **Return Receipt Postcard** (MPEP 503) *(Should be specifically itemized)*
15. [ ] **Certified Copy of Priority Document(s)** *(if foreign priority is claimed)*
16. [ ] **Nonpublication Request** under 35 U.S.C.122 (b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
17. [ ] Other:

18. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:*

[X] Continuation [ ] Divisional [ ] Continuation-in-part (CIP) of prior application No.: 12/476,308

Prior application information: Examiner Michael C. Wimer *Art Unit:* 2821

19. CORRESPONDENCE ADDRESS

[X] The address associated with Customer Number: 61060 ***OR*** [ ] Correspondence address below

Name					
Address					
City		State		Zip Code	
Country		Telephone		Email	

Signature	/Shoaib A. Mithani/	Date	March 10, 2011
Name (Print/Type)	Shoaib A. Mithani	Registration No. (Attorney/Agent)	61,654

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Dated: March 10, 2011 Electronic Signature for Shoaib A. Mithani: /Shoaib A. Mithani/

5647473v.1 47005/P001WUSC5

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	INTERLACED MULTIBAND ANTENNA ARRAYS
First Named Inventor/Applicant Name:	Carles Puente Baliarda
Filer:	Shoaib Amirali Mithani
Attorney Docket Number:	47005-P001WUSC5

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility application filing	1011	1	330	330
Utility Search Fee	1111	1	540	540
Utility Examination Fee	1311	1	220	220
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1090**

Electronic Acknowledgement Receipt	
EFS ID:	9630639
Application Number:	13044831
International Application Number:	
Confirmation Number:	1712
Title of Invention:	INTERLACED MULTIBAND ANTENNA ARRAYS
First Named Inventor/Applicant Name:	Carles Puente Baliarda
Customer Number:	61060
Filer:	Shoaib Amirali Mithani
Filer Authorized By:	
Attorney Docket Number:	47005-P001WUSC5
Receipt Date:	10-MAR-2011
Filing Date:	
Time Stamp:	14:22:18
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1090
RAM confirmation Number	589
Deposit Account	232426
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)	
Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Preliminary Amendment	Amendment.pdf	43342 e34b0d5af2682b01c64e5f6f9944f2c1eb5e dede	no	9
Warnings:					
Information:					
2		Application.pdf	2226989 ddc039a97024d522bdff5403b9515240436 19fa2	yes	37

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	23
Claims	24	24
Abstract	25	25
Drawings-only black and white line drawings	26	37

Warnings:					
Information:					
3	Oath or Declaration filed	Declaration.pdf	310602 fe1cb7143011355413dfe6894823d4ae0e6 10943	no	4
Warnings:					
Information:					
4	Transmittal of New Application	Transmittal.pdf	39905 803ee28a09f12c2c1d9f8660de24fe345e3c 30e2	no	1
Warnings:					
Information:					
5	Fee Worksheet (PTO-875)	fee-info.pdf	32787 850e3a0906b55f2f6b800025dccb59c294fb 2613	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	2653625		

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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 a 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.

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office electronic filing system in accordance with § 1.6(a)(4).

Dated: March 10, 2011
Electronic Signature for Shoaib A. Mithani: /Shoaib A. Mithani/

Docket No. 47005-P001WUSC5
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Carles Puente Baliarda et al.

Application No. Not Yet Assigned | Confirmation No. N/A

Filed: Concurrently Herewith | Art Unit: N/A

For: INTERLACED MULTIBAND ANTENNA ARRAYS | Examiner: Not Yet Assigned

FIRST PRELIMINARY AMENDMENT

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

Dear Sir:

INTRODUCTORY COMMENTS

Prior to examination on the merits, please amend the above-identified U.S. patent application as follows:

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims are reflected in the listing of claims which begins on page 3 of this paper.

Remarks/Arguments begin on page 9 of this paper.

AMENDMENTS TO THE SPECIFICATION

Please add the following at after the Title of the invention:

CROSS-REFERENCE TO RELATED APPLICATIONS

This patent application is a continuation of U.S. Patent Application No. 12/476,308, filed on June 2, 2009. U.S. Patent Application No. 12/476,308 is a continuation of U.S. Patent No. 7,557,768, issued on July 7, 2009. U.S. Patent No. 7,557,768 is a continuation of U.S. Patent No. 7,250,918, issued on July 31, 2007. U.S. Patent No. 7,250,918 is a continuation of U.S. Patent No. 6,937,191, issued on August 30, 2005. U.S. Patent No. 6,937,191 is a continuation of PCT/ES99/00343, filed on October 26, 1999. U.S. Patent Application No. 12/476,308, U.S. Patent No. 7,557,768, U.S. Patent No. 7,250,918, U.S. Patent No. 6,937,191 and International Application No. PCT/ES99/00343 are incorporated herein by reference.

AMENDMENTS TO THE CLAIMS

1. (Canceled)

2. (New) An interlaced multiband antenna array comprising:

a plurality of antenna elements;

wherein the interlaced multiband antenna array is adapted to operate simultaneously on a plurality of working frequency bands;

wherein positions of the plurality of antenna elements result from juxtaposition of a plurality of mono-band antenna arrays, each mono-band antenna array of the plurality of mono-band antenna arrays comprises a plurality of mono-band antenna elements;

wherein a number of the plurality of mono-band antenna arrays corresponds to a number of the plurality of working frequency bands of the interlaced multiband antenna array;

wherein the interlaced multiband antenna array employs a single multiband antenna element in positions where mono-band antenna elements of a plurality of the plurality of mono-band antenna arrays come together;

wherein the single multiband antenna element comprises a plurality of electromagnetically-coupled portions which are adapted to interact with each other to establish radio-electric characteristics of the single multiband antenna element with respect to radiation and impedance patterns that are substantially similar in a plurality of the plurality of working frequency bands;

wherein a central frequency of a first working frequency band of the plurality of working frequency bands does not corresponds to an integer divider of a central frequency of a second working frequency band of the plurality of working frequency bands; and

wherein at least one mono-band antenna element of one of the plurality of mono-band antenna arrays operating at said first working frequency band is repositioned to coincide with a nearest mono-band antenna element of another one of the plurality of mono-band antenna arrays operating at said second working frequency band.

3. (New) The interlaced multiband antenna array of claim 2, wherein a single multiband antenna element is also employed in those positions of the interlaced multiband antenna array where mono-band antenna elements of the plurality of mono-band antenna arrays do not come together.

4. (New) The interlaced multiband antenna array of claim 2, wherein two working frequency bands of the plurality of working frequency bands are situated around 1800MHz and 2100MHz.

5. (New) The interlaced multiband antenna array of claim 2, wherein at least two mono-band antenna elements of the plurality of mono-band antenna arrays come together in each position of the interlaced multiband antenna array.

6. (New) The interlaced multiband antenna array of claim 2, wherein the interlaced multiband antenna array is adapted to operate simultaneously on at least three frequency bands.

7. (New) The interlaced multiband antenna array of claim 2, wherein two working frequency bands of the plurality of working frequency bands are an operating band of a GSM service and an operating band of a UMTS service.

8. (New) The interlaced multiband antenna array of claim 2, wherein two working frequency bands of the plurality of working frequency bands are situated around 1900 MHz and 2100 MHz.

9. (New) The interlaced multiband antenna array of claim 2, wherein three working frequency bands of the plurality of working frequency bands are situated around 900 MHz, 1800 MHz, and 2100 MHz.

10. (New) The interlaced multiband antenna array of claim 2, wherein two working frequency bands of the plurality of working frequency bands are situated around 800 MHz and 1900 MHz.

11. (New) The interlaced multiband antenna array of claim 2, wherein a broadband signal distribution network is employed to excite the plurality of antenna elements for at least two working frequency bands of the plurality of working frequency bands.

12. (New) An interlaced multiband antenna array comprising:

a plurality of antenna elements;

wherein the interlaced multiband antenna array is adapted to operate simultaneously on a plurality of working frequency bands;

wherein positions of the plurality of antenna elements result from juxtaposition of a plurality of mono-band antenna arrays, each mono-band antenna array of the plurality of mono-band antenna arrays comprises a plurality of mono-band antenna elements;

wherein a number of the plurality of mono-band antenna arrays corresponds to a number of the plurality of working frequency bands of the interlaced multiband antenna array;

wherein the interlaced multiband antenna array employs a single multiband antenna element in positions where mono-band antenna elements of a plurality of the plurality of mono-band antenna arrays come together;

wherein the single multiband antenna element comprises a plurality of electromagnetically-coupled portions which are adapted to interact with each other to establish radio-electric characteristics of the single multiband antenna element with respect to radiation and impedance patterns that are substantially similar in a plurality of the plurality of working frequency bands;

wherein the single multiband antenna operates a first working frequency band and a second working frequency band of the plurality of working frequency bands, a central frequency of said second working frequency band being larger than a central frequency larger of the first working frequency band; and

wherein a ratio between the central frequency of said second working frequency band and the central frequency of said first working frequency band is smaller than 1.5.

