4) uplink acquisition and ranging initiated by subscriber on the best scan beam.

Although the present invention has been described in detail, those skilled in the art should understand that they can make various changes, substitutions and alterations herein without departing from the spirit and scope of the invention in its broadest form.

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WHAT IS CLAIMED IS:

1. For use in a wireless access network comprising a plurality of base stations, each of said plurality of base stations capable of bidirectional time division duplex (TDD) communication with wireless access devices disposed at a plurality of subscriber premises in an associated cell site of said wireless access network, a transceiver associated with a first of said plurality of base stations comprising:

transmit path circuitry associated with a beam forming network capable of transmitting directed scanning beam signals in a sector of a cell site associated with said first base station, wherein said transmit path circuitry transmits at a start of a TDD frame a broadcast beam signal comprising a start of frame field and subsequently transmits downlink data traffic in a downlink portion of said TDD frame to at least one of said wireless access devices using at least one directed scanning beam signal.

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2. The transceiver as set forth in Claim 1 wherein said broadcast beam signal further comprises a first beam map containing scanning beam information usable by said at least one wireless access device to detect said least one directed scanning beam signal.

3. The transceiver as set forth in Claim 2 wherein said scanning beam information identifies a downlink time slot in said downlink portion during which said at least one directed scanning beam signal transmits said downlink data traffic.

4. The transceiver as set forth in Claim 3 wherein said scanning beam information identifies at least one modulation format associated with said at least one directed scanning beam signal.

5. The transceiver as set forth in Claim 3 wherein said scanning beam information identifies at least one forward error correction code level associated with said at least one directed scanning beam signal.

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6. The transceiver as set forth in Claim 2 further comprising receive path circuitry associated with said beam forming network capable of receiving uplink data traffic transmitted by said at least one wireless access device in an uplink portion of said TDD frame.

7. The transceiver as set forth in Claim 6 wherein said first beam map further contains uplink transmission information identifying an uplink time slot in said uplink portion during which said at least one wireless access device transmits said uplink data traffic.

8. The transceiver as set forth in Claim 7 wherein said uplink transmission information further identifies at least one modulation format used by said at least one wireless access device to transmit said uplink data traffic.

9. The transceiver as set forth in Claim 8 wherein said uplink transmission information further identifies at least one at least one forward error correction code level used by said at least one wireless access device to transmit said uplink data traffic.

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10. A fixed wireless access network comprising:

a plurality of base stations, each of said base stations capable of bidirectional time division duplex (TDD) communication with wireless access devices disposed at a plurality of subscriber premises in a cell site associated with said each base station, wherein said each base station comprises:

transmit path circuitry associated with a beam forming network capable of transmitting directed scanning beam signals in a sector of said cell site associated with said each station, wherein said transmit path circuitry transmits at a start of a TDD frame a broadcast beam signal comprising a start of frame field and subsequently transmits downlink data traffic in a downlink portion of said TDD frame to at least one of said wireless access devices using at least one directed scanning beam signal.

11. The fixed wireless access network as set forth in Claim 10 wherein said broadcast beam signal further comprises a first beam map containing scanning beam information usable by said at least one wireless access device to detect said least one directed scanning beam signal.

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12. The fixed wireless access network as set forth in Claim 11 wherein said scanning beam information identifies a downlink time slot in said downlink portion during which said at least one directed scanning beam signal transmits said downlink data traffic.

13. The fixed wireless access network as set forth in Claim 12 wherein said scanning beam information identifies at least one modulation format associated with said at least one directed scanning beam signal.

14. The fixed wireless access network as set forth in Claim 12 wherein said scanning beam information identifies at least one forward error correction code level associated with said at least one directed scanning beam signal.

15. The fixed wireless access network as set forth in Claim 11 wherein said each base station further comprises receive path circuitry associated with said beam forming network capable of receiving uplink data traffic transmitted by said at least one wireless access device in an uplink portion of said TDD frame.

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16. The fixed wireless access network as set forth in Claim 15 wherein said first beam map further contains uplink transmission information identifying an uplink time slot in said uplink portion during which said at least one wireless access device transmits said uplink data traffic.

17. The fixed wireless access network as set forth in Claim 16 wherein said uplink transmission information further identifies at least one modulation format used by said at least one wireless access device to transmit said uplink data traffic.

18. The fixed wireless access network as set forth in Claim 17 wherein said uplink transmission information further identifies at least one at least one forward error correction code level used by said at least one wireless access device to transmit said uplink data traffic.

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19. For use in a wireless access network comprising a plurality of base stations, each of said plurality of base stations capable of bidirectional time division duplex (TDD) communication with wireless access devices disposed at a plurality of subscriber premises in an associated cell site of said wireless access network, a method of communicating with a first of said plurality of base stations comprising the steps of:

transmitting at a start of a TDD frame a broadcast beam signal comprising a start of frame field capable of synchronizing receivers in said wireless access devices; and

transmitting downlink data traffic in a downlink portion of said TDD frame to at least one of said wireless access devices in a sector of a cell site associated with said first base station using at least one directed scanning beam signal.

20. The method as set forth in Claim 19 wherein said broadcast beam signal further comprises a first beam map containing scanning beam information usable by said at least one wireless access device to receive said least one directed scanning beam signal.

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21. The method as set forth in Claim 20 wherein said scanning beam information identifies a downlink time slot in said downlink portion during which said at least one directed scanning beam signal transmits said downlink data traffic.

22. The method as set forth in Claim 21 wherein said scanning beam information identifies at least one modulation format associated with said at least one directed scanning beam signal.

23. The method as set forth in Claim 21 wherein said scanning beam information identifies at least one forward error correction code level associated with said at least one directed scanning beam signal.

24. The method as set forth in Claim 20 further the step of receiving uplink data traffic transmitted by said at least one wireless access device in an uplink portion of said TDD frame.

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25. The method as set forth in Claim 24 wherein said first beam map further contains uplink transmission information identifying an uplink time slot in said uplink portion during which said at least one wireless access device transmits said uplink data traffic.

26. The method as set forth in Claim 25 wherein said uplink transmission information further identifies at least one modulation format used by said at least one wireless access device to transmit said uplink data traffic.

27. The method as set forth in Claim 26 wherein said uplink transmission information further identifies at least one at least one forward error correction code level used by said at least one wireless access device to transmit said uplink data traffic.

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WIRELESS ACCESS SYSTEM USING SELECTIVELY ADAPTABLE BEAM FORMING IN TDD FRAMES AND METHOD OF OPERATION

ABSTRACT OF THE DISCLOSURE

A transceiver for use in a wireless access network comprising a plurality of base stations, each of the plurality of base stations capable of bidirectional time division duplex (TDD) communication with wireless access devices disposed at a plurality of subscriber premises in a corresponding cell site of the wireless access network. The transceiver is associated with a first base station and comprises transmit path circuitry associated with a beam forming network for transmitting directed scanning beam signals in a sector of a cell site of the first base station. The transmit path circuitry transmits at a start of a TDD frame a broadcast beam signal comprising a start of frame field and subsequently transmits downlink data traffic in a downlink portion of the TDD frame to at least one of the wireless access devices using at least one directed scanning beam.

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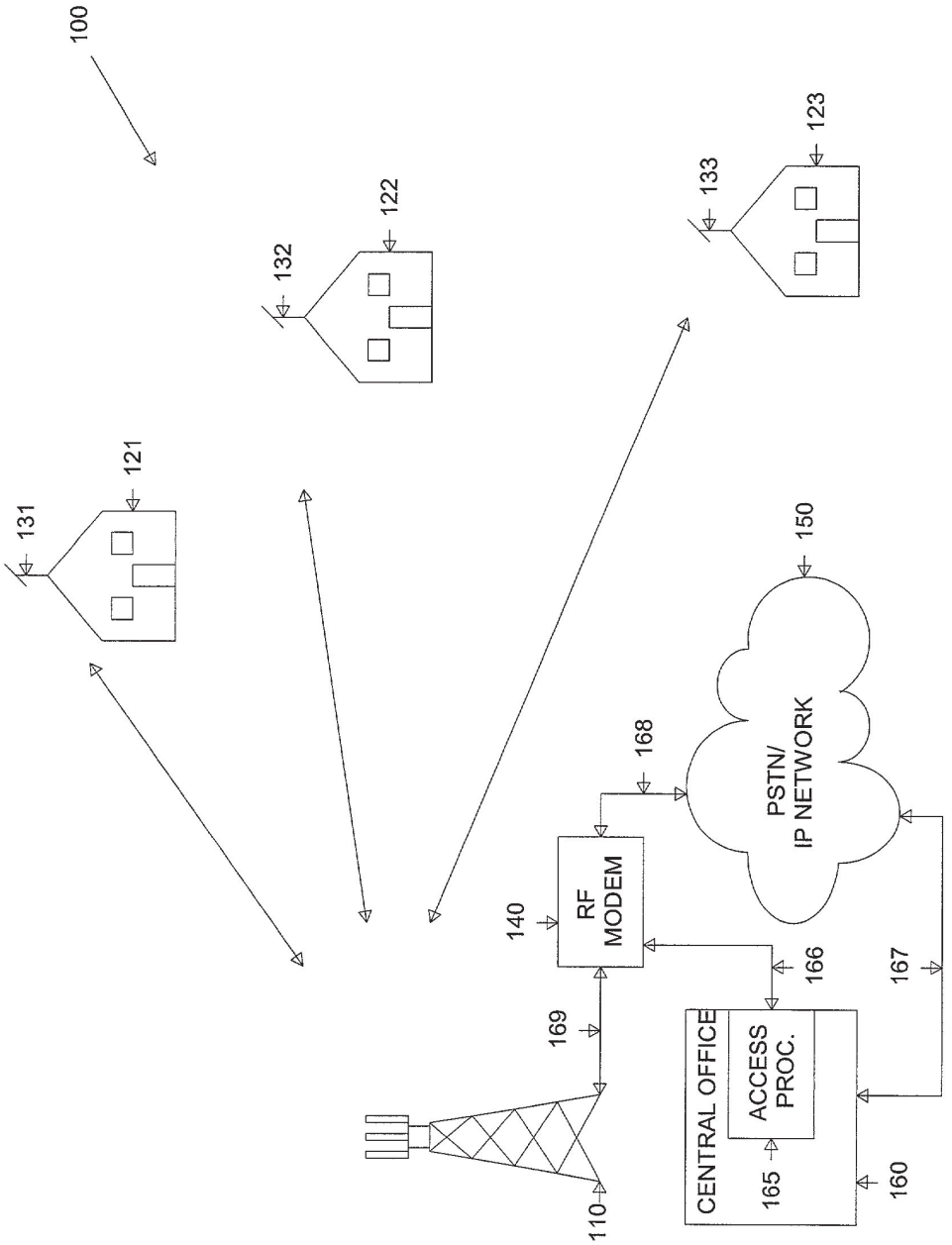


FIGURE 1

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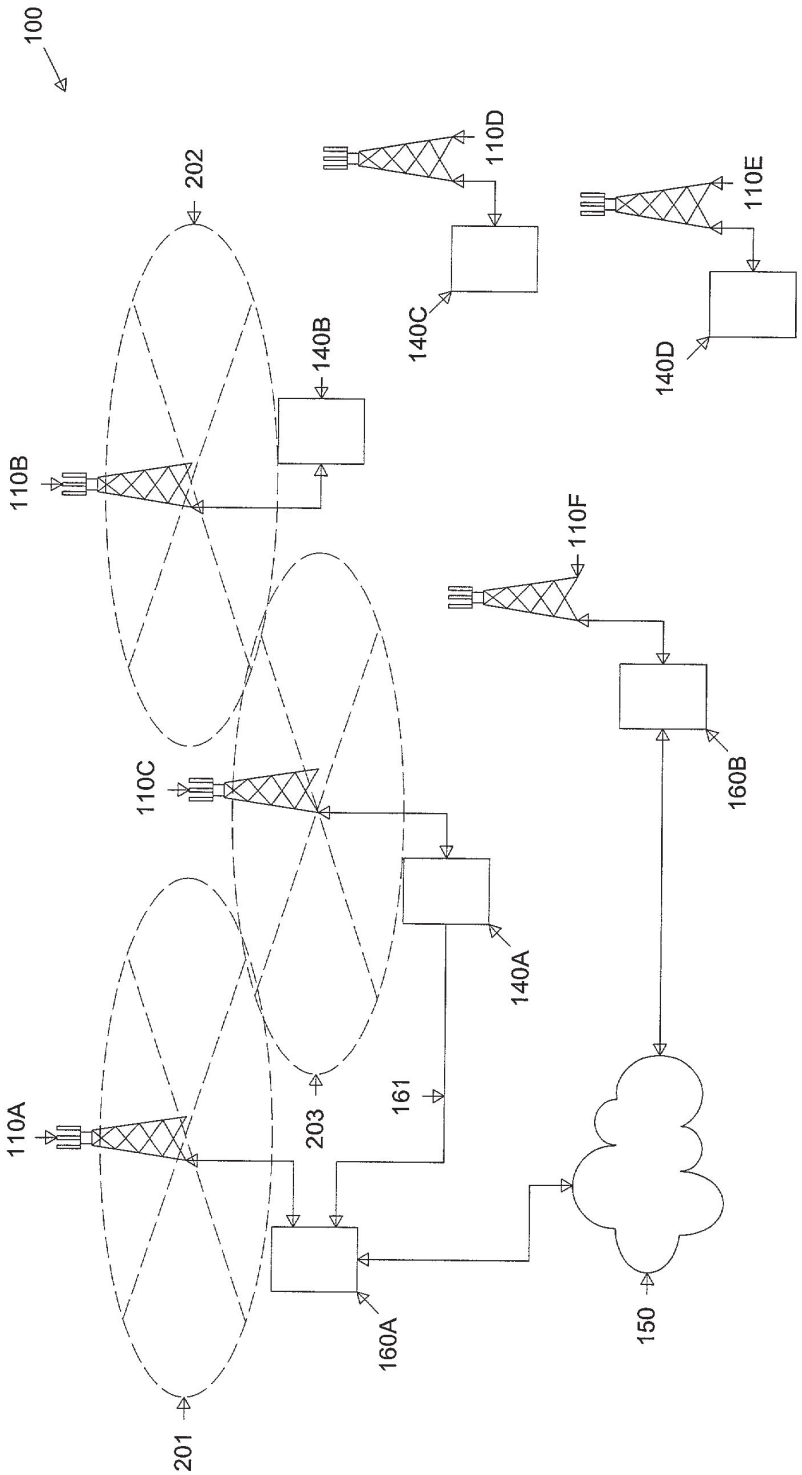


FIGURE 2

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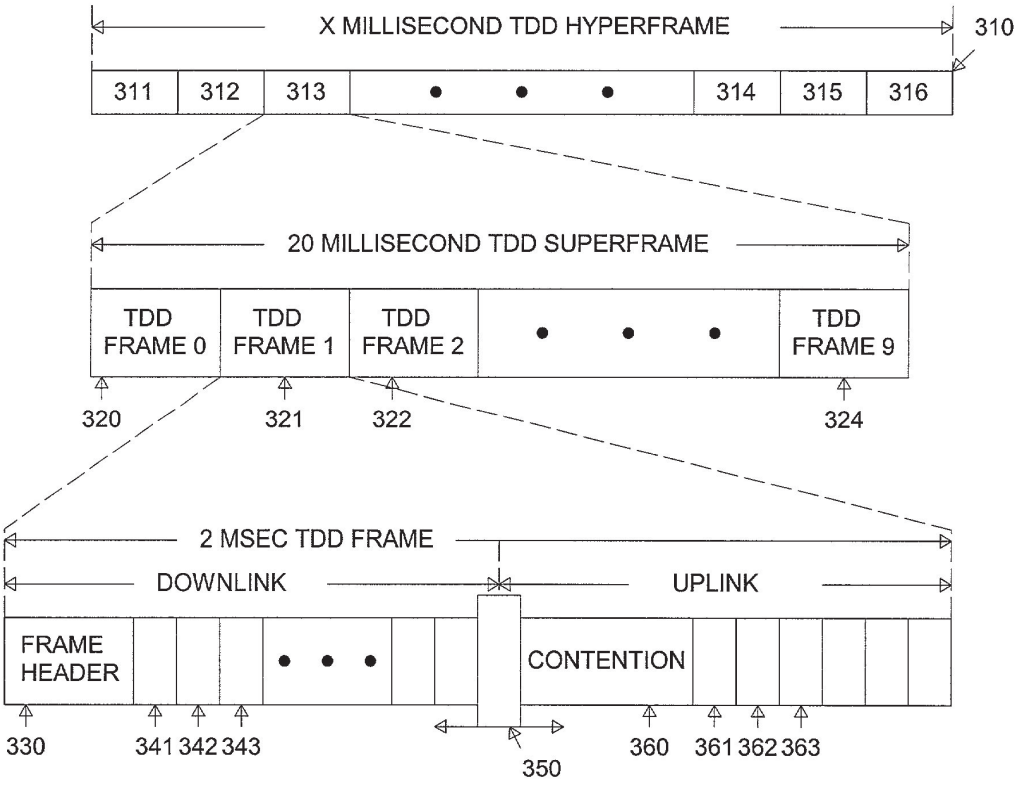


