# United States Patent [19]

## Shull

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[45] Date of Patent: Dec. 21, 1999

[54] **RECEIVED SIGNAL STRENGTH DETERMINATION METHODS AND SYSTEMS**

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[73] Assignee: **Ericsson Inc.**, Research Triangle Park, N.C.

[21] Appl. No.: **08/942,645**

[22] Filed: **Oct. 2, 1997**

[51] **Int. Cl.**$^6$ .................................................. **H04B 17/00**
[52] **U.S. Cl.** ...................................... **455/226.2**; 455/226.4
[58] **Field of Search** ............................. 455/226.2, 226.4; 375/227, 317

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*Primary Examiner*—Reinhard J. Eisenzopf
*Assistant Examiner*—Eliseo Ramos-Feliciano
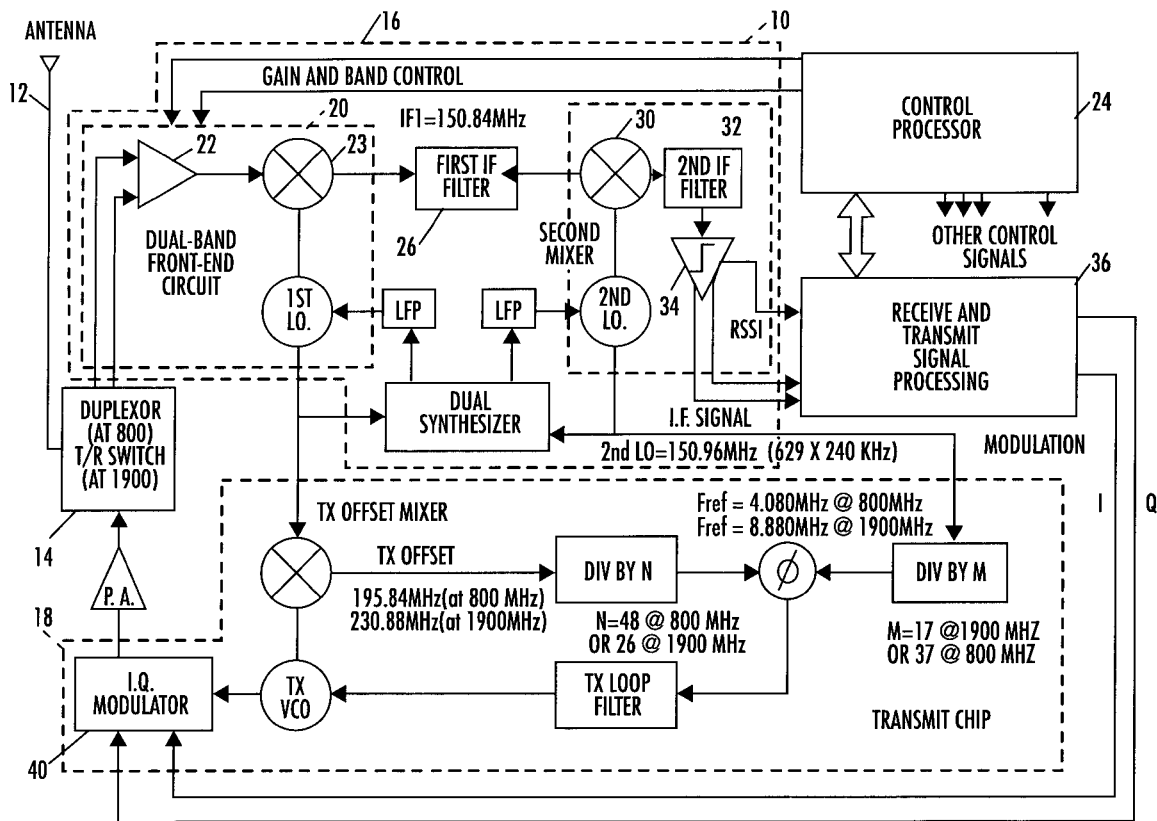*Attorney, Agent, or Firm*—Myers Bigel Sibley & Sajovec

[57] **ABSTRACT**

A signal strength for a received signal such as a radio signal transmitted over a communication network is determined. The signal strength measurement is compensated for non-linear characteristics of the receiver. The compensation is provided by taking two signal strength readings with the receiver set at two different, known, gain levels. The difference between the expected change in the signal strength and the change actually measured by the receiver is used to generate a compensated signal strength measurement A table of compensation factors is generated for each signal strength which is also utilized in generating the compensated signal strength measurement. The compensated signal strength measurement reading is transmitted to the communication network for use in mobile assisted handover.

