

# EXHIBIT 3

(12) **United States Patent**  
**Vaisanen et al.**

(10) **Patent No.:** **US 6,560,443 B1**  
 (45) **Date of Patent:** **May 6, 2003**

(54) **ANTENNA SHARING SWITCHING CIRCUITRY FOR MULTI-TRANSCIVER MOBILE TERMINAL AND METHOD THEREFOR**

(75) Inventors: **Ari Vaisanen**, Ruutana (FI); **Pekko Orava**, Tampere (FI)

(73) Assignee: **Nokia Corporation**, Espoo (FI)

(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/321,824**

(22) Filed: **May 28, 1999**

(51) Int. Cl.<sup>7</sup> ..... **H04B 1/38**

(52) U.S. Cl. .... **455/73; 455/82; 455/552**

(58) **Field of Search** ..... **455/552, 553, 455/101, 103, 73, 129, 277.1, 289, 550, 78, 133, 82, 182; 375/220, 219**

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

4,761,822	A	*	8/1988	Maile	.....	455/82
5,276,920	A		1/1994	Kuisma		
5,410,738	A		4/1995	Mud Rienk et al.		
5,420,599	A		5/1995	Erkocevic		
5,463,406	A	*	10/1995	Vannatta et al.	.....	343/702
5,507,035	A	*	4/1996	Bantz et al.	.....	375/299
5,550,554	A		8/1996	Erkocevic		
5,715,525	A	*	2/1998	Tarusawa et al.	.....	455/101
5,768,691	A		6/1998	Matero et al.		
5,794,159	A		8/1998	Portin		
5,822,693	A	*	10/1998	Harrison	.....	455/432
5,982,807	A	*	11/1999	Snell	.....	370/342
5,987,033	A	*	11/1999	Boer et al.	.....	370/313
6,005,524	A	*	12/1999	Hayes et al.	.....	343/702
6,055,422	A	*	4/2000	Saitoh	.....	455/277.1
6,138,010	A	*	10/2000	Rabe et al.	.....	455/426
6,326,926	B1	*	12/2001	Shoobridge et al.	.....	343/702
2001/0012282	A1	*	8/2001	Yegoshin		

2002/0012381 A1 \* 1/2002 Mattisson et al.  
 2002/0025778 A1 \* 2/2002 Lee

**FOREIGN PATENT DOCUMENTS**

EP	0 475 681	A2	3/1992
EP	0 575 203	A1	12/1993
EP	0623967		11/1994
EP	0 641 090	A2	1/1995
EP	0866588		9/1998

**OTHER PUBLICATIONS**

NEC Publication No. P12398EJ2V1DS00 (Second Edition), "L-Band SPDT Switch", Jan. 1998.

\* cited by examiner

*Primary Examiner*—Charles N. Appiah

(74) *Attorney, Agent, or Firm*—Antonelli, Terry, Stout & Kraus, LLP

(57) **ABSTRACT**

Antenna switching circuitry in a multi-transceiver mobile terminal **10**, which features a first switching unit (SW1) which controllably couples a first transceiver port (P<sub>1</sub>) to either a first antenna port (P<sub>A1</sub>) or a second antenna port (P<sub>A2</sub>); and a second switching unit (SW2) which controllably couples the second antenna port (P<sub>A2</sub>) to either the first transceiver port (P<sub>1</sub>), through the first switching unit (SW1), or to an input/output port (P<sub>I/O</sub>) of a second transceiver (**12**). According to this scheme, the second antenna port is coupled to the input/output port of the second transceiver (**12**) in a mode in which the second transceiver (**12**) is operational, the first transceiver port (P<sub>1</sub>) being decoupled from the second antenna port at this time, wherein the first transceiver port is coupled to the first antenna port and the input/output port of the second transceiver (**12**) is decoupled from the second antenna port, when the first transceiver is in a transmit mode, and wherein the first transceiver port is coupled to either of the first and second antenna ports, when the first transceiver (**11**) is in a receiving mode and the input/output port of the second transceiver (**12**) is decoupled from the second antenna port.