FIGURE 3

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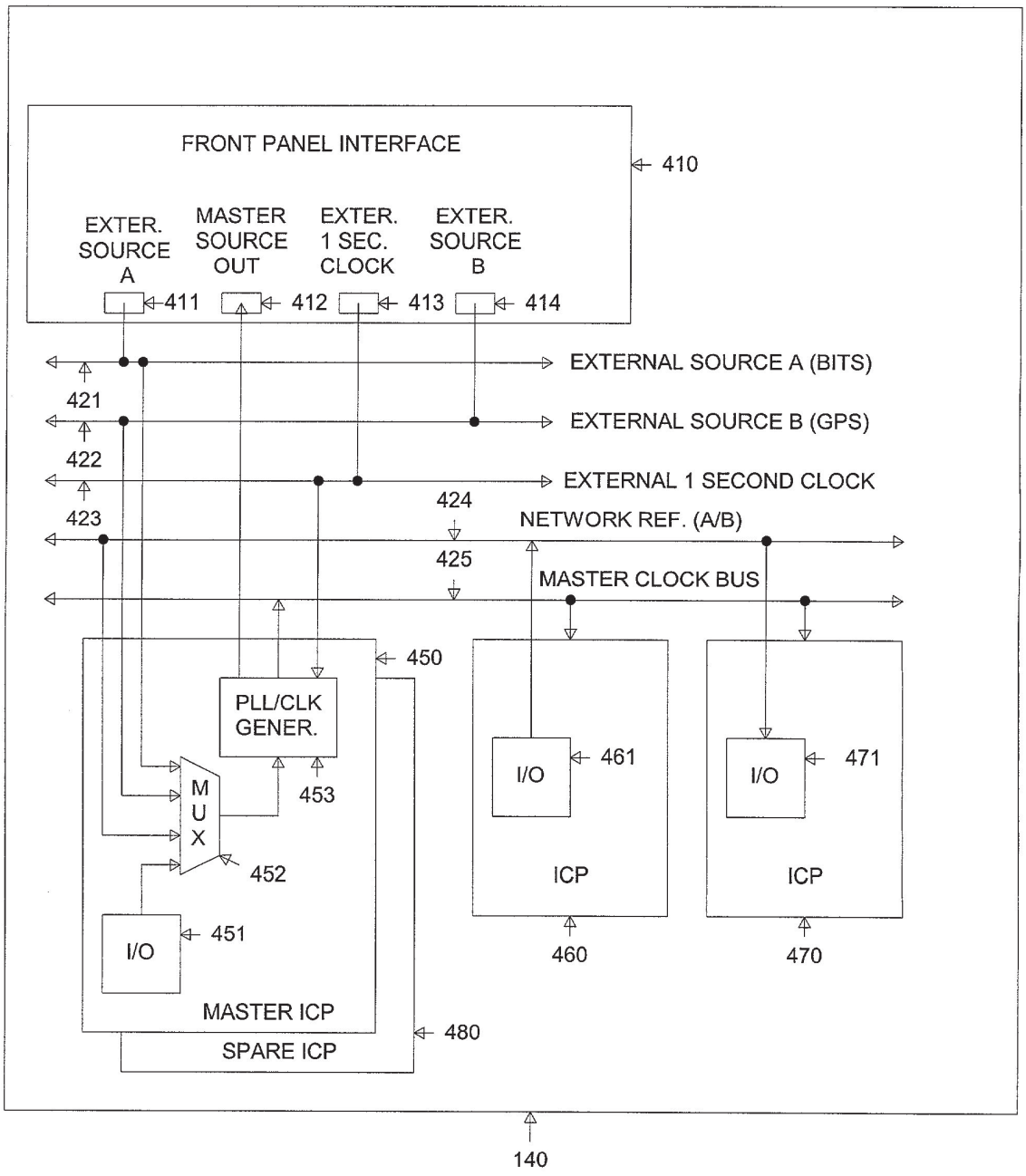


FIGURE 4

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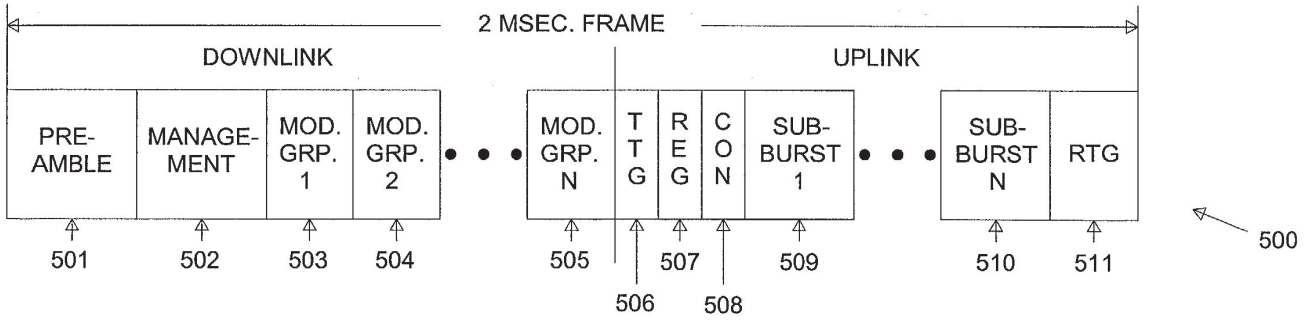


FIGURE 5A

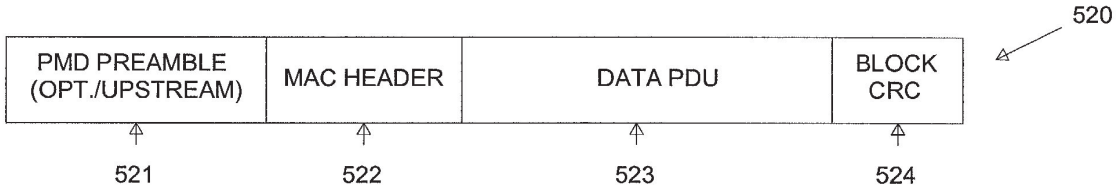


FIGURE 5B

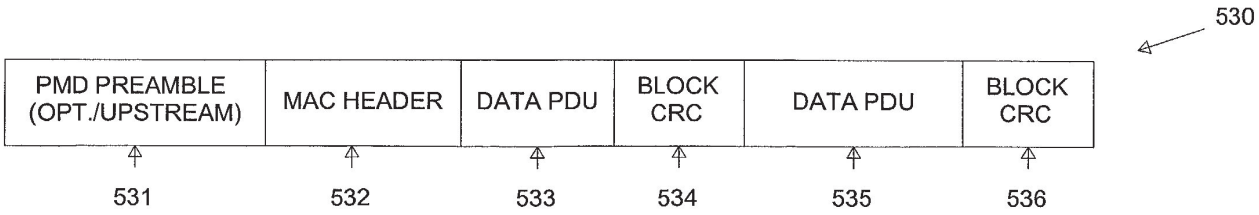


FIGURE 5C

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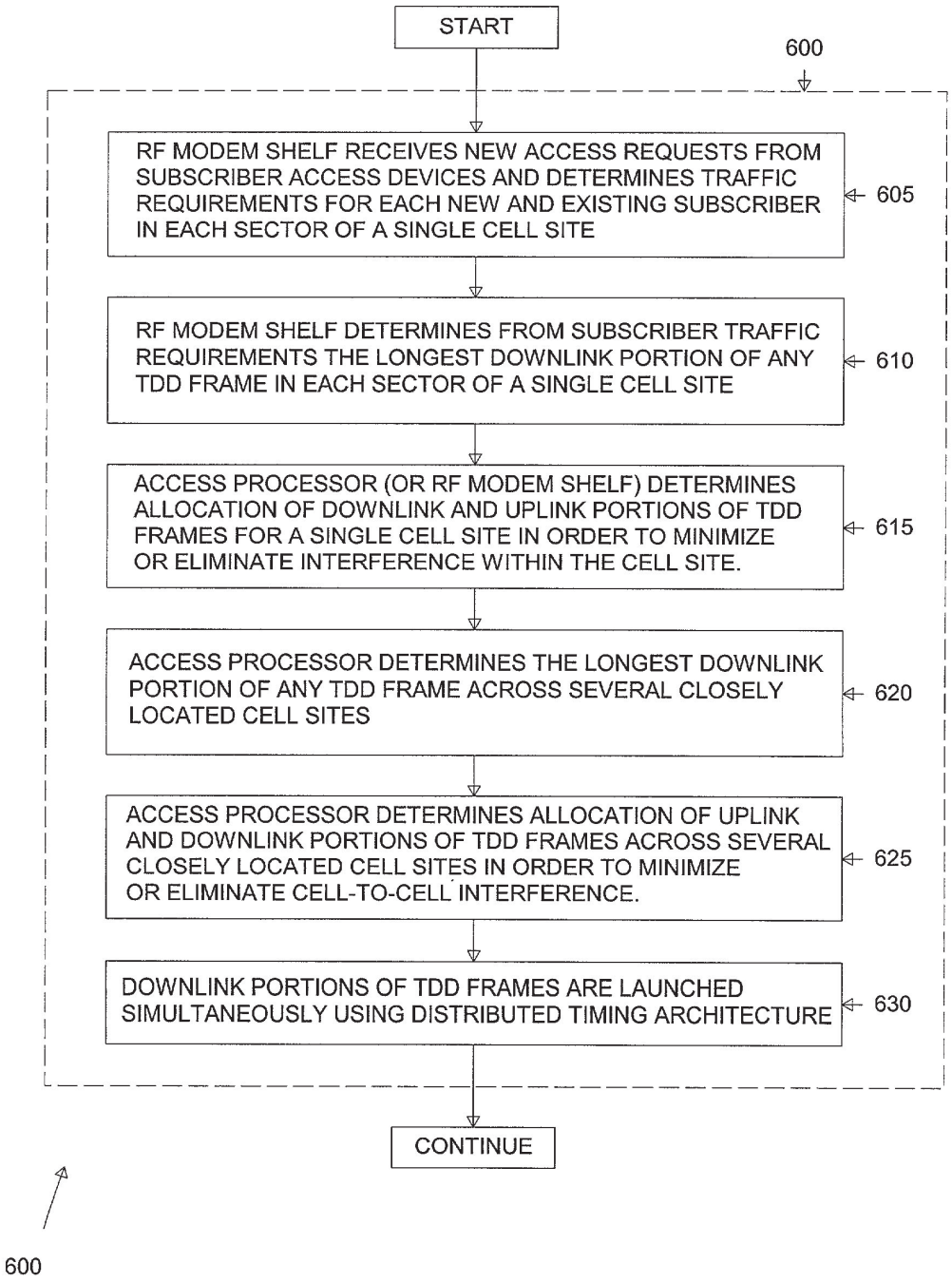


FIGURE 6

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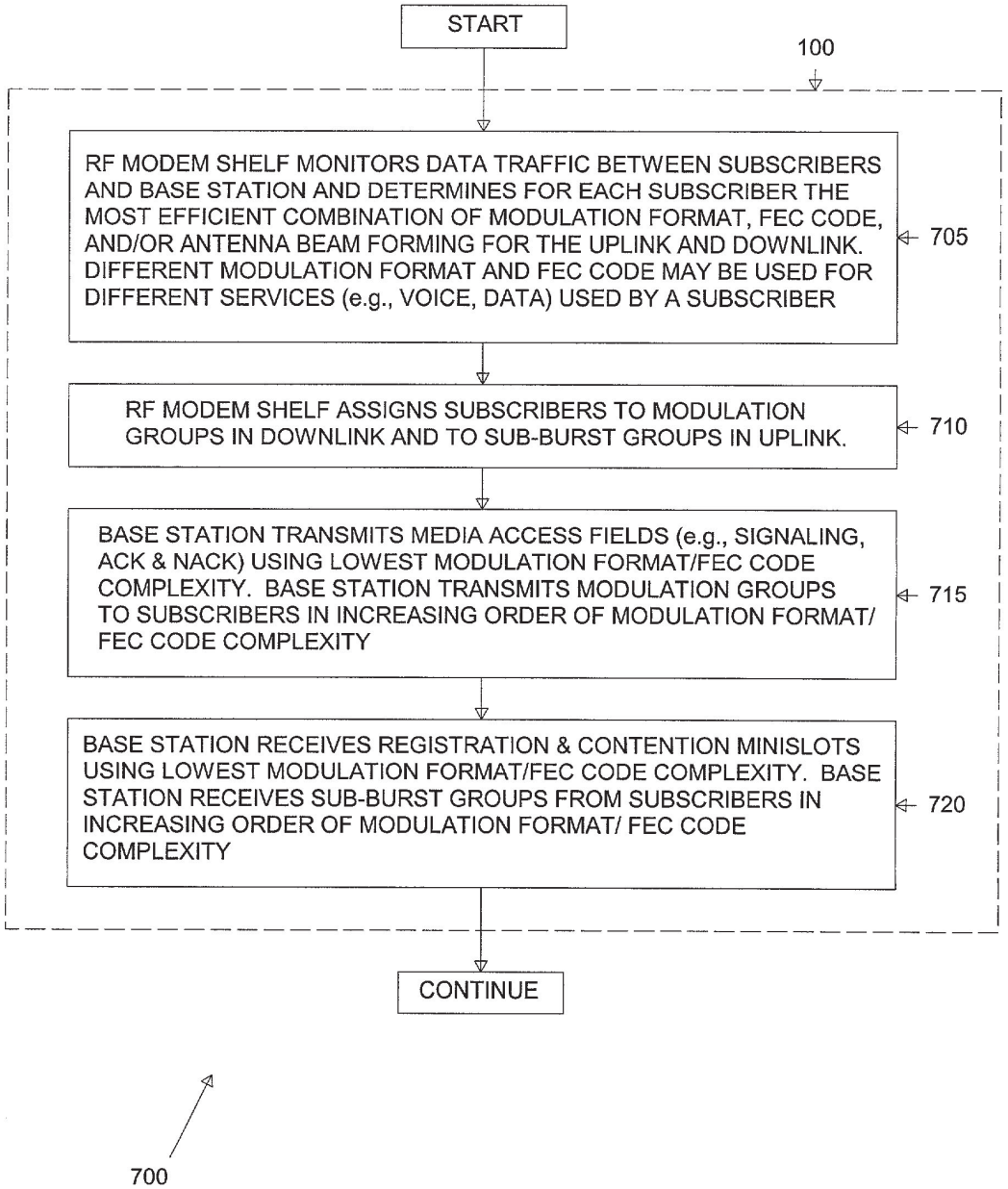