**20 Claims, 4 Drawing Sheets**
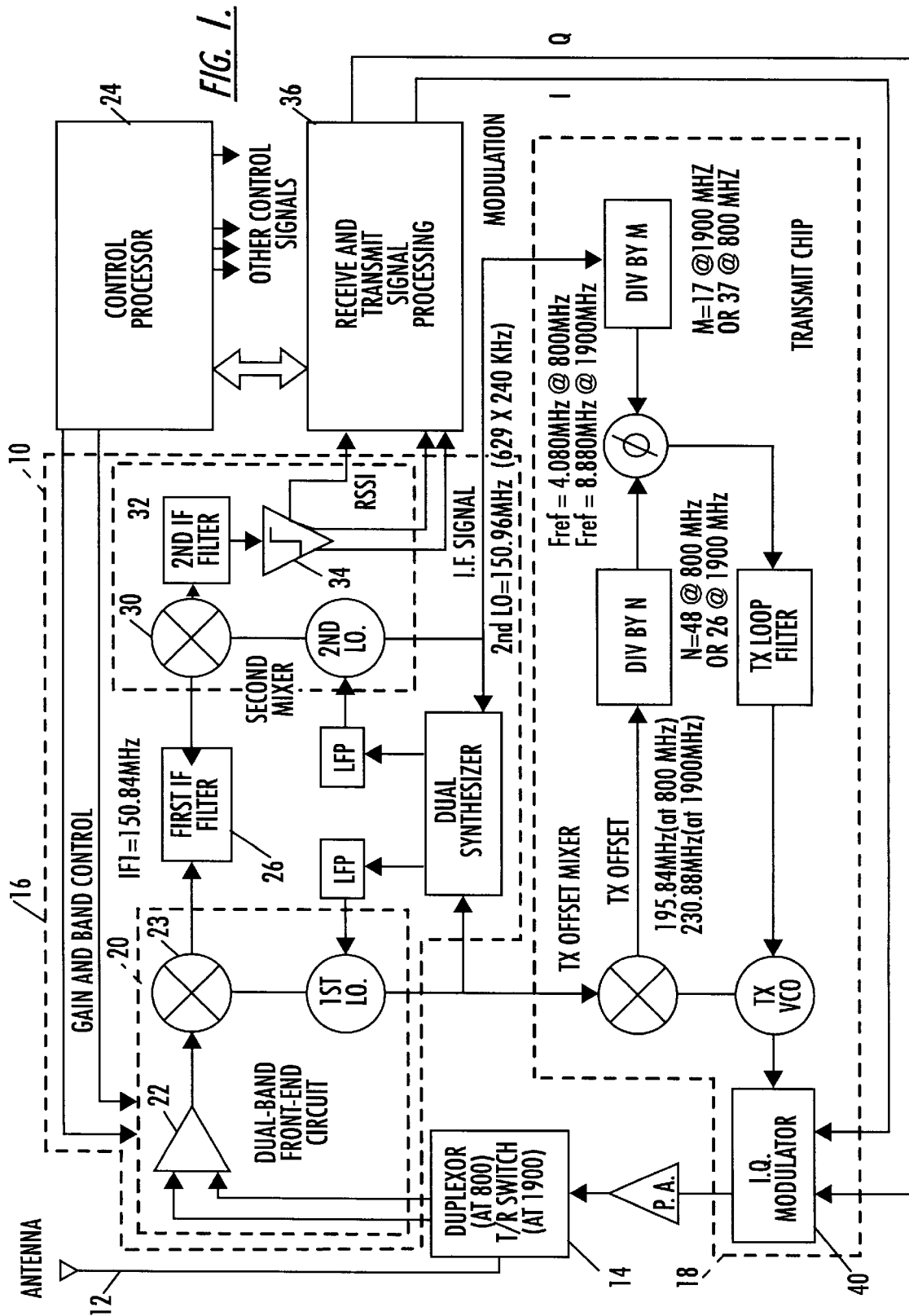
*FIG. 1.*

CONTROL PROCESSOR

OTHER CONTROL SIGNALS

RECEIVE AND TRANSMIT SIGNAL PROCESSING

MODULATION

DIV BY M

M=17 @1900 MHZ OR 37 @ 800 MHZ

TRANSMIT CHIP

Fref = 4.080MHz @ 800MHz
Fref = 8.880MHz @ 1900MHz

I.F. SIGNAL

2nd LO=150.96MHz (629 X 240 KHz)

2ND IF FILTER

RSSI

32

30

2ND L.O.