**42 Claims, 4 Drawing Sheets**

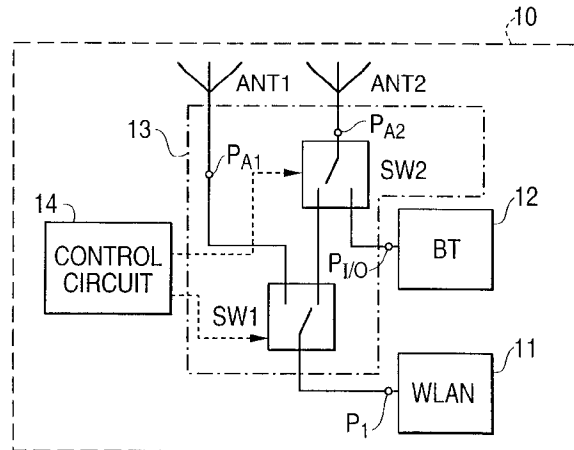


FIG. 1

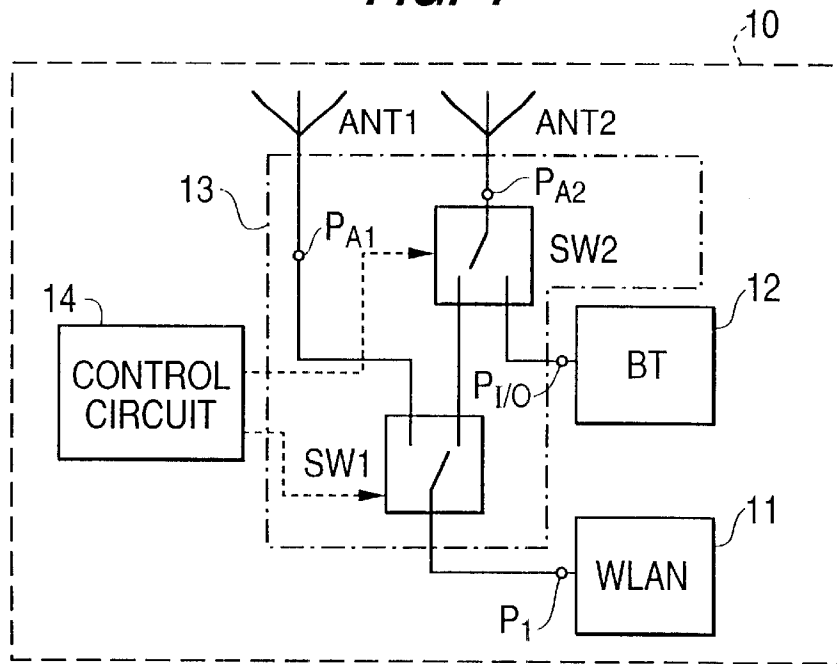
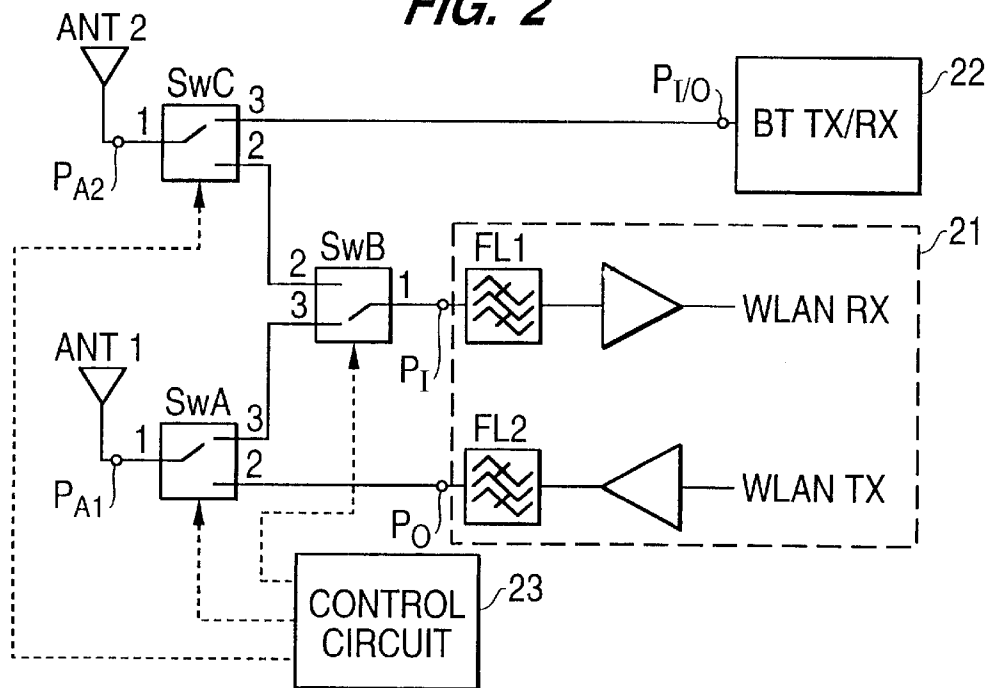
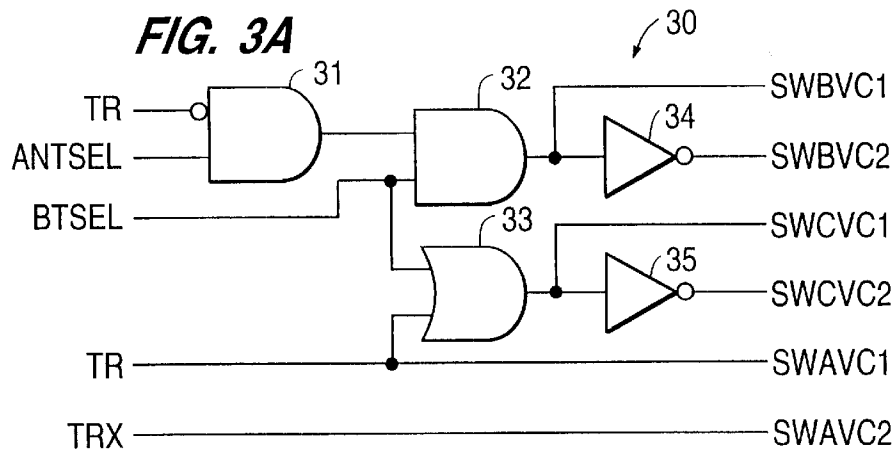