FIGURE 7

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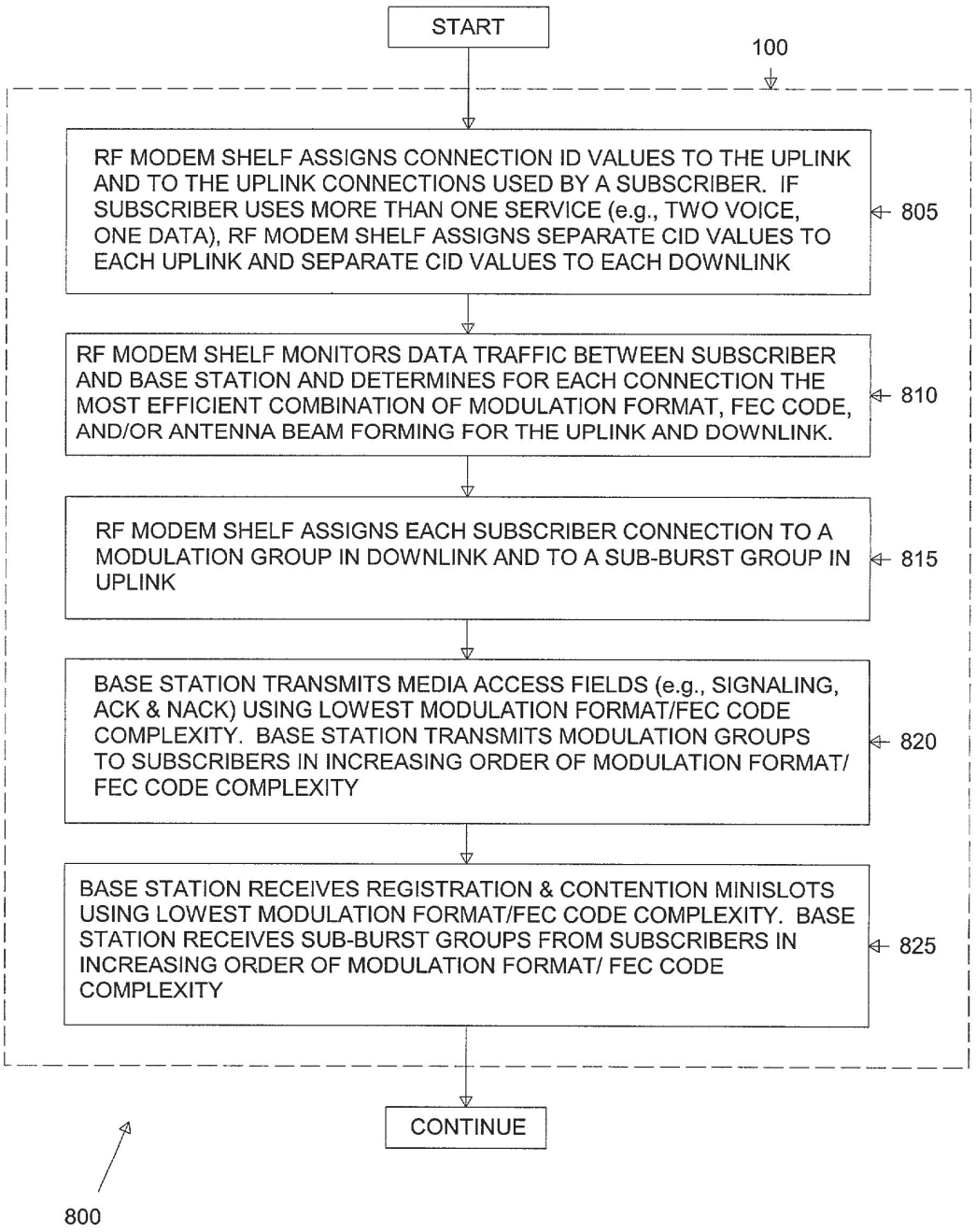


FIGURE 8

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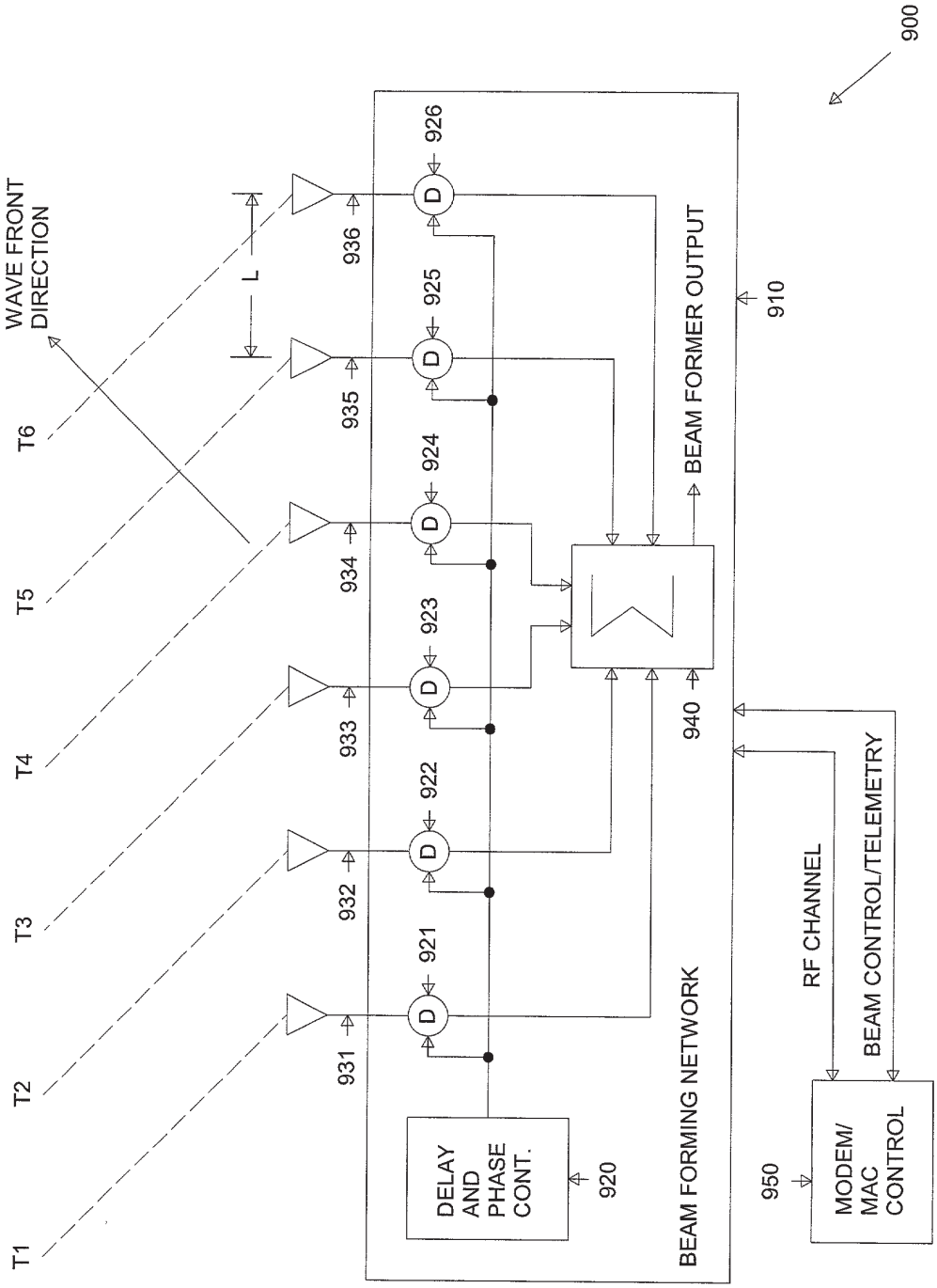


FIGURE 9

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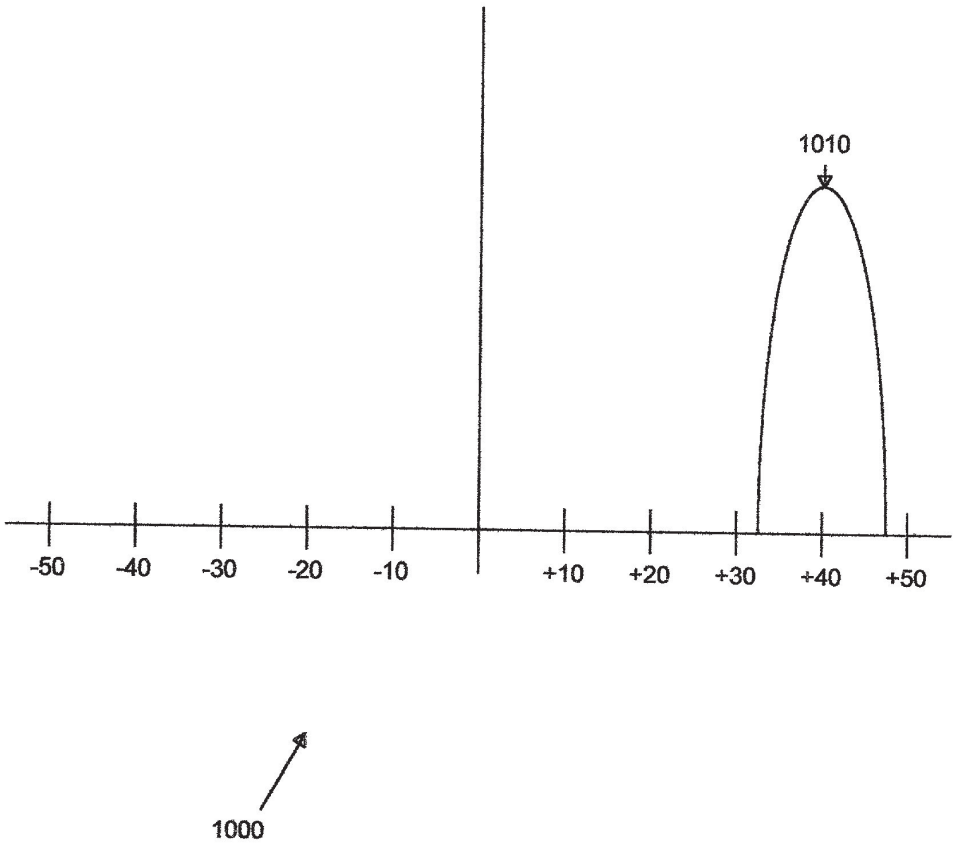


FIGURE 10

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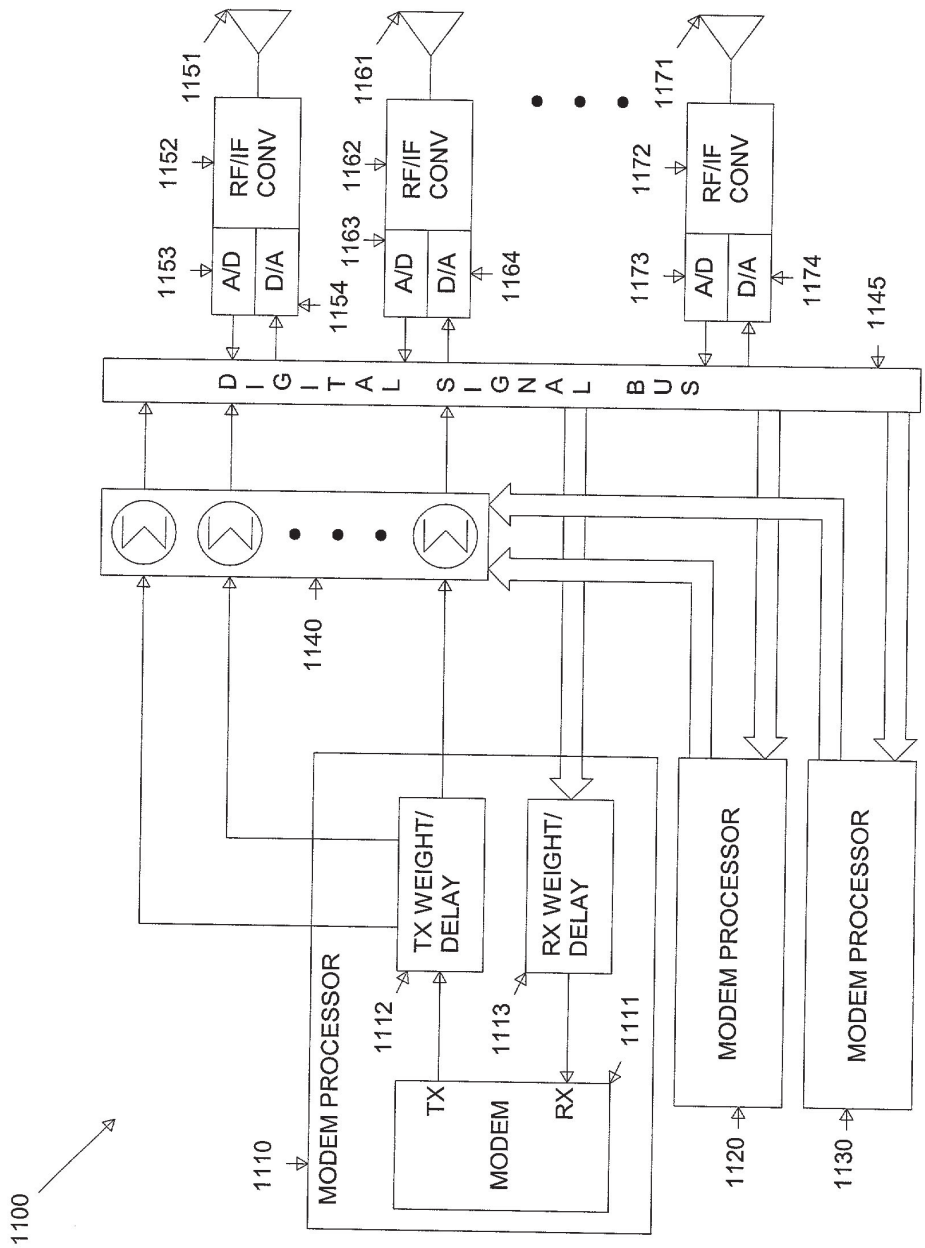


FIGURE 11

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US 9,461,705 B2

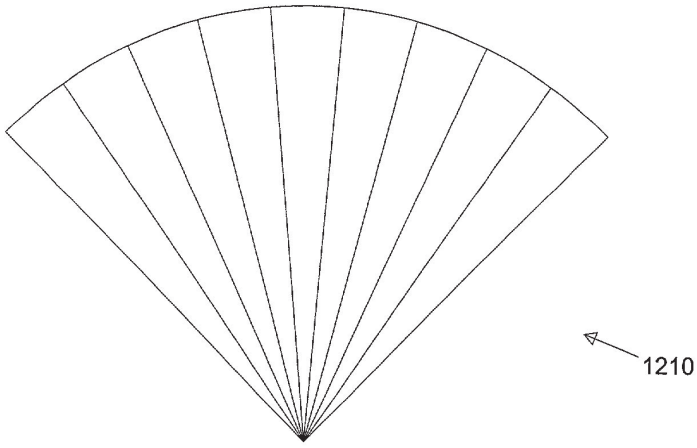


FIGURE 12A

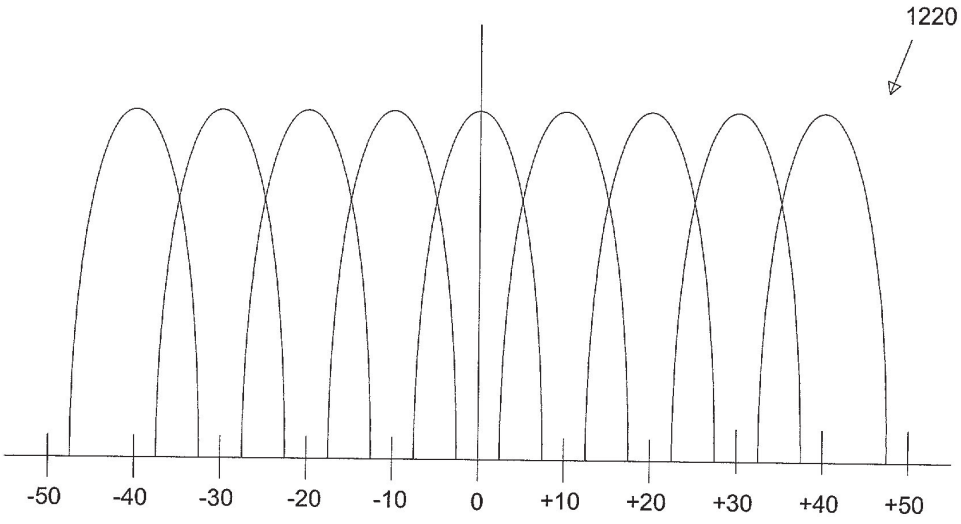


FIGURE 12B

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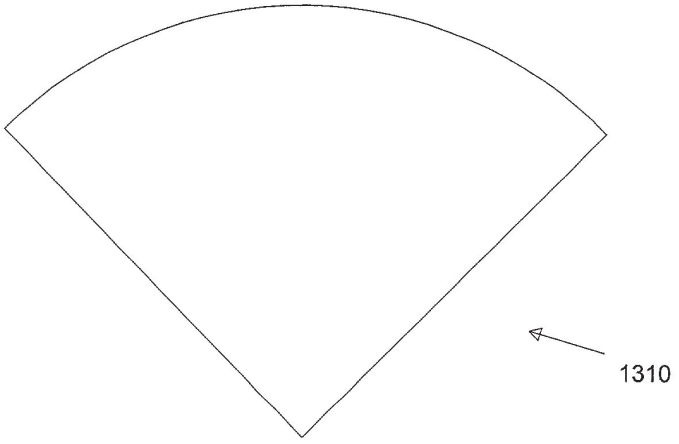