34

SECOND MIXER

DIV BY N

N=48 @ 800 MHZ OR 26 @ 1900 MHZ

TX LOOP FILTER

FIRST IF FILTER

IF1=150.84MHz

LFP

DUAL SYNTHESIZER

26

LFP

GAIN AND BAND CONTROL

20

23

1ST L.O.

TX OFFSET MIXER

TX OFFSET

195.84MHz (at 800 MHz)
230.88MHz (at 1900MHz)

TX VCO

22

DUAL-BAND FRONT-END CIRCUIT

ANTENNA

12

DUPLEXOR (AT 800) T/R SWITCH (AT 1900)

14

P. A.

18

I.Q. MODULATOR

40

Q

I

24

36

10

16

Q

FIG. 2.

```
                    ┌─────────────────────┐   100
                    │   OBTAIN FIRST      │
                    │  MEASUREMENT AT     │
                    │   FIRST GAIN        │
                    └─────────┬───────────┘
                              │
                              ▼
                    ┌─────────────────────┐   102
                    │  OBTAIN SECOND      │
                    │  MEASUREMENT AT     │
                    │  SECOND GAIN        │
                    └─────────┬───────────┘
                              │
                              ▼
                    ┌─────────────────────┐   104
                    │    DETERMINE        │
                    │    EXPECTED         │
                    │   DIFFERENCE        │
                    └─────────┬───────────┘
                              │
                              ▼
                    ┌─────────────────────┐   106
                    │  OBTAIN PREVIOUS    │
                    │  COMPENSATION       │
                    │    FACTOR           │
                    └─────────┬───────────┘
                              │
                              ▼
                    ┌─────────────────────┐   108
                    │   COMPENSATE        │
                    │   STRENGTH          │
                    │  MEASUREMENT        │
                    └─────────┬───────────┘
                              │
                              ▼
                    ┌─────────────────────┐   110
                    │    TRANSMIT         │
                    │  COMPENSATED        │
                    │ MEASUREMENT TO      │
                    │   NETWORK           │
                    └─────────────────────┘
```