13. (New) The interlaced multiband antenna array of claim 12, wherein a first mono-band antenna array of the plurality of mono-band antenna arrays operates said first working frequency band; wherein a second mono-band antenna array of the plurality of mono-band antenna arrays operates said second working frequency band;

wherein a geometrical arrangement of the plurality of mono-band antenna elements of said first mono-band antenna array defines a first length along a first direction;

wherein a geometrical arrangement of the plurality of mono-band antenna elements of said second mono-band antenna array defines a second length along said first direction; and

wherein a ratio between the second length and the first length is not inversely proportional to the ratio between the central frequency of said second working frequency band and the central frequency of said first working frequency band.

14. (New) The interlaced multiband antenna array of claim 12, wherein the first working frequency band is situated around 1800MHz and wherein the second working frequency band is situated around 2100MHz.

15. (New) The interlaced multiband antenna array of claim 12, wherein the interlaced multiband antenna array is adapted to operate simultaneously on at least three frequency bands.

16. (New) The interlaced multiband antenna array of claim 12, wherein three working frequency bands of the plurality of working frequency bands are two operating bands of two GSM services and an operating band of a UMTS service.

17. (New) The interlaced multiband antenna array of claim 12, wherein two working frequency bands of the plurality of working frequency bands are situated around 1900 MHz and 2100 MHz.

18. (New) The interlaced multiband antenna array of claim 12, wherein three working frequency bands of the plurality of working frequency bands are situated around 900 MHz, 1800 MHz, and 2100 MHz.

19. (New) The interlaced multiband antenna array of claim 12, wherein three working frequency bands of the plurality of working frequency bands are situated around 1800 MHz, 1900 MHz, and 2100 MHz.

20. (New) The interlaced multiband antenna array of claim 12, wherein a broadband signal distribution network is employed to excite the plurality of antenna elements for at least two working frequency bands of the plurality of working frequency bands.

21. (New) An interlaced multiband antenna array comprising:

a plurality of antenna elements;

wherein the interlaced multiband antenna array is adapted to operate simultaneously on a plurality of working frequency bands;

wherein positions of the plurality of antenna elements result from juxtaposition of a plurality of mono-band antenna arrays, each mono-band antenna array of the plurality of mono-band antenna arrays comprises a plurality of mono-band antenna elements;

wherein a number of the plurality of mono-band antenna arrays corresponds to a number of the plurality of working frequency bands of the interlaced multiband antenna array;

wherein the interlaced multiband antenna array employs a single multiband antenna element in positions where mono-band antenna elements of a plurality of the plurality of mono-band antenna arrays come together;

wherein the single multiband antenna element comprises a plurality of electromagnetically-coupled portions which are adapted to interact with each other to establish radio-electric characteristics of the single multiband antenna element with respect to radiation and impedance patterns that are substantially similar in a plurality of the plurality of working frequency bands; and

wherein at least one of the plurality of working frequency bands of the interlaced multiband antenna array is an operating band of a UMTS service.

REMARKS

It is submitted that no new matter has been added by the amendments made by this preliminary amendment. Early consideration of the application as amended is respectfully requested.

Dated: March 10, 2011

Respectfully submitted,

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INTERLACED MULTIBAND ANTENNA ARRAYS

DESCRIPTION

Object of the Invention

The present invention consists of antenna arrays which can be operated simultaneously in various frequency bands thanks to the physical disposition of the elements that constitute it, as well as the multiband behaviour of some elements situated strategically in the array.

The array configuration is described on a basis of the juxtaposition or interleaving of various conventional single-band arrays operating in the different bands of interest. In those positions where elements of different multiband arrays come together, use is made of a multiband antenna which covers the different working frequency bands.

The use of a multiband interleaved antenna array (hereinafter simply Multiband Interleaved Array, MIA) implies a great advantage over the classical solution of employing an array for each frequency band: there is a cost saving in the overall radiating system and in its installation (one array replaces several), its size is reduced as well as its visual and environmental impact in the case of base and repeater stations for communication systems.

The present invention finds its application in the field of telecommunications and more specifically in radiocommunication systems.

Background and Summary of the Invention

Antennas started to be developed at the end of the nineteenth century based on the fundamental laws of electromagnetism postulated by James Clerk Maxwell in 1864. The invention of the first antenna has to be attributed to Heinrich Hertz in 1886 who demonstrated the transmission through air of electromagnetic waves. In the mid-1940's the fundamental restrictions regarding the reduction in size of antennas were shown with respect to wavelength and at the beginning of the sixties appeared the first frequency-independent antennas (E.C. Jordan, G.A. Deschamps, J.D.Dyson, P.E. Mayes, "Developments in Broadband Antennas,"IEEE Spectrum, vol.1, pp. 58-71, Apr. 1964; V.H.Rumsey, *Frequency-Independent Antennas*. New York Academic, 1966; R.L. Carrel, "Analysis and design of the log-periodic dipole array," Tech. Rep. 52, Univ. of Illinois Antenna Lab., Contract AF33 (616)-6079, Oct 1961; P.E. Mayes, "Frequency Independent Antennas and Broad-Band Derivatives Thereof", Proc. IEEE, vol.80, no.1, Jan. 1992). At that time proposals were made for helical, spiral, log-periodic arrays, cones and structures defined exclusively by angle pieces for the implementation of broadband antennas.

Antenna array theory goes back to the works of Shelkunoff (S.A. Schellkunhoff, "A Mathematical Theory of Linear Arrays," Bell System Technical Journal,

22,80), among other classic treatises on antenna theory. Said theory establishes the basic design rules for shaping the radiation properties of the array (principally its radiation pattern), though its application is restricted mainly to the case of mono-band arrays. The cause of said restriction lies in the frequency behaviour of the array being highly dependent on the ratio between the distance between elements (antennas) of the array and the working wavelength. Said spacing between elements is usually constant and preferably less than one wavelength in order to prevent the appearance of diffraction lobes. This implies that once the spacing between elements is fixed, the operating frequency (and the corresponding wavelength) is also fixed, it being particularly difficult that the same array work simultaneously at another higher frequency, given that in that case the magnitude of the wavelength is less than the spacing between elements.

The log-periodic arrays suppose one of the first examples of antenna arrays capable of covering a broad range of frequencies (V.H.Rumsey, *Frequency-Independent Antennas*. New York Academic, 1966; R.L. Carrel, "Analysis and design of the log-periodic dipole array," Tech. Rep. 52, Univ. Illinois Antenna Lab., Contract AF33 (616)-6079, Oct 1961; P.E. Mayes, "Frequency Independent Antennas and Broad-Band Derivatives Thereof", Proc. IEEE, vol.80, no.1, Jan.1992). Said arrays are based on distributing the elements that constitute it in such a manner that the spacing between adjacent elements and their length vary according to a geometric progression. Although said antennas are capable of maintaining a same radiation and impedance

pattern over a broad range of frequencies, their application in practice is restricted to some concrete cases due to their limitations regarding gain and size. Thus for example, said antennas are not employed in cellular telephony base stations because they do not have sufficient gain (their gain is around 10 dBi when the usual requirement is for about 17 dBi for such application), they usually have linear polarisation whilst in said environment antennas are required with polarisation diversity, their pattern in the horizontal plane does not have the width necessary and their mechanical structure is too bulky.

The technology of individual multiband antennas is markedly more developed. A multiband antenna is understood to be an antenna formed by a set of elements coupled to each other electromagnetically which interact with each other in order to establish the radio-electric behaviour of the antenna, behaviour which with respect to radiation and impedance patterns is similar in multiple frequency bands (hence the name multiband antenna). Numerous examples of multiband antennas are described in the literature. In 1995 antennas of the fractal or multifractal type were introduced (the coining of the terms fractal and multifractal is attributable to B.B. Mandelbrot in his book *The Fractal Geometry of Nature*, W.H. Freeman and Co. 1983), antennas which by their geometry have a multifrequency behaviour and, in determined cases, a reduced size (C. Puente, R. Pous, J. Romeu, X. Garcia "Antenas Fractales o Mulitfractales", (Spanish patent P9501019). Subsequently multi-triangular antennas were introduced (Spanish patent P9800954) which could work simultaneously in the

GSM 900 and GSM 1800 bands and, more recently, multilevel antennas (Patent PCT/ES99/00296), which offer a clear example of how it is possible to shape the geometry of the antenna in order to achieve a multiband behaviour.