FIGURE 13A

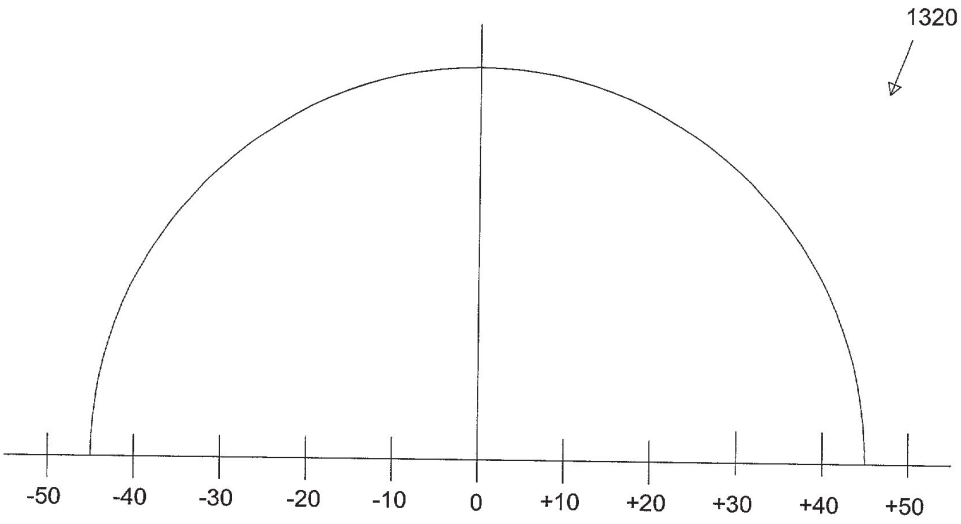


FIGURE 13B

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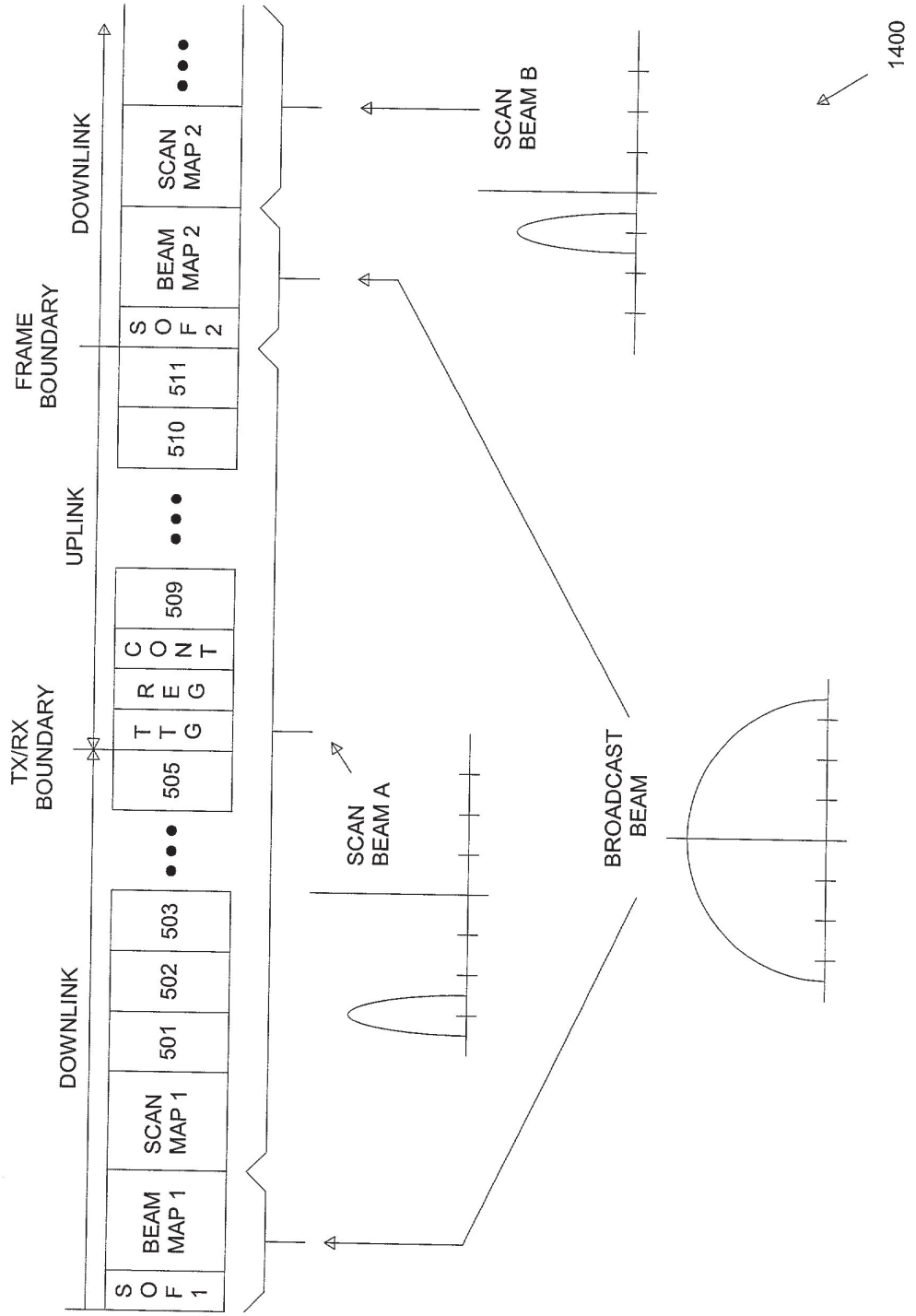


FIGURE 14

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DECLARATION AND POWER OF ATTORNEY

As the 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 the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention, design or discovery entitled:

"WIRELESS ACCESS SYSTEM USING SELECTIVELY ADAPTABLE BEAM FORMING IN TDD FRAMES AND METHOD OF OPERATION"

the specification of which is attached hereto.

I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above;

I acknowledge the duty to disclose to the Office all information known to me to be material to the patentability of this application as defined by Title 37, Code of Federal Regulations, § 1.56.

I hereby claim no foreign priority benefits under 35 U.S.C. § 119 of any foreign application(s) for patent or inventor's certificate on which priority is claimed.

I hereby claim no benefit under Title 35, United States Code, § 120 of any United States application. I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in § 1.56 which became available between the filing date of any prior application(s) and the national or PCT international filing date of this application.

I hereby appoint:

William A. Munck, Registration No. 39,308
John T. Mockler, Registration No. 39,775

my attorneys with full power of substitution and revocation, to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith, and to file and prosecute any international patent applications filed thereon before any international authorities under the Patent Cooperation Treaty.

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Send correspondence to:	Docket Clerk P.O. Drawer 800889 Dallas, Texas 75380
Direct telephone calls to:	(214) 922-9221
Atty. Docket No.:	WEST14-00103

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 § 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 issuing thereon.

Full name of inventor:	Paul F. Struhsaker
Inventor's signature:	_____
Date:	_____
Residence (City, County, State):	Plano, Collin County, Texas
Citizenship:	United States of America
Post Office Address:	5304 Brouette Court Plano, Texas 75023

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Bib Data Sheet

CONFIRMATION NO. 5591

SERIAL NUMBER	FILING DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
09/948,059	09/05/2001 RULE	455	2681	WEST14-00103

APPLICANTS

Paul F. Struhsaker, Plano, TX;

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

THIS APPLN CLAIMS BENEFIT OF 60/262,712 01/19/2001
AND CLAIMS BENEFIT OF 60/262,825 01/19/2001
AND CLAIMS BENEFIT OF 60/262,698 01/19/2001
AND CLAIMS BENEFIT OF 60/262,827 01/19/2001
AND CLAIMS BENEFIT OF 60/262,826 01/19/2001
AND CLAIMS BENEFIT OF 60/262,951 01/19/2001
AND CLAIMS BENEFIT OF 60/262,824 01/19/2001
AND CLAIMS BENEFIT OF 60/263,101 01/19/2001
AND CLAIMS BENEFIT OF 60/263,097 01/19/2001
AND CLAIMS BENEFIT OF 60/273,579 03/05/2001
AND CLAIMS BENEFIT OF 60/262,955 01/19/2001
AND CLAIMS BENEFIT OF 60/262,708 01/19/2001
AND CLAIMS BENEFIT OF 60/273,689 03/05/2001
AND CLAIMS BENEFIT OF 60/273,757 03/05/2001
AND CLAIMS BENEFIT OF 60/270,378 02/21/2001
AND CLAIMS BENEFIT OF 60/270,385 02/21/2001
AND CLAIMS BENEFIT OF 60/270,430 02/21/2001

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

IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** SMALL ENTITY **
*** 10/06/2001

		STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
Foreign Priority claimed	☐ yes ☐ no	TX	14	27	3
35 USC 119 (a-d) conditions met	☐ yes ☐ no ☐ Met after Allowance				
Verified and Acknowledged	Examiner's Signature Initials				

ADDRESS

NOVAKOV DAVIS & MUNCK
A PROFFESSIONAL CORPORATION
900 THREE GALLERIA TOWER
13155 NOEL ROAD
DALLAS , TX 75240

TITLE

Wireless access system using selectively adaptable beam forming in TDD frames and method of operation

☐ All Fees

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FILING FEE RECEIVED 498	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:	☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

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PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2000

Application or Docket Number

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	27	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	27 minus 20=	*
INDEPENDENT CLAIMS	3 minus 3 =	*
MULTIPLE DEPENDENT CLAIM PRESENT		☐

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	355.00	OR	BASIC FEE	710.00
X$ 9=		OR	X$18=	
X40=		OR	X80=	
+135=		OR	+270=	
TOTAL		OR	TOTAL	

CLAIMS AS AMENDED - PART II

AMENDMENT A	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X40=		OR	X80=	
+135=		OR	+270=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT B	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X40=		OR	X80=	
+135=		OR	+270=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT C	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X40=		OR	X80=	
+135=		OR	+270=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. 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.

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CLAIMS ONLY

SERIAL NO.	FILING DATE
APPLICANT(S)	

CLAIMS

	AS FILED		AFTER 1st AMENDMENT		AFTER 2nd AMENDMENT	
	IND.	DEP.	IND.	DEP.	IND.	DEP.
1	1		✓			
2		1				
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TOTAL IND.	3	⬇		⬇		⬇
TOTAL DEP.	24	⬅		⬅		⬅
TOTAL CLAIMS	27					

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TOTAL IND.		⬇		⬇		⬇
TOTAL DEP.		⬅		⬅		⬅
TOTAL CLAIMS						

*MAY BE USED FOR ADDITIONAL CLAIMS OR ADMENDMENTS

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APPLICATION NUMBER	FILING/RECEIPT DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
09/948,059	09/05/2001	Paul F. Struhsaker	WEST14-00103

CONFIRMATION NO. 5591

FORMALITIES LETTER

OC000000006867633

NOVAKOV DAVIS & MUNCK
A PROFFESSIONAL CORPORATION
900 THREE GALLERIA TOWER
13155 NOEL ROAD
DALLAS, TX 75240

Date Mailed: 10/09/2001

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
  Applicant must submit $ **355** *to complete the basic filing fee for a small entity.*
- Total additional claim fee(s) for this application is $63.
  - **$63** for **7** total claims over 20.
- The oath or declaration is unsigned.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(l) of $65 for a small entity in compliance with 37 CFR 1.27, must be submitted with the missing items identified in this letter.
- **The balance due by applicant is $ 483.**

A copy of this notice MUST be returned with the reply.

Customer Service Center
Initial Patent Examination Division (703) 308-1202

PART 3 - OFFICE COPY

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DOCKET NO. WEST14-00103 **PATENT**
Customer No. 23990

O I P E
JAN 1 0 2002
PATENT & TRADEMARK OFFICE
JC154

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	:	PAUL F. STRUHSAKER
U.S. Serial No.	:	09/948,059
Filed	:	September 5, 2001
For	:	WIRELESS ACCESS SYSTEM USING SELECTIVELY BEAM FORMING IN TDD FRAMES AND METHOD OF OPERATION
Group No.	:	2681
Examiner	:	Not Yet Assigned

BOX MISSING PARTS
Commissioner of Patents
Washington, D. C. 20231

Sir:

RESPONSE TO MISSING PARTS OF APPLICATION

In response to the Notice to File Missing Parts of Application dated February 20, 2001, attached are the following documents:

1. A copy of the Notice to File Missing Parts of Application;
2. Declaration and Power of Attorney;
3. Fourteen (14) Sheets of Formal Drawings;
4. Assignment and Recordation Form Cover Sheet;
5. Check in the amount of $538.00 to cover the missing parts surcharge, patent application filing fee and assignment recordal fee;
6. Certificate of Mailing by First Class Mail; and,
7. Our postcard receipt.

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The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Novakov Davis Deposit Account No. 50-0208.

Respectfully submitted,

NOVAKOV DAVIS & MUNCK, P.C.

Date: Dec 10, 2003

William A. Munck
Registration No. 39,308

Docket Clerk
P.O. Drawer 800889
Dallas, Texas 75380
Phone: (214) 922-9221
Fax: (214) 969-7557
Email: wmunck@novakov.com

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N Section A

DOCKET NO. WEST14-00103 **PATENT**
Customer No. 23990

OIPE JC154 JAN 10 2002 PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Washington, D. C. 20231

Sir:

CERTIFICATE OF MAILING BY FIRST CLASS MAIL

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relating to the above application, were deposited as "First Class Mail", with the United States Postal Service, addressed to: BOX MISSING PARTS, Commissioner for Patents, Washington, D.C. 20231, on December 10, 2001.

Date: 12/10/01

Mailer

Date: Dec 10, 2001

William A. Munck
Reg. No. 39,308

P.O. Drawer 800889
Dallas, Texas 75380
Phone: (214) 922-9221
Fax: (214) 969-7557
E-mail: wmunck@novakov.com

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OIPE JC154 JAN 10 2002

UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231
www.uspto.gov

APPLICATION NUMBER	FILING/RECEIPT DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
09/948,059	09/05/2001	Paul F. Struhsaker	WEST14-00103

CONFIRMATION NO. 5591

FORMALITIES LETTER

OC000000006867633

NOVAKOV DAVIS & MUNCK
A PROFFESSIONAL CORPORATION
900 THREE GALLERIA TOWER
13155 NOEL ROAD
DALLAS, TX 75240

Date Mailed: 10/09/2001

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

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  Applicant must submit $ ~~355~~ to complete the basic filing fee for a small entity.
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  - **$63** for **7** total claims over 20.
- The oath or declaration is unsigned.
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- **The balance due by applicant is $ ~~488~~.**
  $ 498.60

A copy of this notice MUST be returned with the reply.