*FIG. 3.*

*FIG. 4.*

# DOCKET ALARM
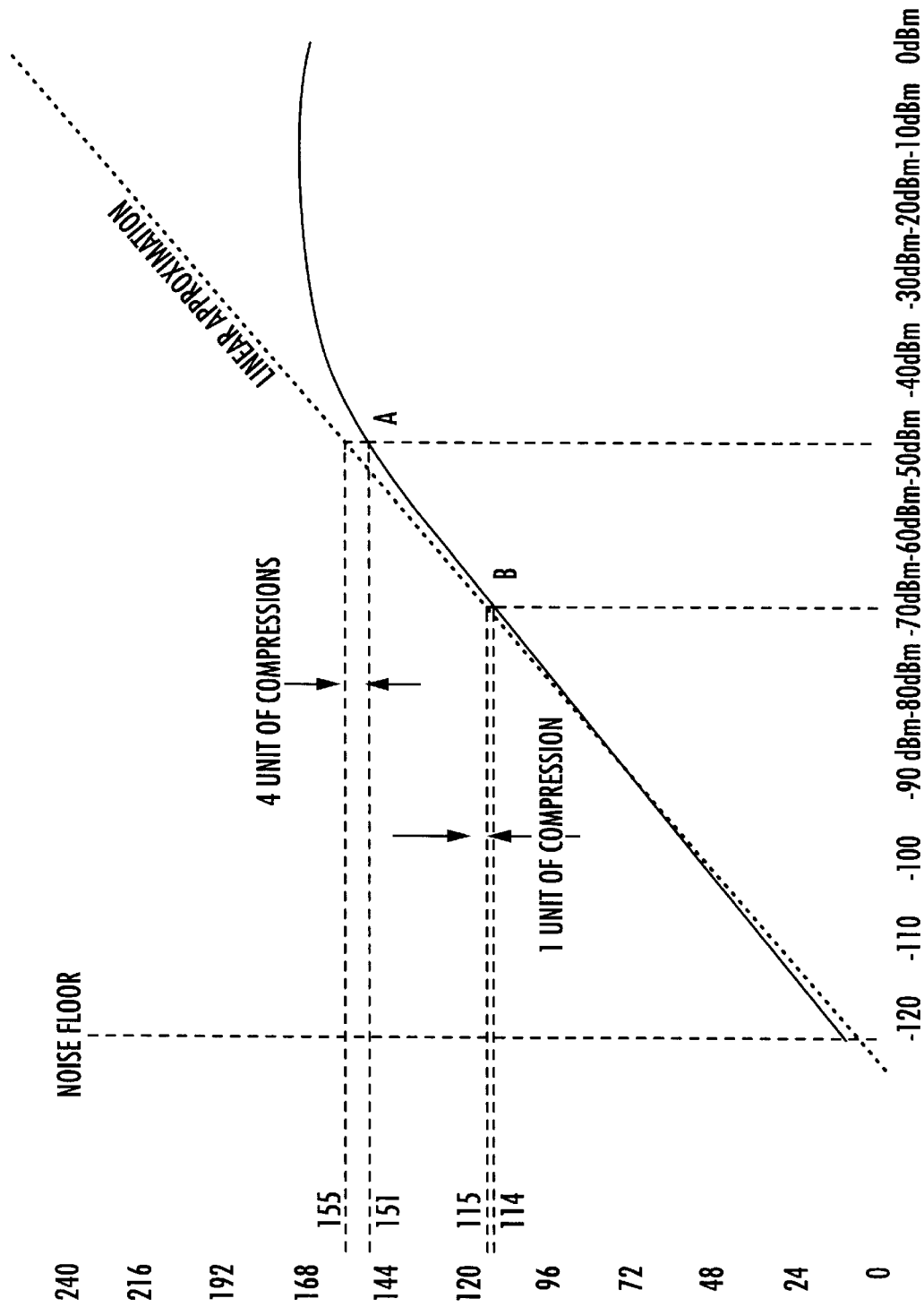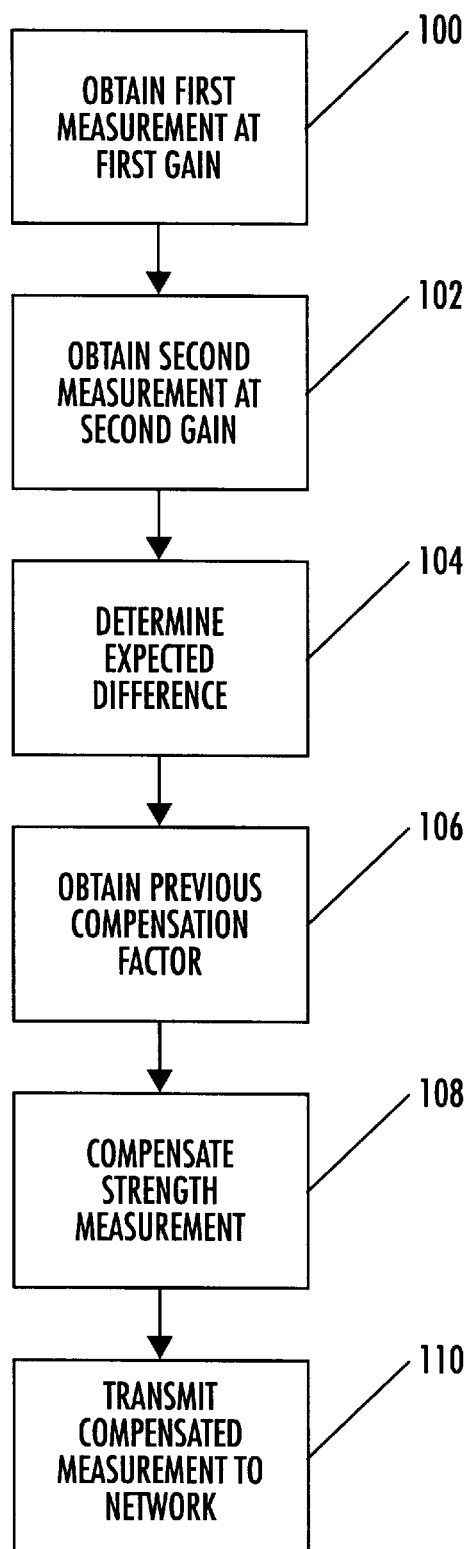