The present invention describes how multiband antennas can be combined in order to obtain an array that works simultaneously in several frequency bands.

A Multiband Interleaved Array (MIA) consists of an array of antennas which has the particularity of being capable of working simultaneously in various frequency bands. This is achieved by means of using multiband antennas in strategic positions of the array. The disposition of the elements that constitute the MIA is obtained from the juxtaposition of conventional mono-band arrays, employing as many mono-band arrays as frequency bands that it is wished to incorporate in the Multiband Interleaved Array. In those positions in which one or various elements originating in the conventional mono-band arrays coincide, a single multiband antenna (element) shall be employed which covers simultaneously the different bands. In the remaining non-concurrent positions, it can be chosen to employ also the same multiband antenna or else recur to a conventional mono-band antenna which works at the pertinent frequency. The excitation at one or various frequencies of each element of the array depends therefore on the position of the element in the array and is controlled by means of the signal distribution network.

Brief Description of the Drawings

The characteristics expounded in the foregoing, are presented in graphical form making use of the figures in the drawings attached, in which is shown by way of a purely illustrative and not restrictive example, a preferred form of embodiment. In said drawings:

Figure 1 shows the position of the elements of two classic mono-band arrays which work at frequencies f and f/2 respectively, and the disposition of elements in a multiband interleaved array, which has a dual frequency behaviour (at frequencies f and f/2), working in the same manner as classic arrays but with a smaller total number of elements.

Figure 2 shows another particular example of multiband interleaved array but with three frequencies in this case, and the respective three classic mono-band arrays which constitute it. It is a matter of extending the case of figure 1 to 3 frequencies f, f/2 and f/4.

Figure 3 shows another particular example of multiband interleaved array, in which the different working frequencies are not separated by the same scale factor. It is a matter of extending the case of figures 1 and 2 to 3 frequencies f, f/2 and f/3.

Figure 4 shows a further particular example of multiband interleaved array, in which the different working frequencies are not separated by the same scale factor. It is a matter of extending the case of figure 3 to 3 frequencies f, f/3 and f/4.

Figure 5 shows a multiband interleaved array configuration which requires a repositioning of the elements to obtain frequencies that do not correspond to an integer factor of the highest frequency. In this particular example the frequencies f, f/2 and f/2,33 have been chosen.

Figure 6 shows the extension of the design of an MIA to the two-dimensional or three-dimensional case, specifically, an extension of the example of figure 1 to two dimensions.

Figure 7 shows one of the preferred of operating modes (AEM1). It is a matter of an MIA in which the multiband elements are multi-triangular elements. The array works simultaneously at dual frequencies, for example in the GSM 900 and GSM 1800 bands.

Figure 8 shows another of the preferred operating modes (AEM2). It is a matter of an MIA in which the multiband elements are multilevel elements. The array works simultaneously at dual frequencies, for example in the GSM 900 and GSM 1800 bands.

Figure 9 shows another of the preferred operating modes (AEM3). It is a matter of an MIA in which the multiband elements are multilevel elements. The configuration is similar to that of Figure 8 (AEM2 mode), the difference being that the new disposition permits the total width of the antenna to be reduced.

Figure 10 shows another example of multiband antenna which can be employed in MIAs. It is a matter of

a stacked patch antenna, which in this specific example works at two dual frequencies (for example, GSM 900 and GSM 1800)

Figure 11 shows the disposition of said patches in the MIA type array (AEM4 configuration). Observe that, in contrast to the previous cases, in this case multiband antennas are employed only in those positions where it is strictly necessary; in the remainder mono-band elements are employed the radiation pattern of which is sufficiently like that of the multiband element in the pertinent band.

Figure 12 shows another configuration (AEM5), in which the elements have been rotated through 45° in order to facilitate the procurement of double polarisation at +45° or -45°.

Description of the Preferred Embodiment of the Invention

In making the detailed description that follows of the preferred embodiment of the present invention, reference shall constantly be made to the Figures of the drawings, throughout which use has been made of the same numerical references for the same or similar parts.

A multiband interleaved array (MIA) is constituted by the juxtaposition of various conventional mono-band arrays. The conventional antenna arrays usually have a mono-band behaviour (that is, they work within a relatively small frequency range, typically of the order of 10% about a centre frequency) and this is not only because the elements (antennas) that constitute it have

a mono-band behaviour, but also because the physical spacing between elements conditions the working wavelength. Typically, the conventional mono-band arrays are designed with a spacing between elements of around a half-wavelength, spacing which may be increased in some configurations in order to enhance directivity, though it is usually kept below one wavelength to avoid the appearance of diffraction lobes.

This purely geometric restriction (the magnitude of the wavelength conditions the geometry of the elements of the array and their relative spacing) signifies a major drawback in those environments and communication systems in which various frequency bands have to be employed simultaneously. A clear example is the GSM cellular mobile telephony system. Initially located in the 900 MHz band, the GSM system has turned into one of the most widespread on a world scale. The success of the system and the spectacular growth in demand for this type of service has led to the cellular mobile telephony operators expanding its service into a new band, the 1800 MHz band, in order to provide coverage for a greater customer base. Making use of classic mono-band antenna technology, the operators have to duplicate their antenna network in order to provide coverage simultaneously to GSM 900 and GSM 1800. Using a single MIA specially designed for the system (like that described in the particular cases of figures 7 through 12); the operators reduce the cost of their network of base stations, the time to expand into the new band and the visual and environmental impact of their installations (through the simplification of the overall radiating structure).

It is important to point out that the scenario which has just been outlined above deals only with one particular example of a type of MIA and its application; as may well be gauged by anyone familiar with the subject, in no way are the MIAs which are described in the present invention restricted to said specific configuration and can easily be adapted to other frequencies and applications.

The multiband interleaved arrays base their operation on the physical disposition of the antennas which constitute them and on the particular type of element that is employed in some strategic positions of the array.

The positions of the elements in an MIA are determined from the positions of the elements in as many mono-band arrays as there are frequencies or frequency bands required. The design of the array is, in that sense, equal to that of the mono-band arrays insomuch as it is possible to choose the current weighting for each element, in order to shape the radiation pattern according to the needs of each application. The configuration of the MIA is obtained from the juxtaposition of the positions of the different mono-band arrays. Naturally, such juxtaposition proves difficult to implement in practice in those positions in which various antennas of the different arrays coincide; the solution proposed in this invention rests in the use of a multiband antenna (for example of the fractal, multi-triangular, multi-level, etc. type) which covers all the frequencies associated with its position.

A basic and particular example of how to arrange the elements in an MIA is described in Figure 1. In the columns of the figures (1.1) and (1.2) two conventional mono-band arrays are shown in which the positions of the elements (indicated by the black circles and the circumferences respectively) are chosen in such a manner that the spacing between elements is typically less than the working wavelength. Thus, taking as reference the working frequency *f* of the array (1.1), the array (1.2) would work at a frequency *f/2* as the elements have a spacing double that of the previous case. In figure (1.3) the disposition is shown of the elements in the MIA which is capable of working simultaneously on the frequencies *f* and *f/2* conserving basically the same facilities as the two arrays (1.1) and (1.2). In the positions in which elements of the two conventional arrays (indicated in figure (1.3) by means of black circles located at the centre of a circumference) coincide, a multiband antenna is employed capable of working in the same manner (same impedance and pattern) on the frequencies (1.1) and (1.2). The remaining not common elements (indicated either by a black circle, or by a circumference) can be implemented either by means of the same multiband element employed in the common positions (and selecting the working frequency by means of the signal distribution network of the array), or by employing conventional mono-band elements. In this example the array (1.3) has a dual behaviour frequency-wise (at frequencies f and f/2), working in the same manner as the arrays (1.1) and (1.2) but with a smaller total number of elements (12 instead of 16).

Multiple examples of multiband antennas are already described in the state of the art. Antennas with fractal geometry, multi-triangular antennas, multi-level antennas even stacked patch antennas are some examples of antennas capable of working in like manner in multiple frequency bands. These, and other multiband elements can be employed in the positions of the MIAs in which elements of various mono-band arrays come together.