RECEIVED
OCT 15 2001
NOVAKOV DAVIS & MUNCK

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Initial Patent Examination Division (703) 308-1202
PART 1 - ATTORNEY/APPLICANT COPY

01/16/2002 MBIZUNES 00000015 09948059
02 FC:205 65.00 OP
03 FC:201 370.00 OP
04 FC:203 63.00 OP

DOCKETED
OCT 16 2001

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O I P E JC154 JAN 1 0 2002 PATENT & TRADEMARK OFFICE

DECLARATION AND POWER OF ATTORNEY

As a below named sole 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 sole inventor of the subject matter which is claimed and for which a patent is sought on the invention, design or discovery entitled:

"WIRELESS ACCESS SYSTEM USING SELECTIVELY ADAPTABLE BEAM FORMING IN TDD FRAMES AND METHOD OF OPERATION"

the specification of which was filed on September 5, 2001 and assigned U.S. Serial No. 09/948,059.

I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above;

I acknowledge the duty to disclose to the Office all information known to me to be material to the patentability of this application as defined by Title 37, Code of Federal Regulations, § 1.56.

I hereby claim no foreign priority benefits under 35 U.S.C. §119 of any foreign application(s) for patent or inventor's certificate on which priority is claimed.

I hereby claim the benefit under Title 35, United States Code, §119(e) of any 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(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in § 1.56 which became available between the filing date of any prior application(s) and the national or PCT international filing date of this application.

APPLICATION SERIAL NO.	DATE FILED	STATUS
N/A		

I hereby claim the benefit under Title 35, United States Code, § 120 of any 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(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in § 1.56 which became available between the filing date of any prior application(s) and the national or PCT international filing date of this application.

APPLICATION SERIAL NO.	DATE FILED	STATUS
N/A		

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Ex.1012

I hereby appoint:

William A. Munck, Registration No. 39,308
John T. Mockler, Registration No. 39,775

all of the firm of NOVAKOV DAVIS & MUNCK, P.C. my attorneys with full power of substitution and revocation, to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith, and to file and prosecute any international patent applications filed thereon before any international authorities under the Patent Cooperation Treaty.

Send correspondence to:	Docket Clerk P.O. Drawer 800889 Dallas, Texas 75380
Direct telephone calls to:	William A. Munck, Esq. (214) 922-9221
Atty. Docket No.:	WEST14-00103

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 § 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 issuing thereon.

Full name of sole inventor:	Paul F. Struhsaker
Inventor's signature:	
Date:	9 NOV 2001
Residence (City, County, State):	Plano, Collin County, Texas
Citizenship:	United States of America
Post Office Address:	5304 Brouette Court Plano, Texas 75023

PETITIONER NOKIA
Ex.1012

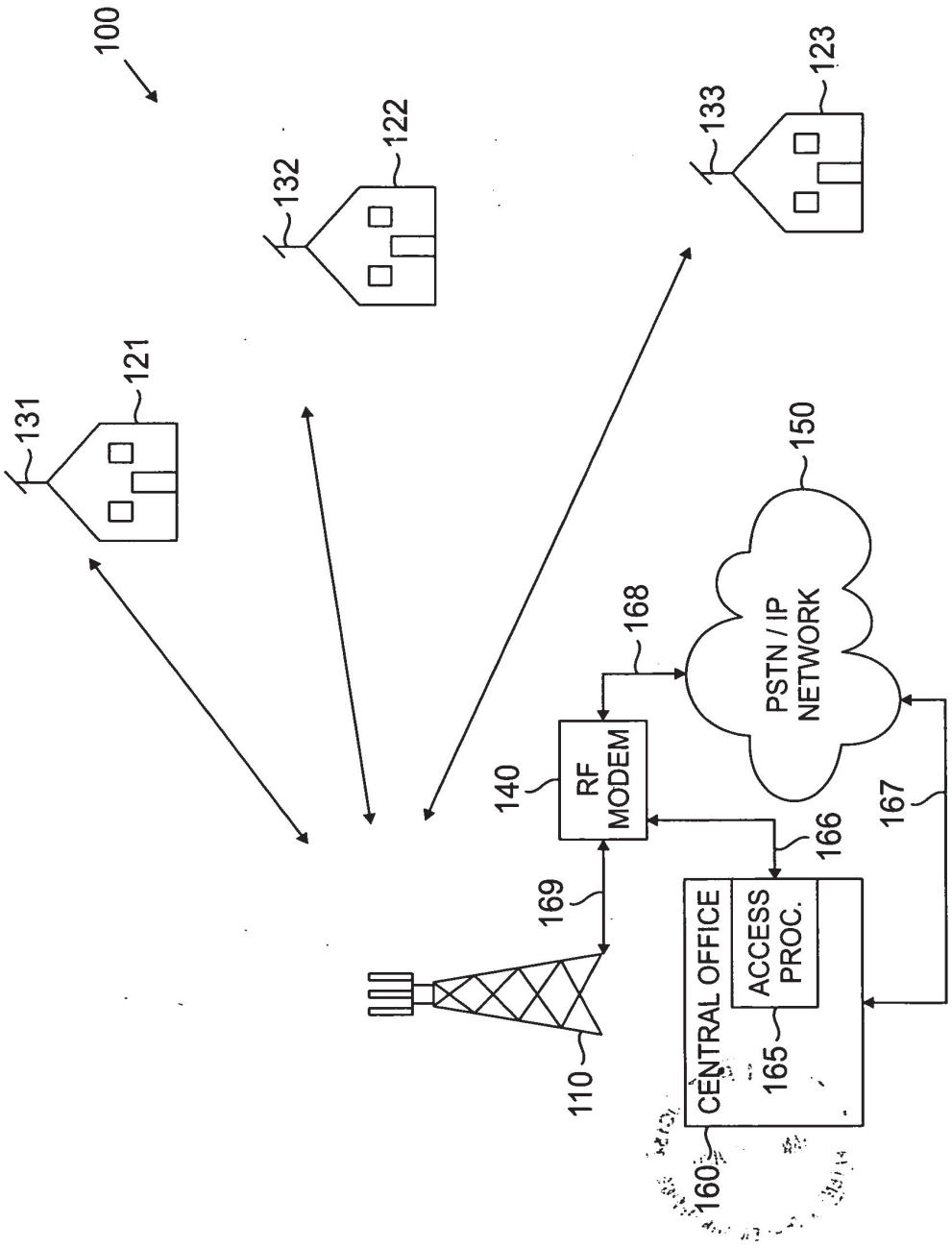


FIG. 1

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Ex.1012

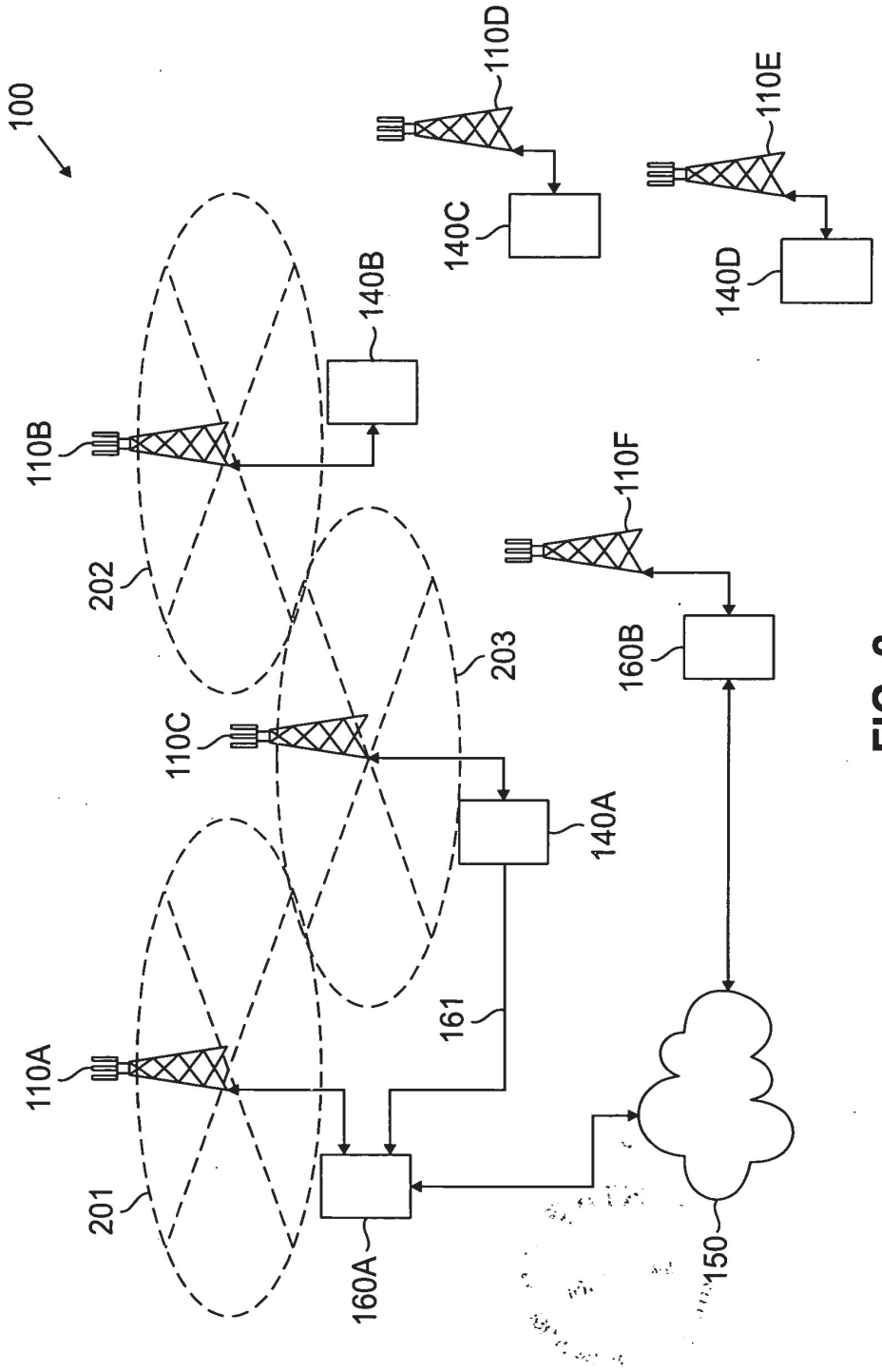


FIG. 2

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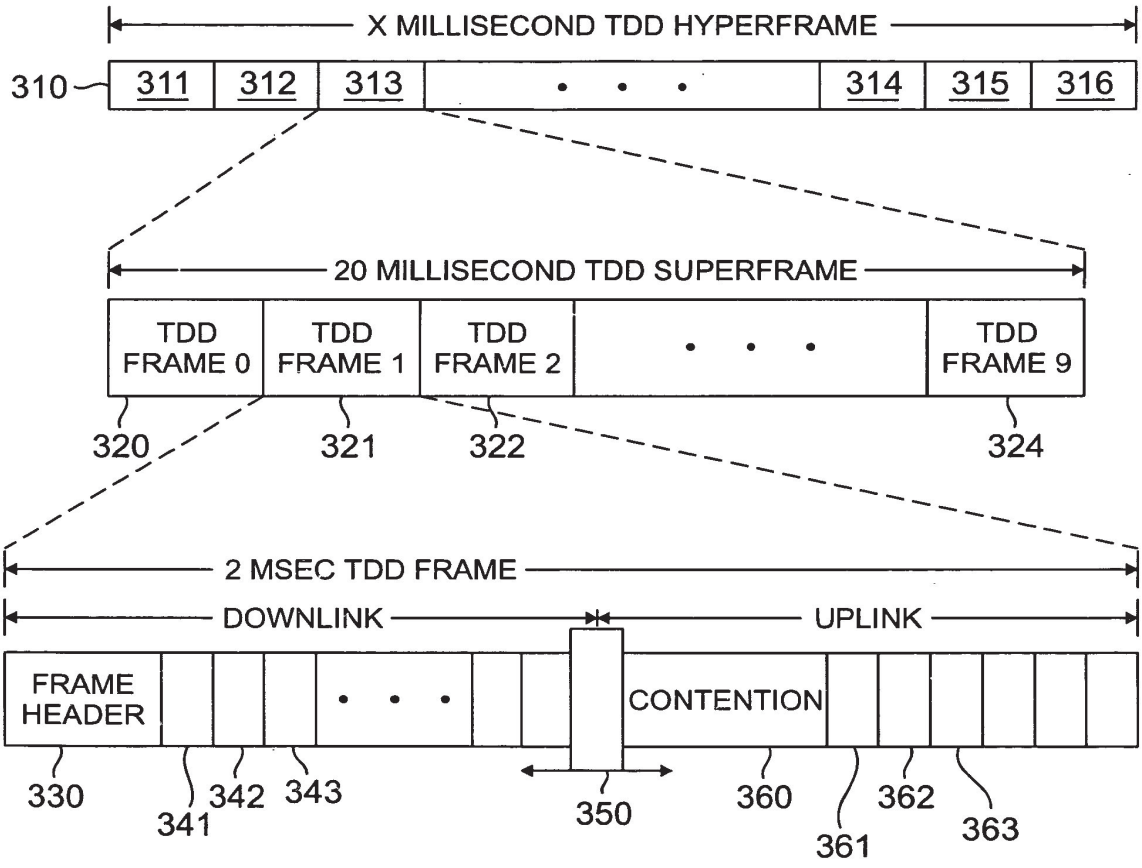


FIG. 3

PETITIONER NOKIA
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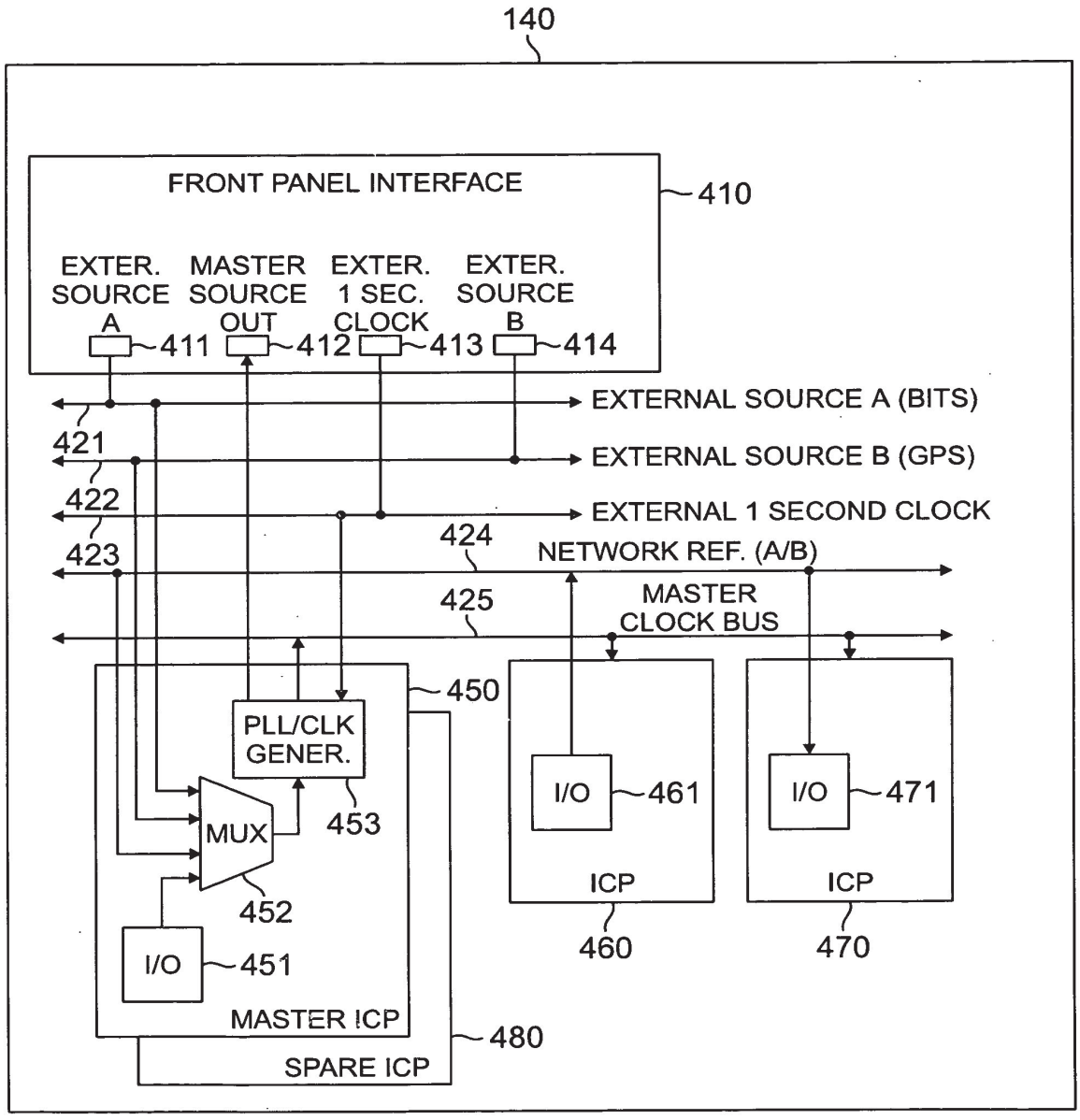