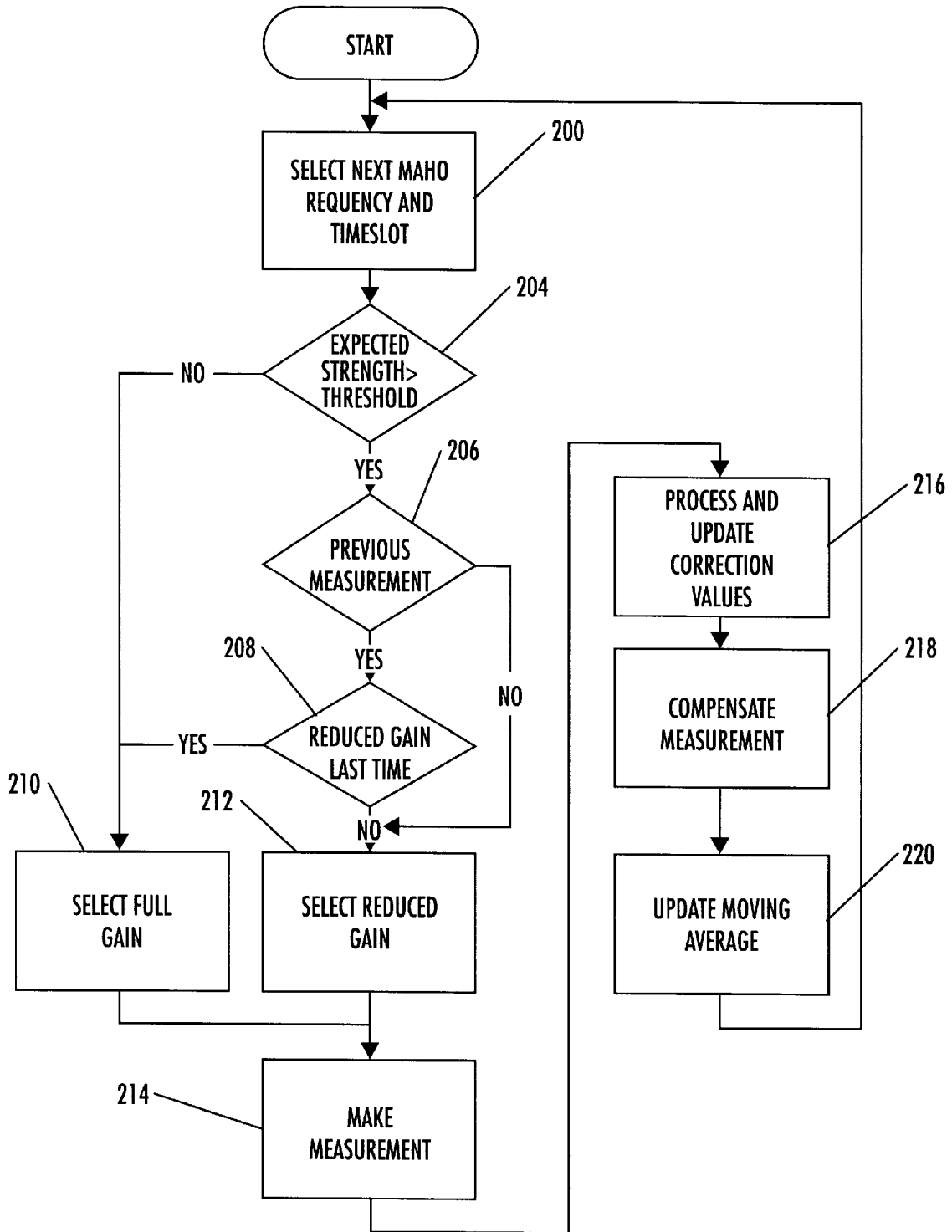
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