In the following figures other MIA configurations are shown, based on the same inventive concept, though having the disposition of the elements adapted to other frequencies. In Figure 2 the configuration described is that of a tri-band MIA working at frequencies f, f/2 and f/4. The disposition of elements in the three classic mono-band arrays at the frequencies f, f/2 and f/4 is illustrated in the figures (2.1), (2.2) and (2.3) by means of black circles, circumferences and squares respectively. The position of the elements of the MIA is determined from the configuration of the three mono-band arrays designed for each one of the three frequencies. The three arrays come together in the MIA that is shown in figure (2.4). In those positions where elements of the three arrays would come together (indicated in the drawing by the juxtaposition of the different geometric figures identifying each array) use is made of a multiband element. The three-frequency array of figure (2.4) behaves in the same manner as the three arrays (2.1), (2.2) and (2.3) at their respective working frequencies, but employing only 13 elements instead of the 21 required in the total of the three mono-band arrays.

Figures 3, 4 and 5 describe, by way of example and not restrictively the design of other MIAs based on the same principle though at other frequencies. In the first two cases the frequencies employed are integer multiples of a fundamental frequency; in the case of figure 5 the ratio between frequencies is not restricted to any particular rule, though it supposes an example of array in which the frequencies the GSM 900, GSM 1800 and UMTS services can be combined.

Specifically, Figure 3 illustrates another particular example of multiband interleaved array, in which the different working frequencies are not separated by the same scale factor. It concerns the extension of the case of Figures 1 and 2 to 3 frequencies f, f/2 and f/3. The disposition of elements of the three classic mono-band arrays at the frequencies f, f/2 and f/3 is shown in figures (3.1), (3.2) and (3.3) by means of black circles, circumferences and squares respectively. The column of figure (3.4) shows the disposition of elements in the tri-band interleaved array. In those positions in which elements of the three arrays come together (indicated in the drawing by the juxtaposition of the different geometric figures identifying each array), use is made of a multiband element; the same strategy is followed in those positions in which elements of two arrays coincide: use should be made of a multiband element capable of covering the frequencies pertinent to its position, preferentially the same element as that used in the remaining positions, selecting those frequencies which are necessary by means of the feeder network. Notice

that as the three-frequency array of figure (3.4) behaves in the same manner as the three arrays (3.1), (3.2) and (3.3) at their respective working frequencies, but employing only 12 elements instead of the 21 required in the total of the three mono-band arrays.

Figure 4 illustrates a new particular example of multiband interleaved array, in which the different working frequencies are not separated by the same scale factor. It concerns the extension of the case of Figure 3 to 3 frequencies f, f/3 and f/4. The disposition of elements of the three classic mono-band arrays at the frequencies f, f/3 and f/4 are shown in figures (4.1), (4.2) and (4.3) by means of black circles, circumferences and squares respectively. The column of figure (4.4) shows the disposition of elements in the tri-band interleaved array. In those positions where elements of the three arrays would come together (indicated in the drawing by the juxtaposition of the different geometric figures identifying each array), use is made of a multiband element. The three-frequency array of figure (4.4) behaves in the same manner as the three arrays (4.1), (4.2) and (4.3) at their respective working frequencies, but employing only 15 elements instead of the 24 required in the total of the three mono-band arrays.

It is convenient to re-emphasise that in the particular cases of Figures 3 and 4 the arrays can work at 3 frequencies simultaneously. The disposition of elements is such that the three frequencies do not always coincide in all the elements; nonetheless, by employing a tri-band antenna in those positions and

selecting the working frequencies for example by means of a conventional frequency-selective network, it is possible to implement the MIA.

In some configurations of multiband interleaved array, especially in those in which the different frequencies do not correspond to an integral factor of the highest frequency 1, it is required that the elements be repositioned, as in Figure 5. In this particular example the frequencies f, f/2 and f/2,33 have been chosen. The disposition of elements of the three classic mono-band arrays at the frequencies f, f/2 and f/2,33 is represented in figures (5.1), (5.2) and (5.3) by means of black circles, circumferences and squares respectively. The column of figure (5.4) shows what would be the disposition of elements in the tri-band interleaved array according to the same plan as in the previous examples. Notice how in this case the ratio of frequencies involves the collocation of elements at intermediate positions which make its practical implementation difficult. The solution to be adopted in this case consists in displacing the position of the element of the array that works at the lowest frequency (indicated by arrows) until it coincides with another element (that nearest) of the highest frequency array; then the two or more coincident elements in the new position are replaced with a multiband element. An example of the final configuration once the elements have been repositioned, is shown in figure (5.5). It is important that the element displaced be preferentially that of the lowest frequency array, in this way the relative displacement in terms of the working wavelength

is the least possible and the appearance of secondary or diffraction lobes is reduced to the minimum.

Figure 6 illustrates how the configuration MIAs is not limited to the linear (one-dimensional) case, but it also includes arrays in 2 and 3 dimensions (2D and 3D). The procedure for distributing the elements of the array in the 2D and 3D cases is the same, replacing also the different coincident elements with a single multiband antenna.

More examples of particular configurations of MIAs are described below. In the five examples described, various designs are presented for GSM 900 and GSM 1800 systems (890 MHz-960 MHz and 1710 MHz-1880 MHz bands). It is a question of antennas for cellular telephony base stations, which present basically the same radiofrequency behaviour in both bands; by employing such versions of MIA antenna the operators reduce the number of antennas installed to one half, minimising the cost and environmental impact of their base stations.

AEM1 MODE

The AEM1 configuration, represented in Figure 7, is based on the use of GSM 900 and GSM 1800 multi-triangular elements. The array is obtained by interleaving two conventional mono-band arrays with spacing between elements less than one wavelength ( ) in the pertinent band (typically a spacing is chosen less than 0.9 in order to minimise the appearance of the diffraction lobe in the end-fire direction). The original arrays can have 8 or 10 elements, depending on the gain required by the operator. The juxtaposition of

both arrays in a single MIA is achieved in this case by employing dual multi-triangular elements. Such elements incorporate two excitation points (one for each band), which allows the working band to be selected according to their position in the array. In figure 7 the position of the elements is shown, as well as their working frequencies. The elements shown in white indicate operation in the GSM 900 band; the elements shown in black indicate operation in the GSM 1800 band and the elements marked in black in the lower triangle and in white in their two upper triangles indicate simultaneous operation in both bands. Precisely the simultaneous operation in both bands via a single multiband element (the multi-triangular element) in such positions of the array (those positions at which those of the original mono-band arrays coincide), is one of the main characteristic features of the MIA invention.

The manner of feeding the elements of the AEM1 array is not characteristic of the invention of the MIAs and recourse may be had to any conventionally known system. In particular and given that the multi-triangular elements are excited at two different points, it is possible to make use of an independent distribution network for each band. Another alternative consists in employing a broadband or dual band distribution network, by coupling a combiner/diplexer which interconnects the network and the two excitation points of the multi-triangular antenna.

Finally, the antenna may therefore come with two input/output connectors (one for each band), or combined

in a single connector by means of a combiner/diplexer network.

AEM2 MODE

This particular configuration of AEM2, shown in Figure 8, is based on a multilevel antenna which acts as a multiband element. In addition to working simultaneously in the GSM 900 and GSM 1800 bands, the antenna has also double linear polarisation at +45° and -45° with respect to the longitudinal axis of the array. The fact that the antenna has double polarisation signifies an additional advantage for the cellular telephony operator, since in this manner he can implement a diversity system which minimises the effect of fading by multipath propagation. The multilevel element which is described in Figure 8 is more suitable than the multi-triangular element described previously since the element itself has a linear polarisation at +45° in GSM 900 and at -45° in GSM 1800.

The array is obtained by interleaving two conventional mono-band arrays with spacing between elements less than one wavelength ( ) in the pertinent band (typically a spacing less than 0.9 is chosen in order to minimise the appearance of the diffraction lobe in the end-fire direction). The original arrays can have 8 or 10 elements depending on the gain required by the operator. The juxtaposition of both arrays in a single MIA is achieved in this case by employing in-band dual multilevel elements. Such elements incorporate two points of excitation (one for each band), which permits the working band to be selected according to their position in the array. In Figure 8 the position of the

elements is shown, as well as their working frequencies. The elements shown in white indicate operation in the GSM 900 band; the elements shown in black indicate operation in the GSM 1800 band and the elements marked in black in their lower triangle and in white in the upper triangles indicate simultaneous operation in both bands. Precisely the simultaneous operation in both bands via a single multiband element (the multilevel element) in such positions of the array (those positions in which those of the original mono-band arrays coincide), is one of the main characteristic features of the MIA invention.

It is possible to achieve double polarisation on a basis of exciting the multilevel element at various points on its surface; nonetheless in order to augment the isolation between connectors of different polarisation, it is chosen in the example described to implement a double column to separate the +45° polarization (left-hand column) from that of -45° (right-hand column). To increase the isolation between bands, it is even possible to interchange the polarisation inclination in the columns of the array in one of the bands (for example in DCS).