FIG. 2





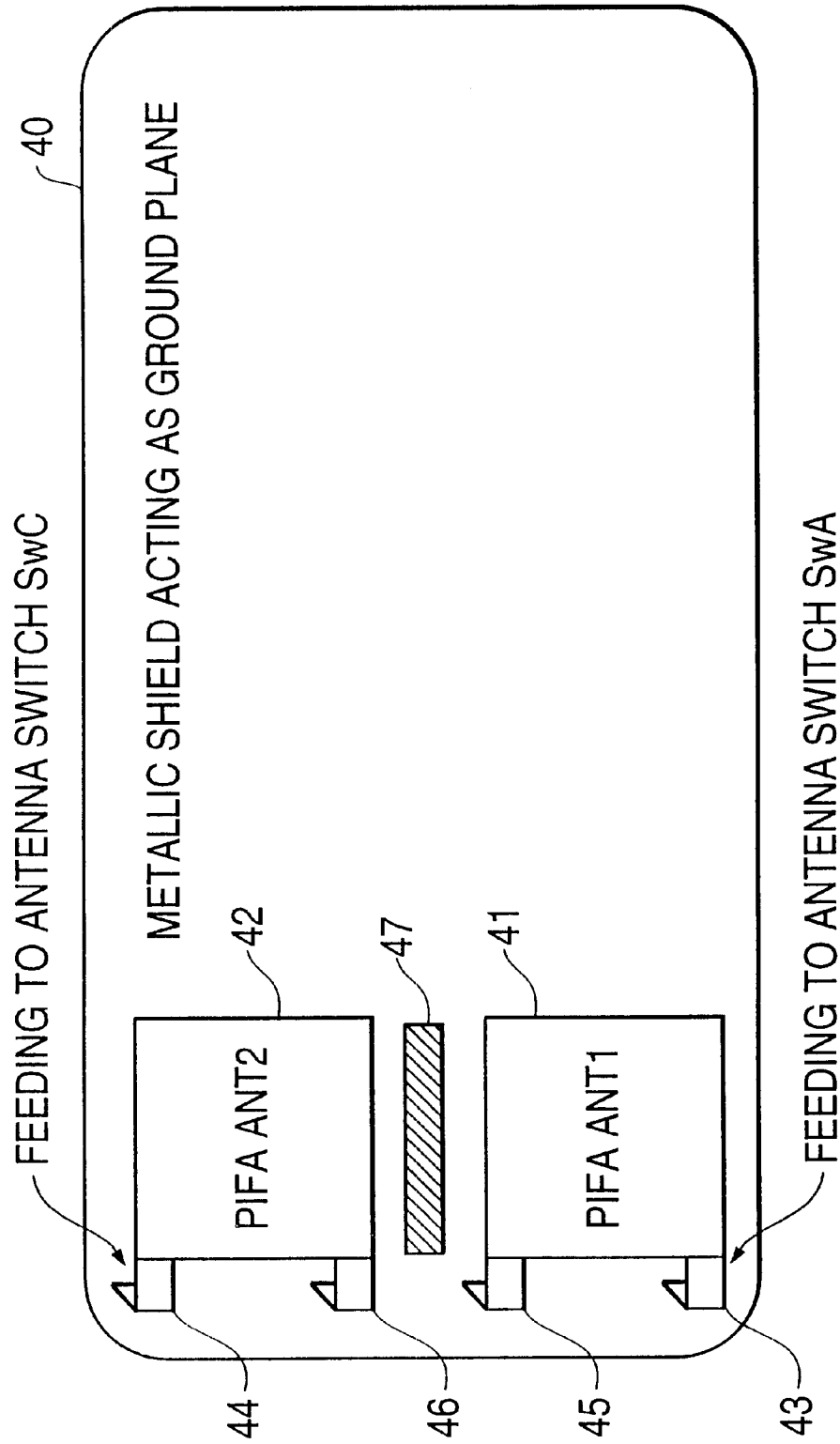
**FIG. 3B**

SIGNAL	FUNCTION
ANTSEL	SELECT ANT1 IF ANTSEL = 0 (ANTSEL OVERRIDDEN WHEN TR=1)
BTSEL	BLUETOOTH ACTIVE IF BTSEL = 0
TR	TRANSMITTER ACTIVE IF TR = 1
TRX	INVERSE OF TR

**FIG. 3C**

VC1	VC2	CONNECTIONS
0	0	PORTS 1, 2 AND 3 ISOLATED
0	1	PORT 1-PORT 3, PORT 2 ISOLATED
1	0	PORT 1-PORT2, PORT 3 ISOLATED
1	1	PORTS 1, 2 AND 3 ISOLATED

**FIG. 4**



# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

## LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.