FIG. 4

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Ex.1012

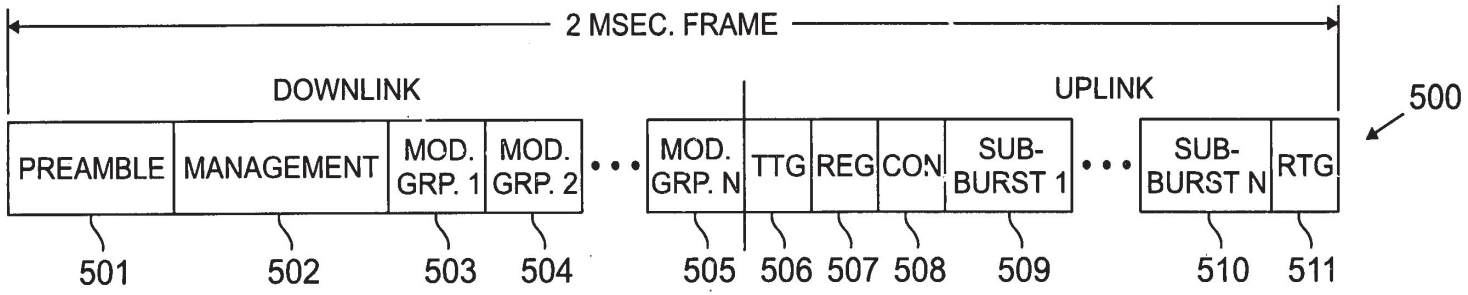


FIG. 5A

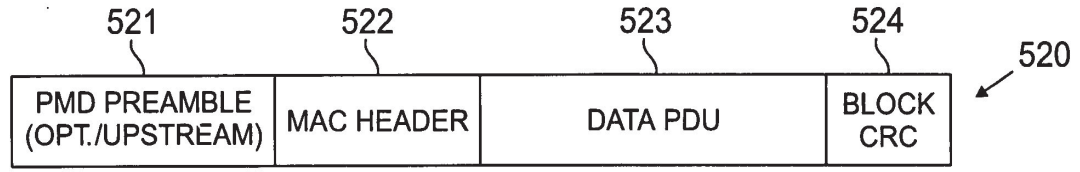


FIG. 5B

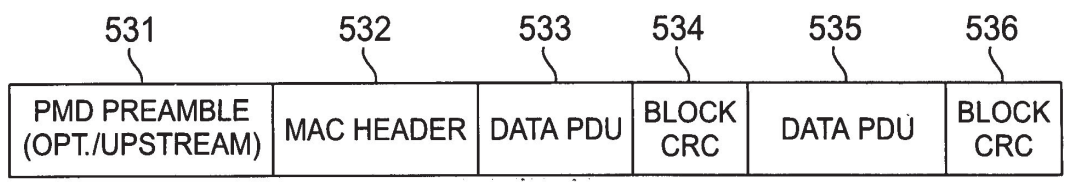


FIG. 5C

P. 128
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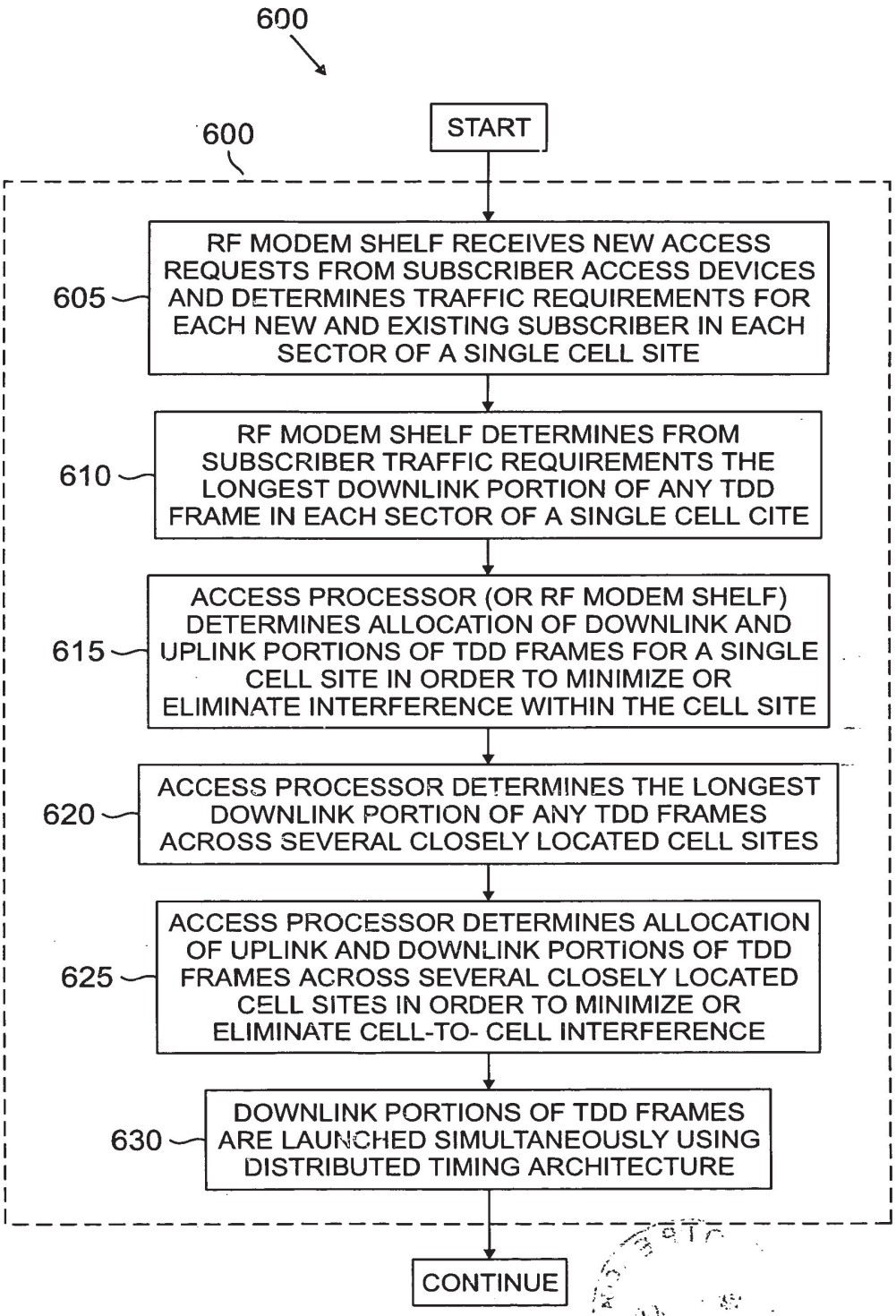


FIG. 6

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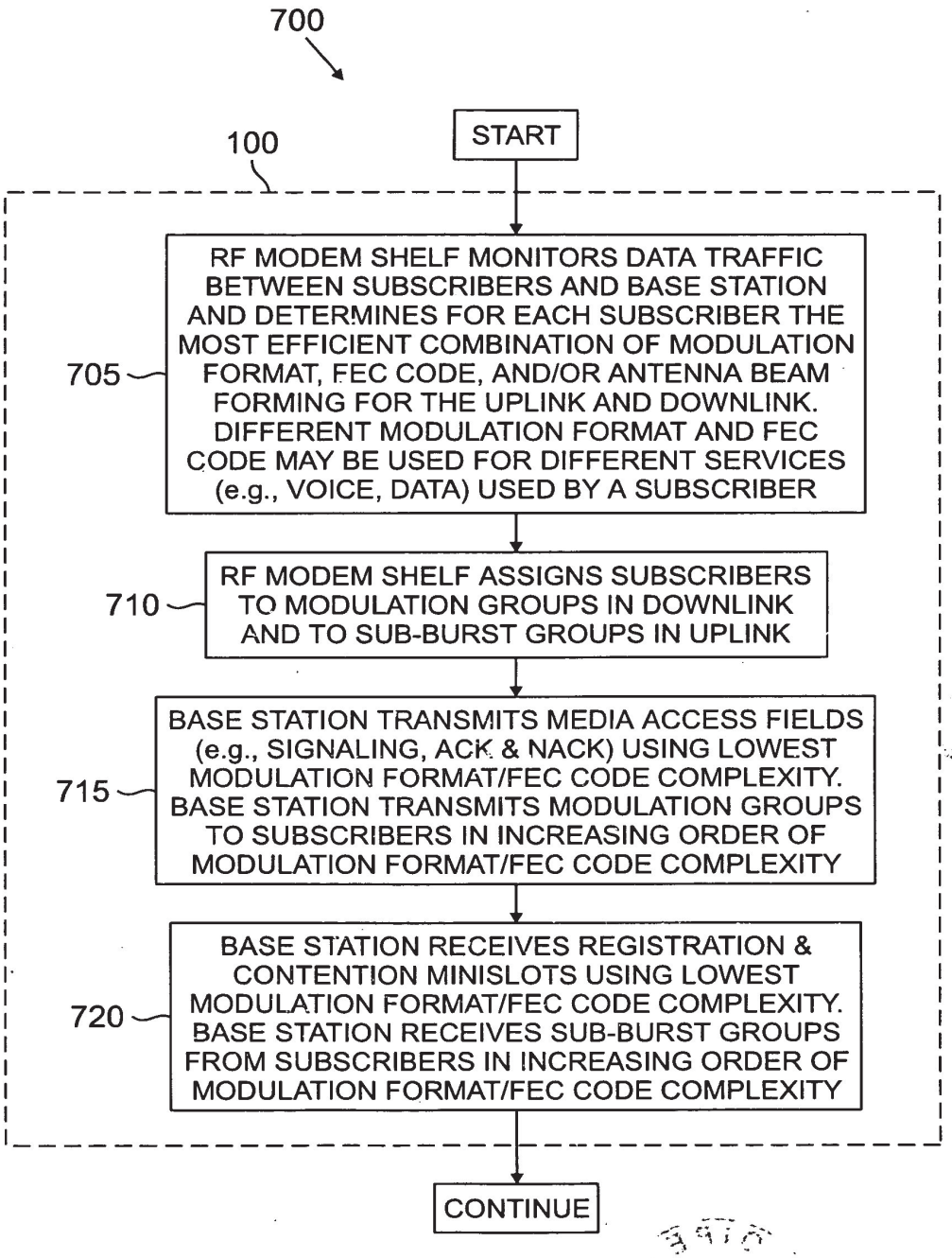


FIG. 7

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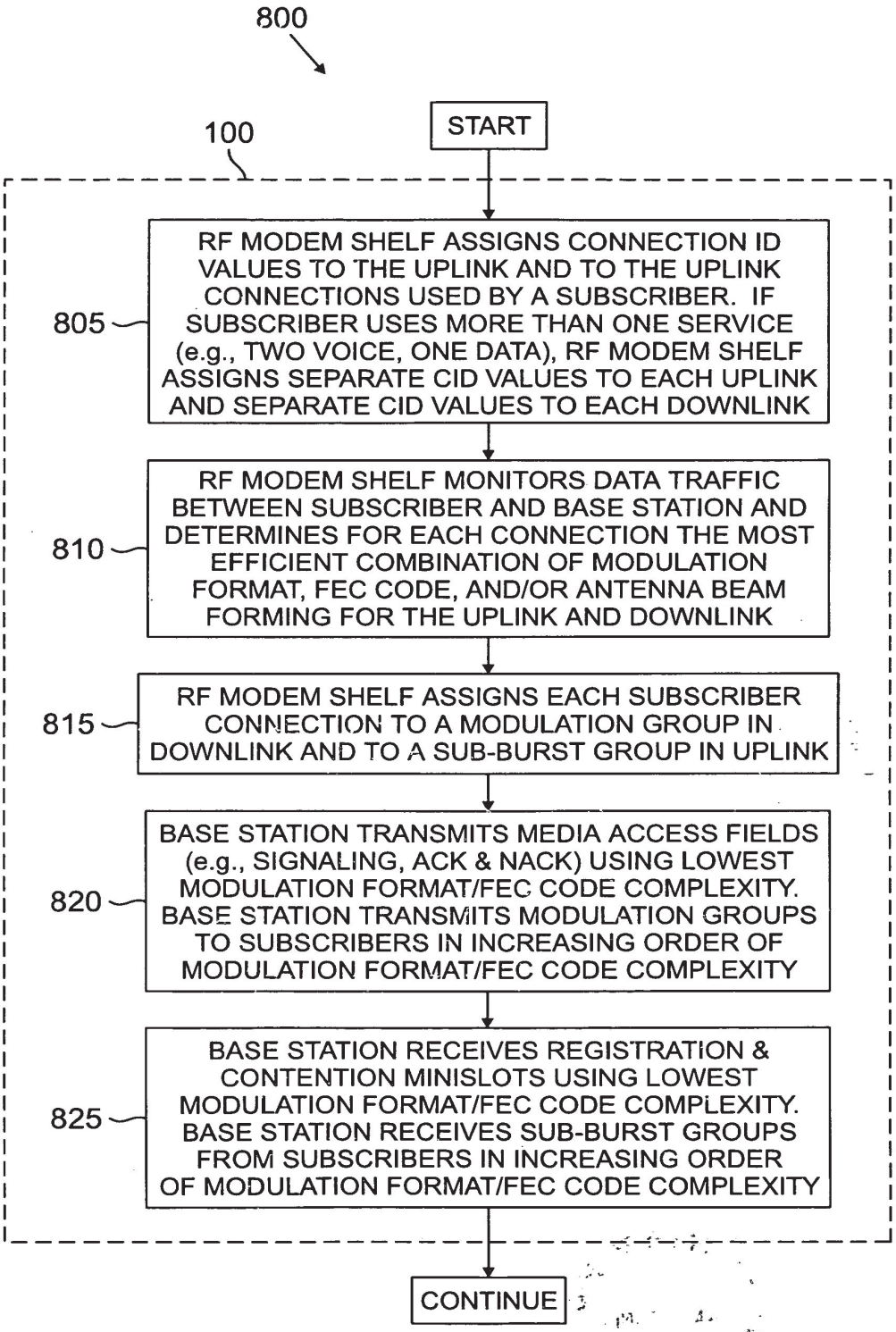