The manner of feeding the elements of the array AEM2 is not characteristic of the invention of the MIAs and recourse can be had to any conventionally known system. In particular and given that the multi-triangular elements are excited at two different points, it is possible to make use of an independent distribution network for each band and polarisation. Another alternative consists in employing a broadband or

dual band distribution network, by coupling a combiner/diplexer which interconnects the network and the two excitation points of the multilevel antenna. The antenna may then come with four input/output connectors (one for each band and polarisation), or else combined in only two connectors (one for each independent polarisation) by means of combiner/diplexer network in each polarisation.

AEM3 MODE

The AEM3 configuration, as shown in Figure 9, is very similar to the AEM2 (the position of the multilevel elements and the type of element itself is the same as in the previous case), with the difference that the right-hand column is reversed with respect to that on the left. In this manner an antenna with dual band and polarisation is obtained, the total width of the antenna being reduced with respect to the previous case (in this particular example the width is reduced by about 10%). In order to increase the isolation between the columns of double polarisation it is convenient that oblique fins be inserted between contiguous elements. In that case, lateral fins are also incorporated in all the elements which work in GSM 1800, fins which contribute to narrowing the radiation beam in the horizontal plane (plane at right angles to the longitudinal axis of the array).

Nor is the signal distribution system especially characteristic of the MIA configuration and the same system can be used as in the previous case.

AEM4 MODE

Another example of multiband interleaved array is that termed herein AEM4 and which is shown in schematic form in Figure 11. In this case, the multiband element is a stacked square patch antenna (Figure 10), though it is obvious for anyone familiar with the subject that patches of other shapes could be employed. Square- or circular-shaped types are preferred in the event that is wished to work with double polarisation. In the example of Figure 10 the particular case is described of square patches.

The lower patch is of appropriate size for its resonant frequency (associated typically with the patch fundamental mode) to coincide with the lower band (GSM 900 in this specific case); moreover, this patch acts in turn as ground plane of the upper patch. The latter is of a size such that its resonance is centred in the upper band (GSM 1800). The elements of the array are mounted on a metallic or metal-coated surface which acts as ground plane for all the elements of the array. The feeder system is preferentially of the coaxial type, a cable being employed for the lower patch and band and another for the upper patch and band. The excitation points are collocated on the bisectors of the patches (for example, the approximate excitation points are marked by means of circles on the plan view of the antenna) if vertical or horizontal polarisation is desired, or on the diagonals if, on the other hand, linear polarisation inclined at 45° is desired. In the event it is desired that the array work with double polarisation, each of the patches is excited

additionally on the bisector or diagonal opposite (orthogonal) to the first.

The feeding of the elements of the array AEM4 is not characteristic of the invention of the MIAs and recourse can be had to any conventionally known system. In particular and given that the stacked patch antenna is excited at two different points, it is possible to make use of an independent distribution network for each band and polarisation. Another alternative consists in employing a broadband or dual band distribution network, by coupling a combiner/diplexer which interconnects the network and the two excitation points of the multilevel antenna.

The antenna may then come with four input/output connectors (one for each band and polarisation), or else combined in only two connectors (one for each independent polarisation) by means of a combiner/diplexer network in each polarisation.

AEM5 MODE

The AEM5 configuration, as shown in Figure 12, adopts the same approach as the AEM4, though all the elements are rotated through 45° in the plane of the antenna. In this manner the radiation pattern is modified in the horizontal plane, in addition to rotating the polarization through 45°.

It is of interest to point out that both in the AEM4 configuration and in the AEM5, the multiband element constituted by the stacked patches is really only strictly necessary in those strategic positions in

which elements originating in the conventional mono-band arrays coincide. In the remaining positions, it shall be possible to employ indistinctly multiband or mono-band elements that work at the frequency determined for its location, as long as its radiation pattern is sufficiently like that of the stacked patch antenna in order to avoid the appearance of diffraction lobes.

It is not deemed necessary to extend further the content of this description in order that an expert in the subject can comprehend its scope and the benefits arising from the invention, as well as develop and implement in practice the object thereof.

Notwithstanding, it must be understood that the invention has been described according to a preferred embodiment thereof, for which reason it may be susceptible to modifications without this implying any alteration to its basis, it being possible that such modifications affect, in particular, the form, the size and/or the materials of manufacture.

CLAIMS

1.- Interlaced multiband antenna arrays which works simultaneously on various frequencies characterised in that the position of the elements in the array is obtained from the juxtaposition of as many mono-band arrays as there are working frequencies required, employing a single multiband antenna, capable of covering the different working frequencies, in those positions of the array in which the positions of two or more elements of the mono-band arrays come together.

A B S T R A C T

Antenna arrays which can work simultaneously in various frequency bands thanks to the physical disposition of the elements which constitute them, and also the multiband behaviour of some elements situated strategically in the array. The configuration of the array is described based on the juxtaposition or interleaving of various conventional mono-band arrays working in the different bands of interest. In those positions in which elements of different multiband arrays come together, a multiband antenna is employed which covers the different working frequency bands. The advantages with respect to the classic configuration of using one array for each frequency band are: saving in cost of the global radiating system and its installation (one array replaces several), and its size and visual and environmental impact are reduced in the case of base stations and repeater stations for communication systems.

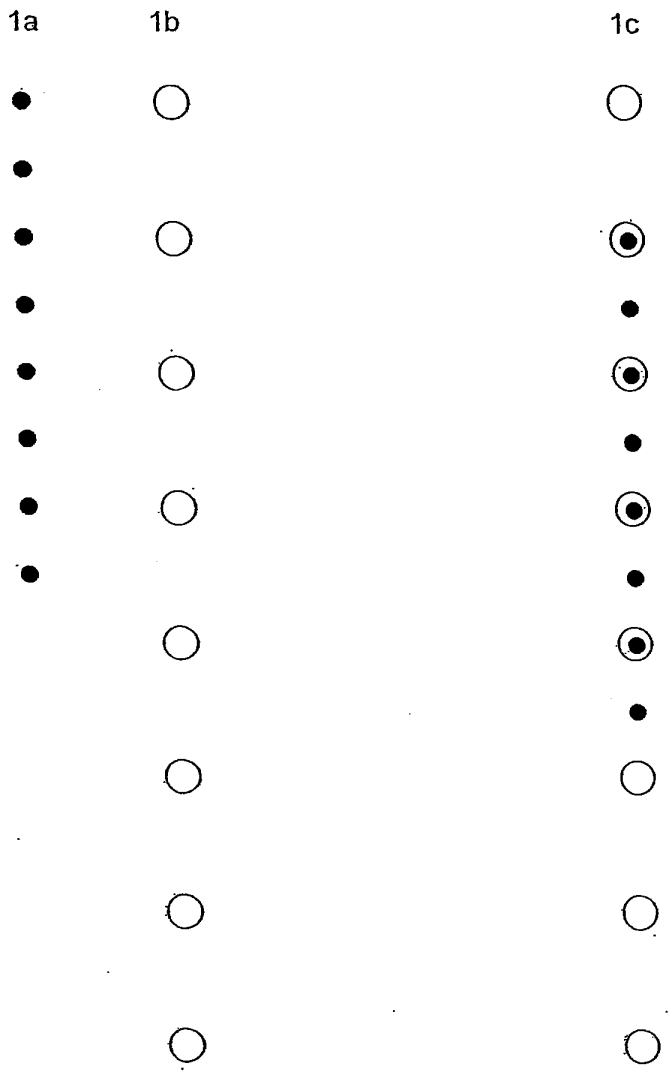


FIG. 1

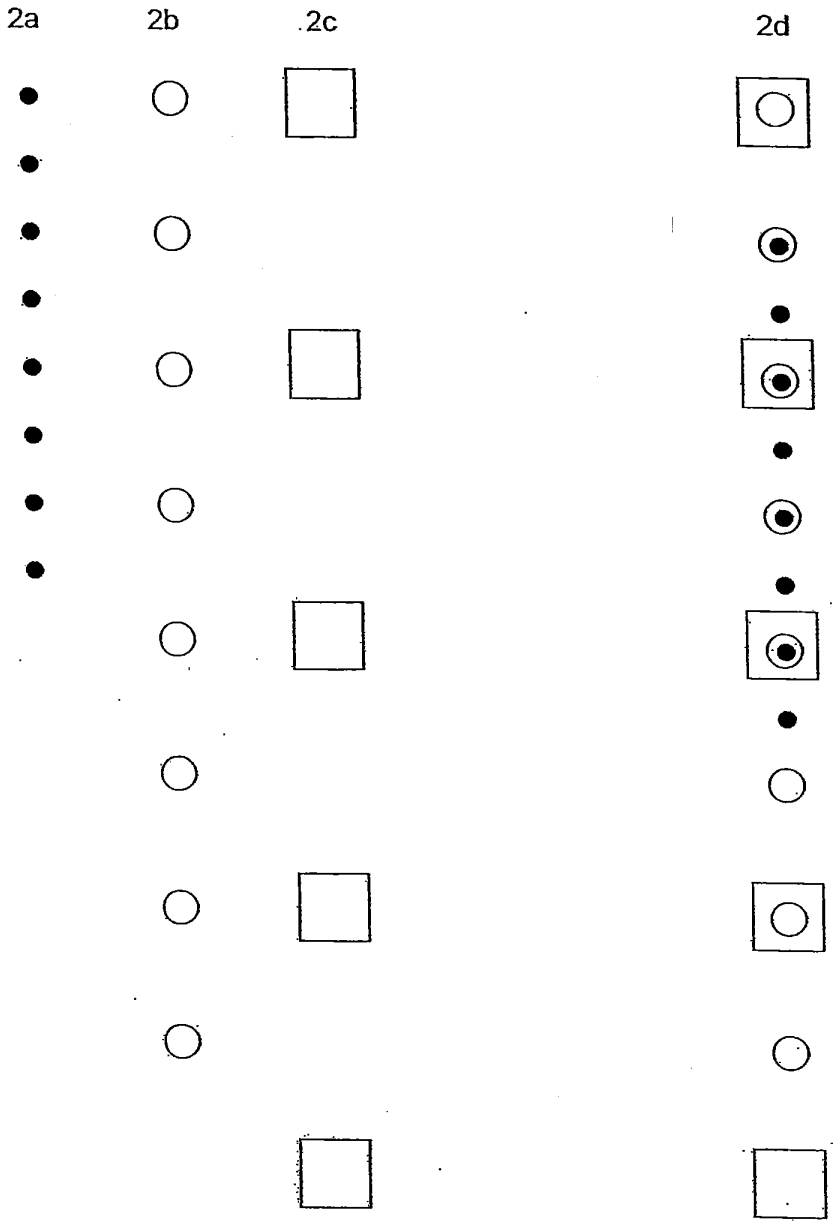


FIG. 2

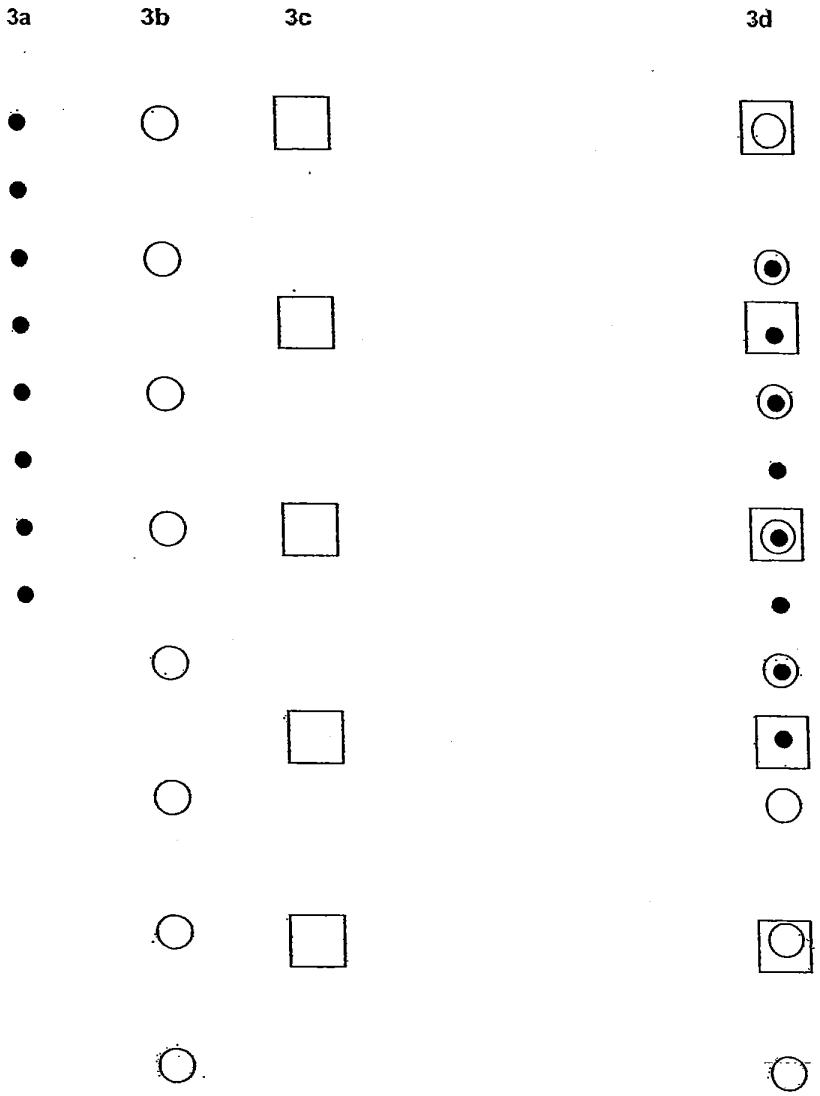


FIG. 3