FIG. 8

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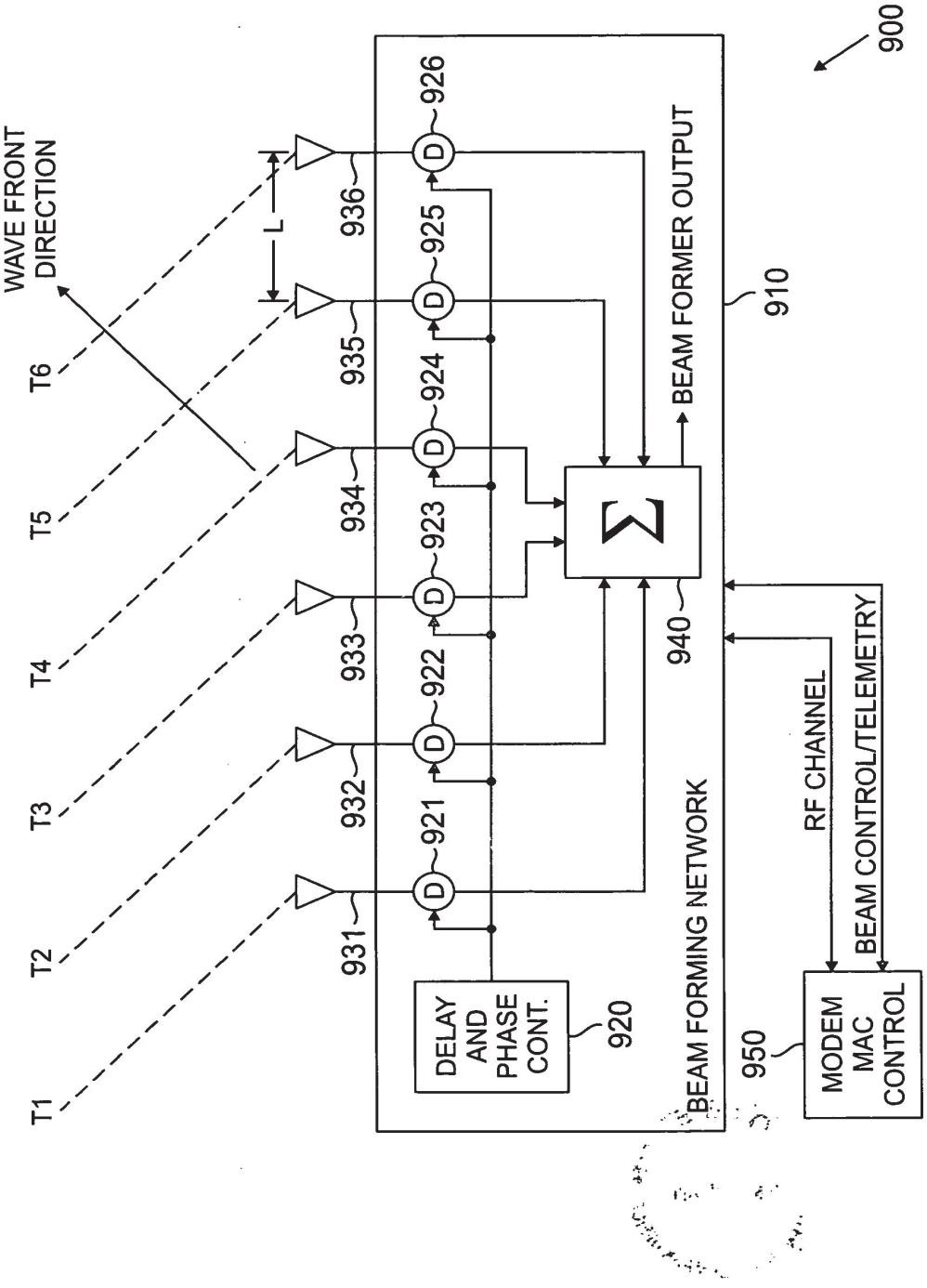


FIG. 9

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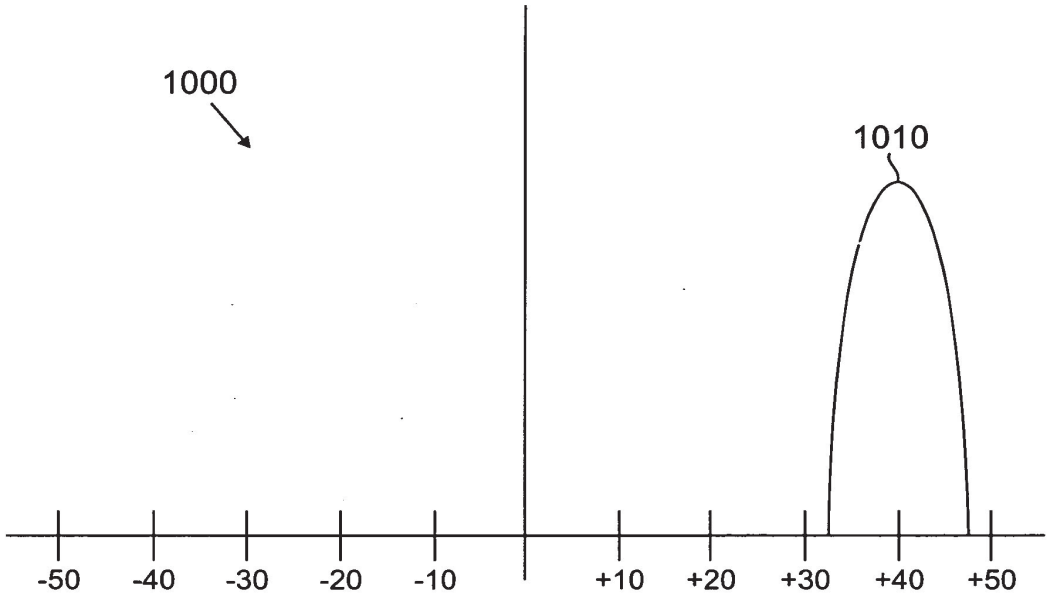


FIG. 10

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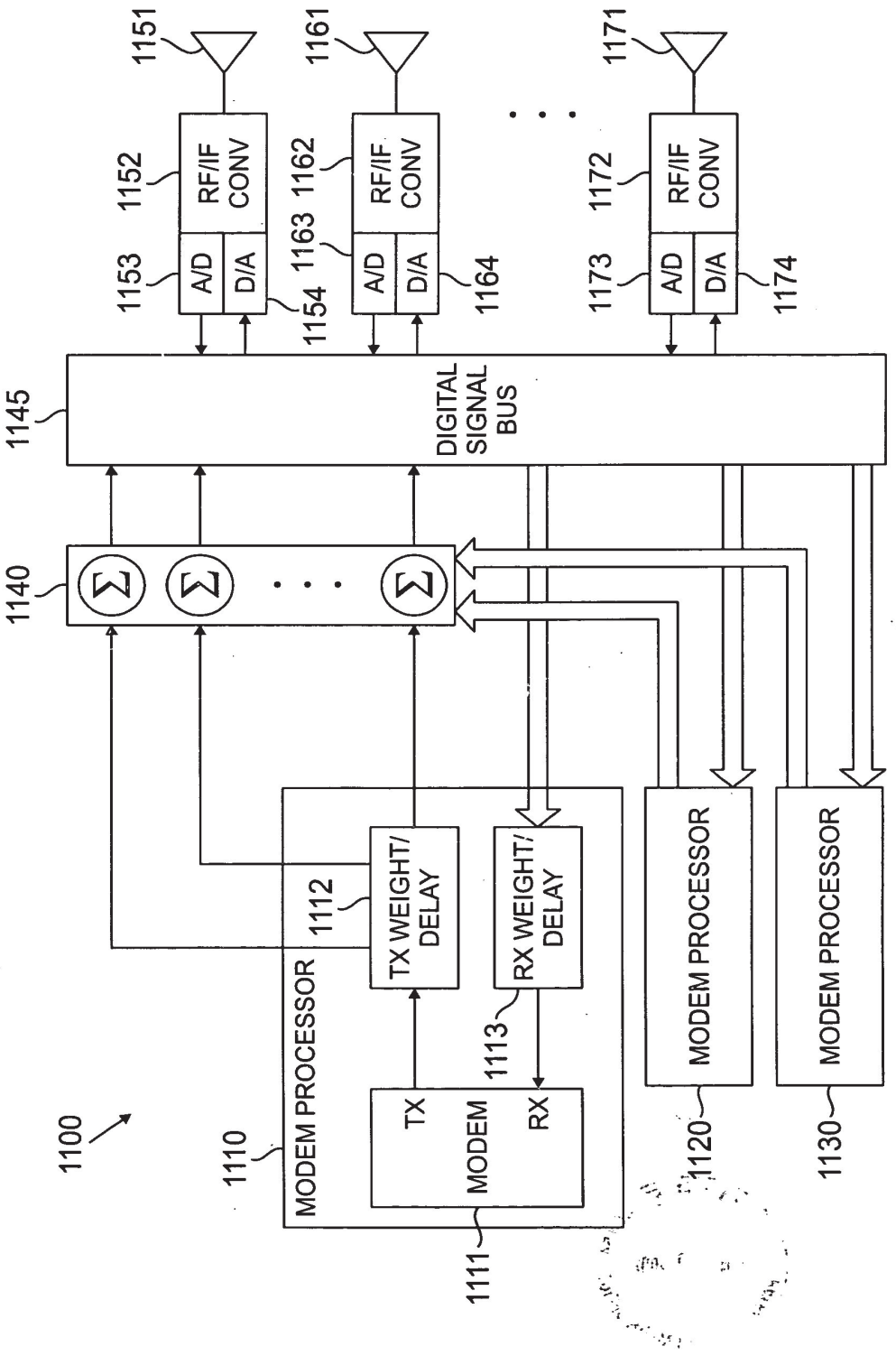


FIG. 11

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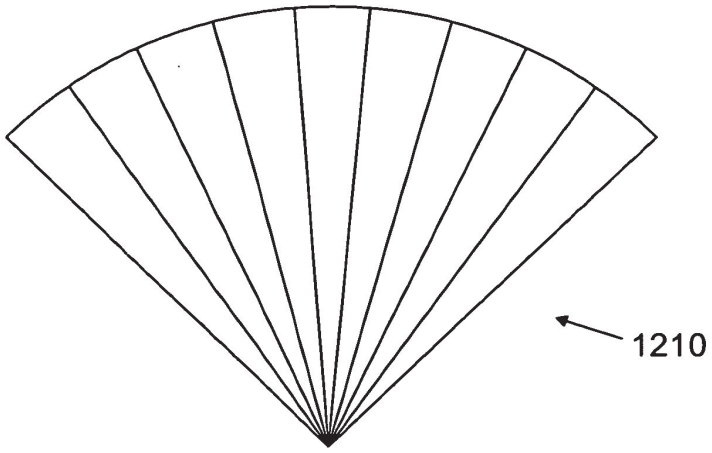


FIG. 12A

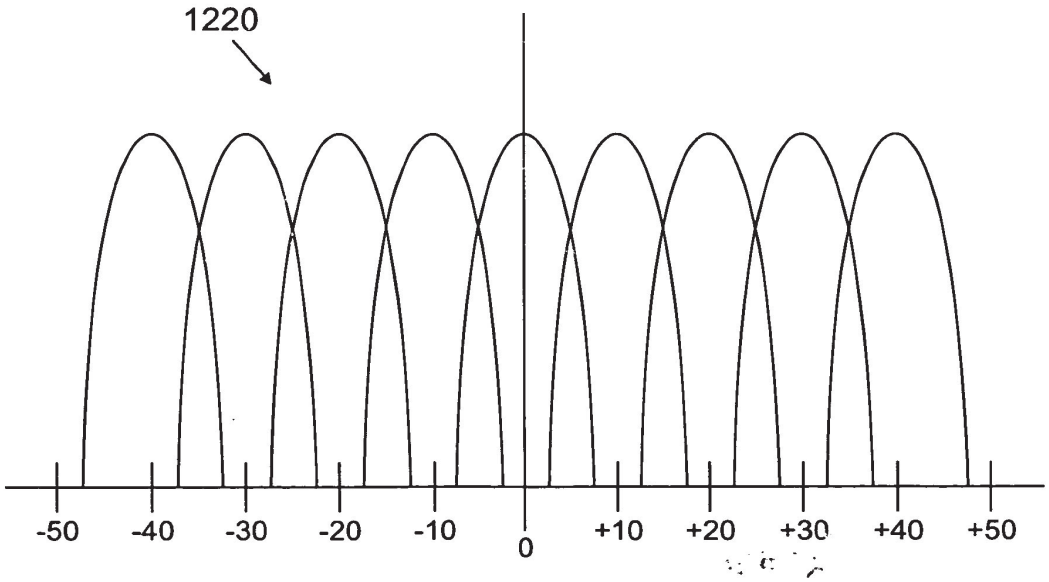


FIG. 12B

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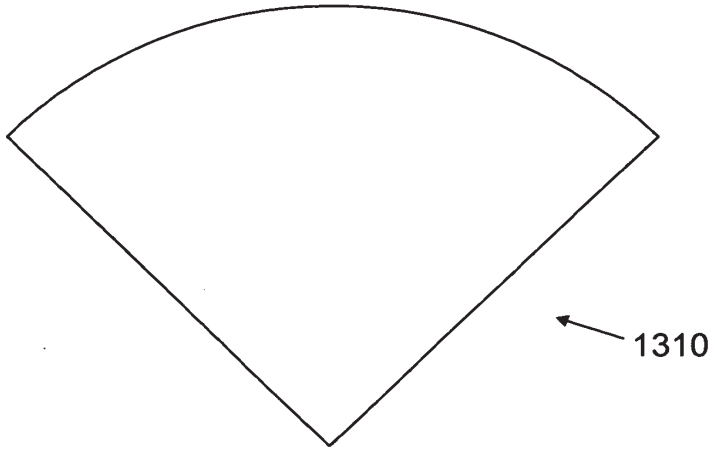


FIG. 13A

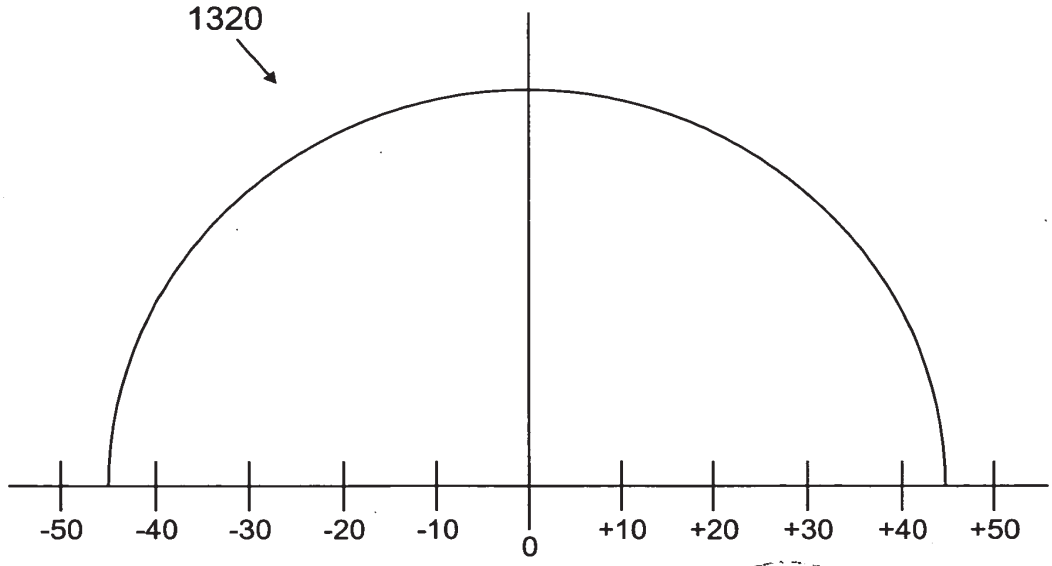


FIG. 13B

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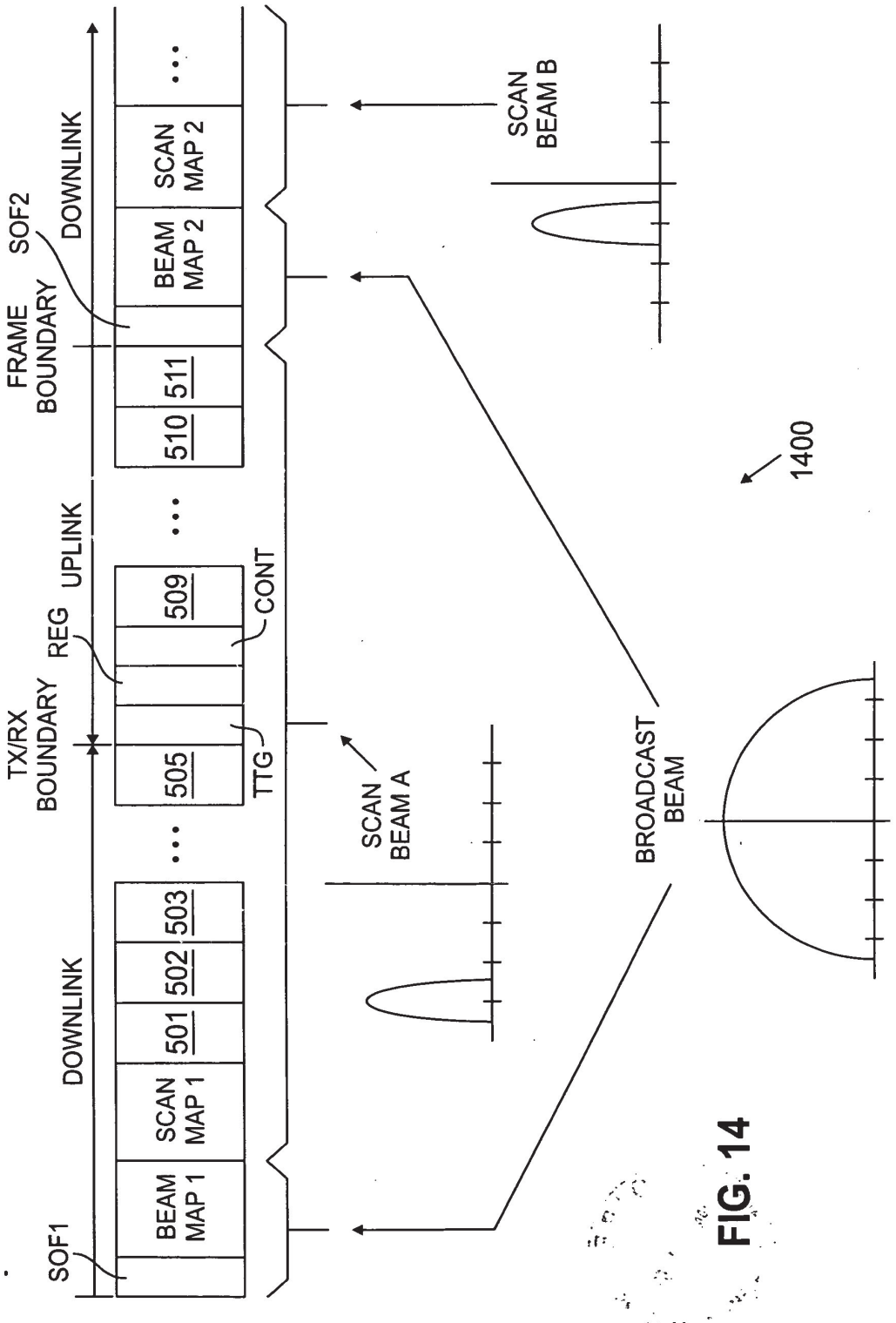