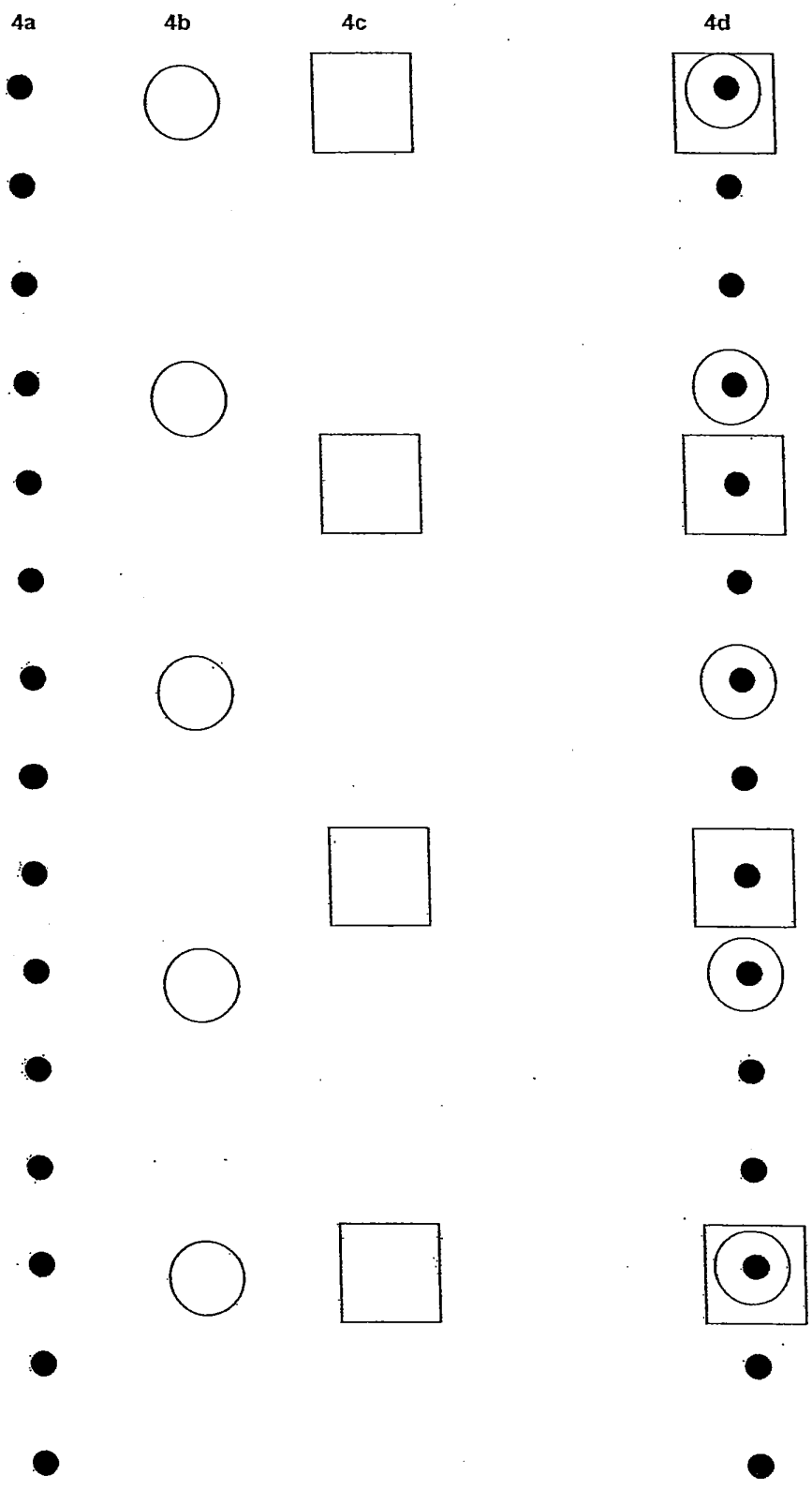


FIG. 4

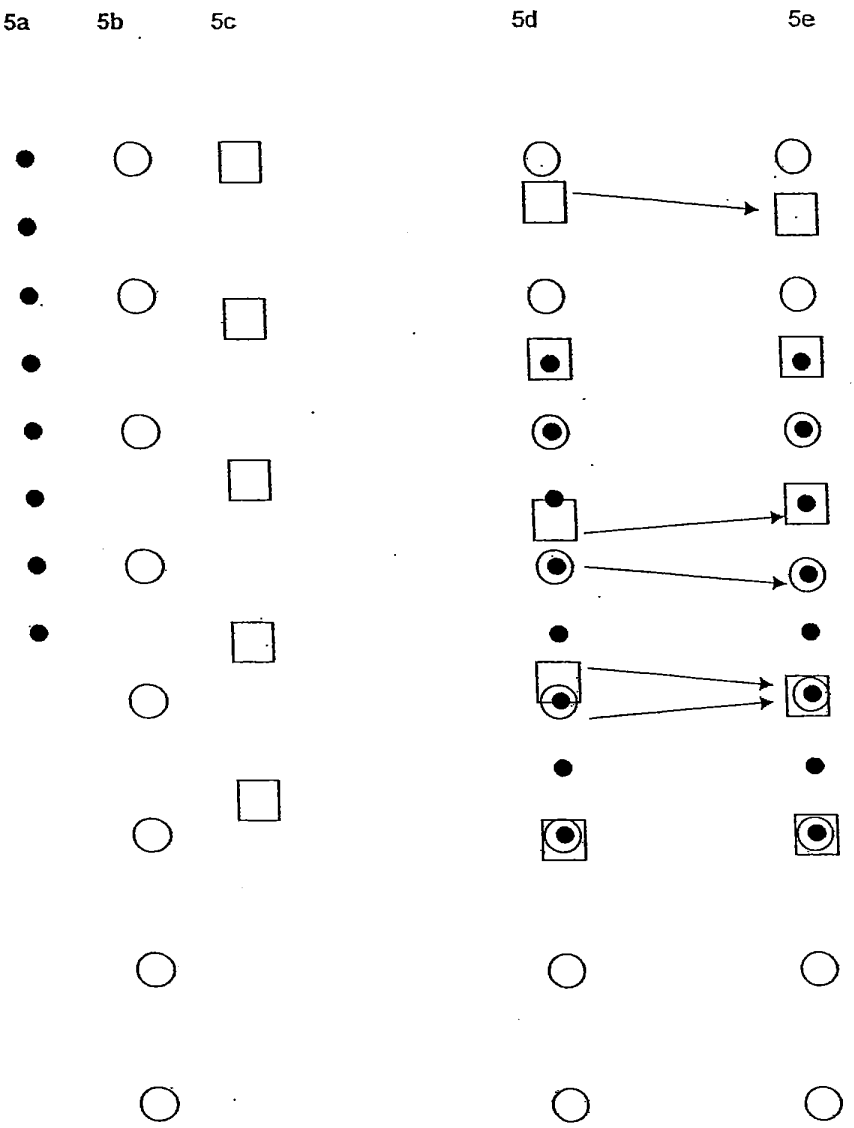
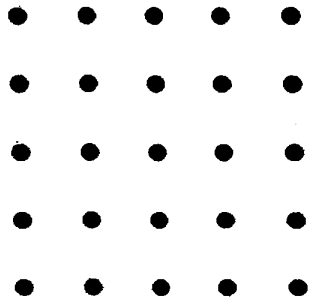
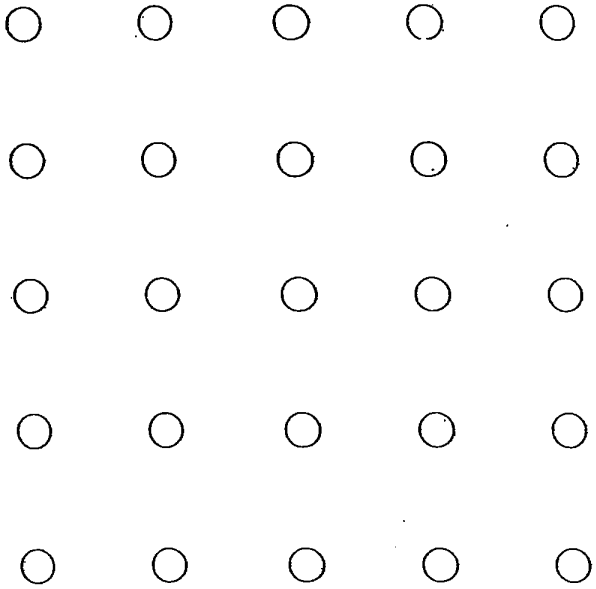


FIG. 5

6a



6b



6c

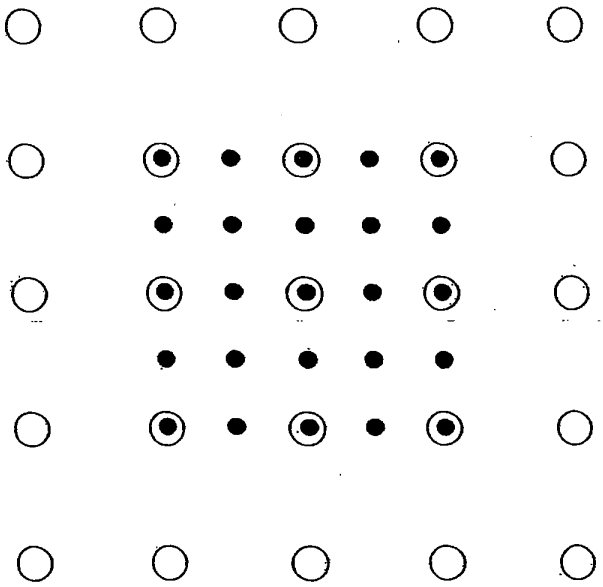


FIG. 6

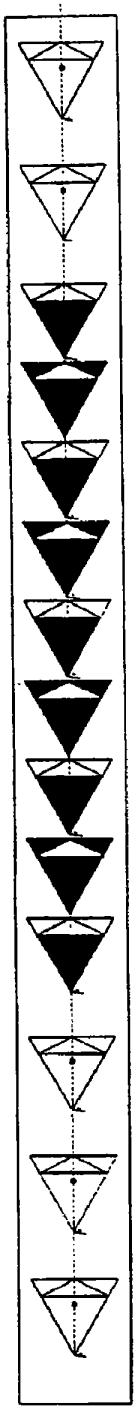


FIG. 7

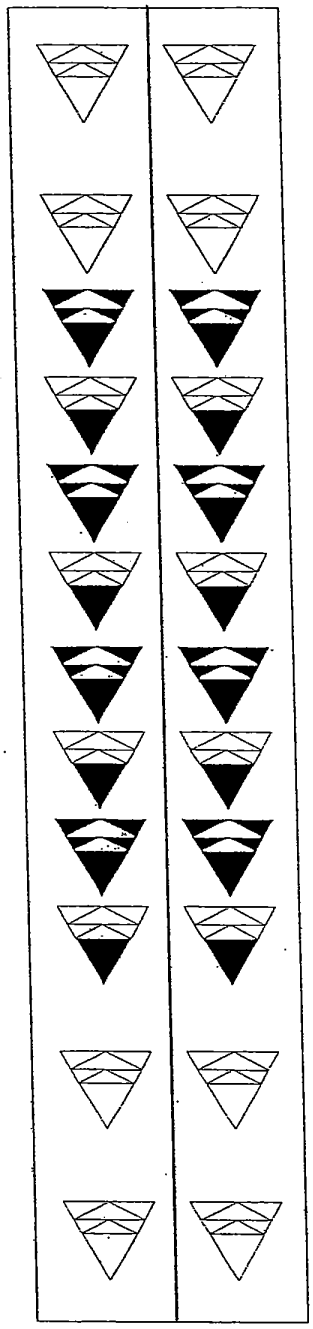


FIG. 8

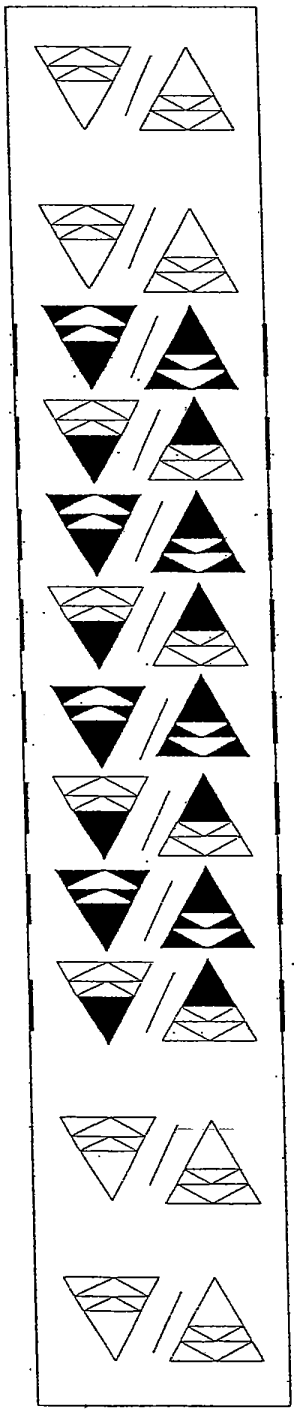


FIG. 9

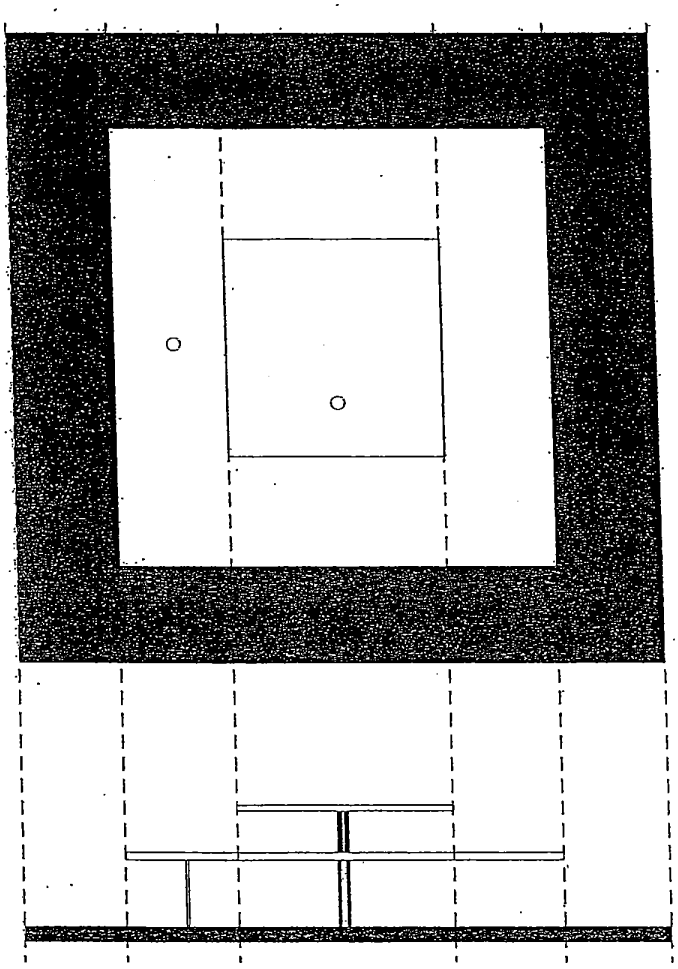


FIG. 10

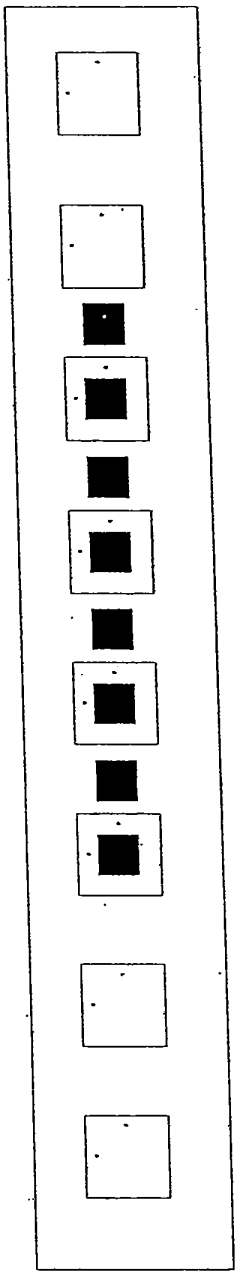


FIG. 11

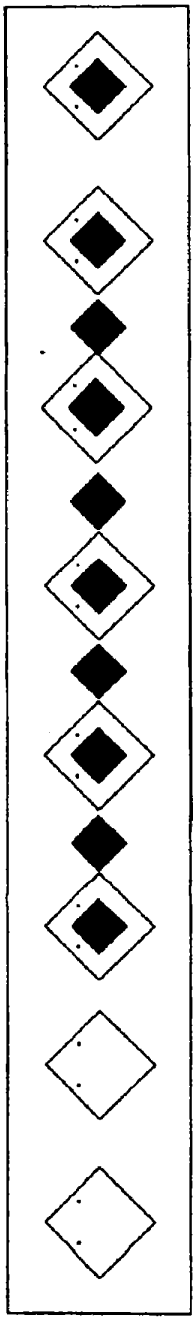


FIG. 12

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am an original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

INTERLACED MULTIBAND ANTENNA ARRAYS

the specification of which was filed on November 12, 2004 as Application No. 10/988,261.

In the event that the filing date and/or Application No. are not entered above at the time I execute this document, and if such information is deemed necessary, I hereby authorize and request my attorneys/agent(s) at **Winstead PC**, P.O. Box 50784, Dallas, Texas 75201, to insert above the filing date and/or Application No. of said application.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by an amendment, if any, specifically referred to herein.

I acknowledge the duty to disclose all information known to me that is material to patentability in accordance with Title 37, Code of Federal Regulations, § 1.56.

FOREIGN PRIORITY CLAIM

I hereby claim foreign priority benefits under Title 35, United States Code § 119(a)-(d) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

[x] no such foreign applications have been filed

[ ] such foreign application have been filed as follows:

EARLIEST FOREIGN APPLICATION(S), IF ANY FILED WITHIN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION

Application Number	Country	Date of Filing	Priority Claimed Under 35 USC 119

ALL FOREIGN APPLICATION(S), IF ANY FILED MORE THAN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION

Application Number	Country	Date of Filing

CLAIM FOR BENEFIT OF EARLIER U.S. PROVISIONAL APPLICATIONS

I hereby claim priority benefits under Title 35, United States Code §119(e), of any United States provisional patent application(s) listed below:

[x] no such U.S. provisional applications have been filed.

[ ] such U.S. provisional application have been filed as follows:

Application Number	Date of Filing	Priority Claimed Under 35 USC 119

CLAIM FOR BENEFIT OF EARLIER U.S./PCT APPLICATION(S)

I hereby claim the benefit under Title 35, United States Code, §120 of the United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose all information that is material to patentability in accordance with Title 37, Code of Federal Regulations, §1.56 which became available to me between the filing date of the prior application and the national or PCT international filing date of this application:

[ ] no such U.S./PCT applications have been filed.

[x] such U.S./PCT application have been filed as follows:

Application Number	Relationship	Parent Application	Date of Filing
10/988,261	Continuation of	10/135,019	04-23-2002
10/135,019	Continuation of	PCT/ES99/00343	10-26-1999

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I hereby appoint:

All practitioners at Customer Number 61060

all of **Winstead PC**, P.O. Box 50784, Dallas, Texas 75201, jointly, and each of them severally, my attorneys at law/patent agent(s), with full power of substitution, delegation and revocation, to prosecute this application, to make alterations and amendments therein, to receive the patent, and to transact all business in the U. S. Patent and Trademark Office connected therewith.

The undersigned hereby authorizes the U.S. attorney or agent named herein to accept and follow instructions from Fractus, S.A. as to any action to be taken in the United States Patent and Trademark Office regarding this application without direct communication between the U.S. attorney or agent and the undersigned. In the event of a change in the persons from whom instructions may be taken, the U.S. attorney or agent named herein will be so notified by the undersigned.

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Please direct telephone calls to: Stanley R. Moore at (214) 745-5110.

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Second inventor's signature	Date July 18th, 2007
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Citizenship Spain	
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Third inventor's signature	Date July 18th, 2007
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PTO/SB/06 (07-06)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/044,831	Filing Date 03/10/2011	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
	03/10/2011	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
AMENDMENT	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)					
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
AMENDMENT	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/KIMBERLY PANNELL/