FIG. 14

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DOCKET NO. WEST14-00103 **PATENT**
Customer No. 23990

O I P E
JAN 1 0 2002
PATENT & TRADEMARK OFFICE
JC154

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	:	PAUL F. STRUHSAKER
U.S. Serial No.	:	09/948,059
Filed	:	September 5, 2001
For	:	WIRELESS ACCESS SYSTEM USING SELECTIVELY BEAM FORMING IN TDD FRAMES AND METHOD OF OPERATION
Group No.	:	2681
Examiner	:	Not Yet Assigned

BOX MISSING PARTS
Commissioner of Patents
Washington, D. C. 20231

Sir:

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Respectfully submitted,

NOVAKOV DAVIS & MUNCK, P.C.

Date: Dec 10, 2003

William A. Munck
Registration No. 39,308

Docket Clerk
P.O. Drawer 800889
Dallas, Texas 75380
Phone: (214) 922-9221
Fax: (214) 969-7557
Email: wmunck@novakov.com

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DOCKET NO. WEST14-00103 **PATENT**
Customer No. 23990

OIPE JC154 JAN 10 2002 PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Date: 12/10/01

Mailer

Date: Dec 10, 2001

William A. Munck
Reg. No. 39,308

P.O. Drawer 800889
Dallas, Texas 75380
Phone: (214) 922-9221
Fax: (214) 969-7557
E-mail: wmunck@novakov.com

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UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231
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APPLICATION NUMBER	FILING/RECEIPT DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
09/948,059	09/05/2001	Paul F. Struhsaker	WEST14-00103

CONFIRMATION NO. 5591

FORMALITIES LETTER

OC000000006867633

NOVAKOV DAVIS & MUNCK
A PROFFESSIONAL CORPORATION
900 THREE GALLERIA TOWER
13155 NOEL ROAD
DALLAS, TX 75240

Date Mailed: 10/09/2001

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

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- **The balance due by applicant is $ ~~488~~.**
  $ 498.60

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RECEIVED
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NOVAKOV DAVIS & MUNCK

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Initial Patent Examination Division (703) 308-1202
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01/16/2002 MBIZUNES 00000015 09948059
02 FC:205 65.00 OP
03 FC:201 370.00 OP
04 FC:203 63.00 OP

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OCT 16 2001

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OIPE JC71
FEB 06 2003
PATENT & TRADEMARK OFFICE

2681 #4
02-14-03

DOCKET NO.: WEST14-00103 **PATENT**
Customer No. 23990

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	:	PAUL F. STRUHSAKER, ET AL.
U.S. Serial No.	:	09/948,059
Filed	:	September 5, 2001
For	:	WIRELESS ACCESS SYSTEM USING SELECTIVELY ADAPTABLE BEAM FORMING IN TDD FRAMES AND METHOD OF OPERATION
Group No.	:	2681
Examiner	:	(Not yet assigned)

RECEIVED
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Technology Center 2600

Commissioner for Patents
Washington, D.C. 20231

Sir:

CERTIFICATE OF MAILING BY FIRST CLASS MAIL

The undersigned hereby certifies that the following documents:

1. Postcard receipt;
2. Information Disclosure Statement;
3. Form PTO-SB-08;
4. Copy of International Search Report issued in Int'l Application No. PCT/IB02/03571;
5. Four (4) references

relating to the above application, were deposited as "First Class Mail" with the United States Postal Service, addressed to Commissioner for Patents, Washington, D.C. 20231, on February 3, 2003.

Date: Feb 3, 2003 — Kathy Hamilton
Mailer

Date: Jan. 31, 2003 — Will C. Munck
William A. Munck
Reg. No. 39,308

P.O. Drawer 800889
Dallas, Texas 75380
Phone: (972) 628-3600
Fax: (972) 628-3616
E-mail: *wmunck@davismunck.com*

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FEB 06 2003
PATENT & TRADEMARK OFFICE

DOCKET NO.: WEST14-00103 **PATENT**
Customer No. 23990

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	:	PAUL F. STRUHSAKER, ET AL.
U.S. Serial No.	:	09/948,059
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For	:	WIRELESS ACCESS SYSTEM USING SELECTIVELY ADAPTABLE BEAM FORMING IN TDD FRAMES AND METHOD OF OPERATION
Group No.	:	2681
Examiner	:	(Not yet assigned)

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Technology Center 2600

Commissioner for Patents
Washington, D.C. 20231

Sir:

INFORMATION DISCLOSURE STATEMENT

Pursuant to the duty of disclosure under 37 C.F.R. § 1.56, Applicant submits this statement. This submittal is made in accordance with 37 C.F.R. §§ 1.97 and 1.98 and § 609 of the Manual of Patent Examining Procedure. The patents, publications and other information herein are listed below and on the attached Form PTO-SB-08. These references were located in a International Search Report issued in the related PCT Patent Application No. PCT/IB02/03571, a copy of which is attached hereto. Copies of the listed references are submitted herewith.

U.S. Patents

Patent No.	Inventor	Date
6,181,955	Dartois	Jan. 30, 2001

PETITIONER NOKIA
Ex.1012

Foreign Patents

Patent No.	Country	Date
WO 96/37970	PCT	Nov. 28, 1996

Publications

BENYAMIN-SEEYAR, Anader, et al; "DRAFT DOCUMENT FOR SC-FDE PHY LAYER SYSTEM FOR SUB 11 GHz BWA"; XP-002224912; IEEE 802.16.3c01-58r2; IEEE 802.16 Broadband Wireless Access Working Group, 'Online!; May 17, 2001; pages 0-87;

LEIBA, Yigal, et al.; "MAC AND PHY SUPPORT FOR AAS"; XP-002224913; IEEE C802.16a-02/49; IEEE 802.16 Broadband Wireless Access Working Group, 'Oneline!; May 10, 2002, pages 1-10

Applicant hereby expressly reserves the right to swear behind the effective dates of any of the above Patents and to question the relevance and materiality of the Patents and Publications listed herein, in whole, in part, or in combination, subsequent to filing this Information Disclosure Statement.

Respectfully submitted,

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 1 of 2

Complete if Known	
Application Number	09/948,059
Filing Date	September 5, 2001
First Named Inventor	Paul F. Struhsaker
Art Unit	2681
Examiner Name	Not yet assigned
Attorney Docket Number	WEST14-00103

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number: Number - Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
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	AB	WO 96/37970	11/28/1996	Nokia Telecommunications OY		

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Sheet 2 of 2

Complete if Known	
Application Number	09/948,059
Filing Date	September 5, 2001
First Named Inventor	Paul F. Struhsaker
Group Art Unit	2681
Examiner Name	Not yet assigned
Attorney Docket Number	WEST14-00103

OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
	AC	BENYAMIN-SEEYAR, Anader, et al; "DRAFT DOCUMENT FOR SC-FDE PHY LAYER SYSTEM FOR SUB 11 GHz BWA"; XP-002224912; IEEE 802.16.3c01-58r2; IEEE 802.16 Broadband Wireless Access Working Group, 'Online!; May 17, 2001; pages 0-87;	
	AD	LEIBA, Yigal, et al.; "MAC AND PHY SUPPORT FOR AAS"; XP-002224913; IEEE C802.16a-02/49; IEEE 802.16 Broadband Wireless Access Working Group, 'Oneline!; May 10, 2002, pages 1-10	

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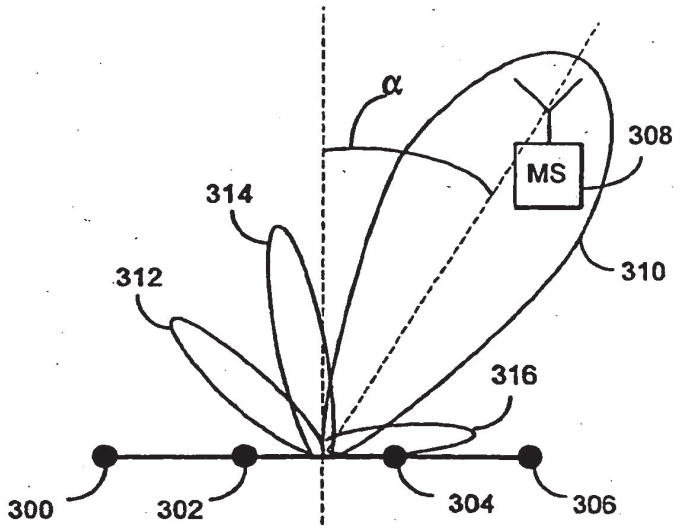
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(54) Title: METHOD FOR TRANSMITTING PILOT CHANNELS, AND A CELLULAR RADIO SYSTEM

(57) Abstract

The invention relates to a cellular radio system and a method for transmitting pilot channels in a cellular radio network, which comprises in each cell at least one base station (550) communicating with mobile stations (552, 554) located within its area, which base stations transmit a data signal in the downlink direction by using transmission directions changing in time and which transmit information about the system to the mobile stations on control channels. In order to enable as efficient use of the pilot channels as possible, the base stations transmit at least one first pilot channel with a predetermined radiation pattern (560), which determines the cell coverage area, and second pilot channels on transmission directions (556, 558) changing in time.



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Method for transmitting pilot channels, and a cellular radio system

The invention relates to a method for transmitting pilot channels in a cellular radio network, which comprises in each cell at least one base station communicating with mobile stations located within its area, which base stations transmit a data signal in the downlink direction by using transmission directions changing in time and which transmit information about the system to the mobile stations on control channels.

In order to operate, mobile stations in a cellular radio network require a great deal of information about the base station in the area of which they are located. In order to be able to communicate with the base station, the mobile stations should first of all be informed of the existence of the base station and be synchronized with the transmission of the base station. They also need information for example about the network which the base station belongs to and about the traffic channels used. In the present cellular systems, the base stations regularly transmit information of the kind described above in each cell on channels allocated for the purpose.

The present invention is applicable for use especially in a cellular system utilizing code division multiple access. Code division multiple access (CDMA) is a multiple access method, which is based on the spread spectrum technique and which has been applied recently in cellular radio systems, in addition to the prior FDMA and TDMA methods. CDMA has several advantages over the prior methods, for example spectral efficiency and the simplicity of frequency planning. An example of a known CDMA system is disclosed in the EIA/TIA Interim Standard: Mobile Station-Base Station Compatibility

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Standard for Dual-Mode Wideband Spread Spectrum Cellular System, TIA/EIA/IS-95, July 1993, EIA/TIA IS-95, which is incorporated herein by reference.

In the CDMA method, the narrow-band data signal of the user is multiplied to a relatively wide band by a spreading code having a considerably broader band than the data signal. In known test systems, bandwidths such as 1.25 MHz, 10 MHz and 25 MHz have been used. In connection with multiplying, the data signal spreads to the entire band to be used. All users transmit by using the same frequency band simultaneously. A separate spreading code is used over each connection between a base station and a mobile station, and the signals of the different users can be distinguished from one another in the receivers on the basis of the spreading code of each user.

Matched filters provided in the receivers are synchronized with a desired signal, which they recognize on the basis of a spreading code. The data signal is restored in the receiver to the original band by multiplying it again by the same spreading code that was used during the transmission. Signals multiplied by some other spreading code do not correlate in an ideal case and are not restored to the narrow band. They appear thus as noise with respect to the desired signal. The spreading codes of the system are preferably selected in such a way that they are mutually orthogonal, i.e. they do not correlate with each other.

In a CDMA cellular radio system, it is possible to use a so-called pilot channel in the transmission direction of base station to subscriber equipments, i.e. in the downlink direction. A pilot channel is a data-unmodulated signal which is transmitted with a specific spreading code and utilizing the same frequency band on which the actual traffic channels are situated, the

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pilot signal being distinguishable from them only on the basis of the spreading code. The pilot signal is a channel known and listened to by all subscriber equipments within the cell area, and it is used for example in power measurements and in the generation of a coherent phase reference. Each base station of the system transmits its own pilot signal on the basis of which the subscriber equipments can distinguish the transmissions of different base stations from each other.

US patent 5109390, which is incorporated herein by reference, and the aforementioned IS-95 standard disclose a prior art CDMA cellular system utilizing a separate pilot channel that is transmitted to the same coverage area with the data signals.

In a typical mobile phone environment, the signals between a base station and a mobile station propagate along several paths between the transmitter and the receiver. This multipath propagation is mainly due to the reflections of the signal from the surrounding surfaces. Signals which have propagated along different paths arrive at the receiver at different times due to their different transmission delays. CDMA differs from the conventional FDMA and TDMA in that the multipath propagation can be exploited in the reception of the signal. The receiver generally utilized in a CDMA system is a multibranch receiver structure where each branch is synchronized with a signal component which has propagated along an individual path. Each branch is an independent receiver element, the function of which is to compose and demodulate one received signal component. In a conventional CDMA receiver, the signals of the different receiver elements are combined advantageously, either

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coherently or incoherently, whereby a signal of good quality is achieved.

CDMA systems can also apply a soft handover wherein a mobile station may simultaneously communicate with several base stations by utilizing macrodiversity. The connection quality of the mobile station thus remains high during the handover and the user does not notice a break in the connection.

Interference caused by other connections in the desired connection thus appears in the receiver as noise that is evenly distributed. This is also true when a signal is examined in an angular domain according to the incoming directions of the signals detected in the receivers. The interference caused by the other connections in the desired connection thus also appears in the receiver as distributed in the angular domain, i.e. the interference is rather evenly distributed into the different incoming directions.

The capacity of the CDMA, which can be measured by means of spectral efficiency, has been further improved with sectorization. A cell is then divided into sectors of a desired size that are serviced by directional antennas. The mutual noise level caused by the mobile stations can thus be reduced significantly in the base station receiver. This is based on the fact that on average the interference is evenly distributed between the different incoming directions, the number of which can thus be reduced by means of sectorization. The sectorization can naturally be implemented in both transmission directions. The advantage provided in the capacity by the sectorization is proportional to the number of the sectors.

A sectorized cell may also utilize a softer handover wherein a mobile station performs a handover from one sector to another by communicating

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