

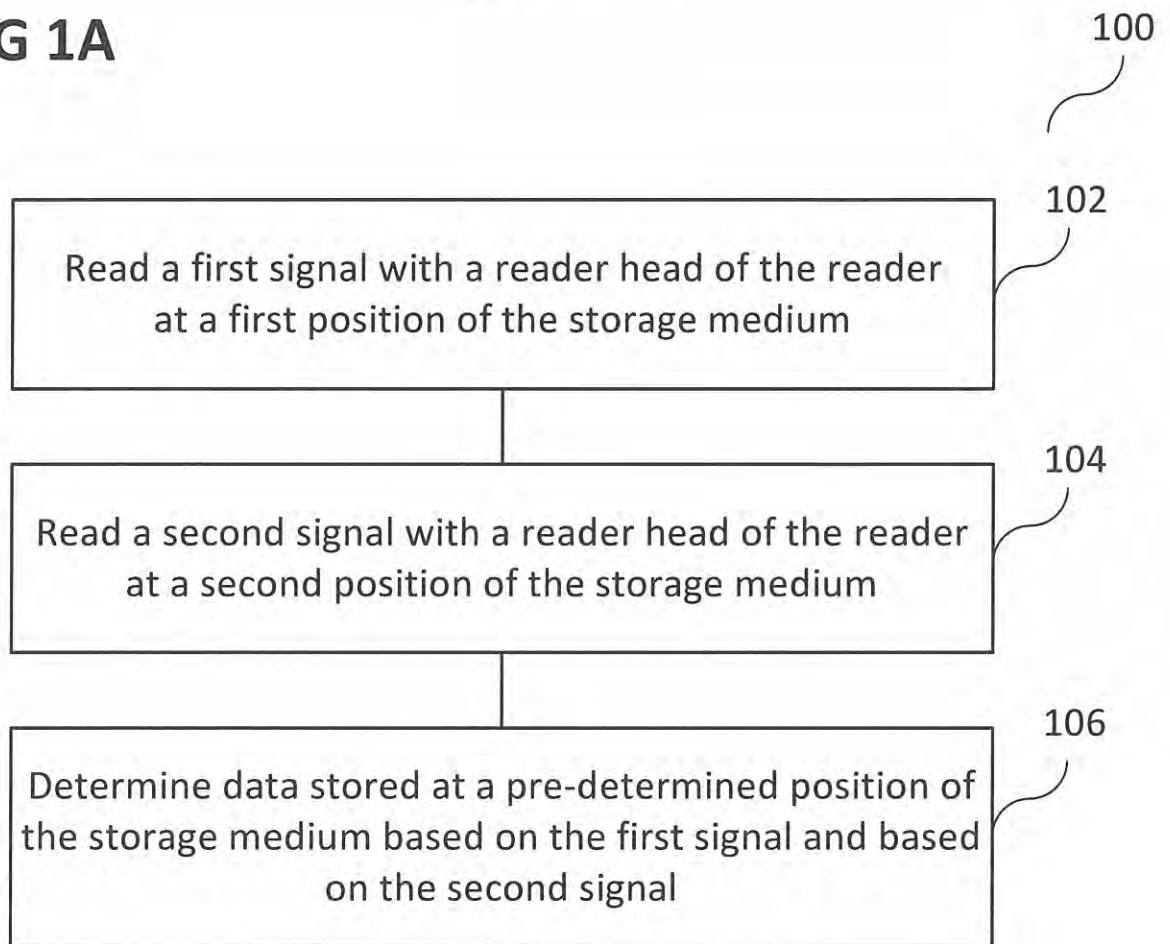
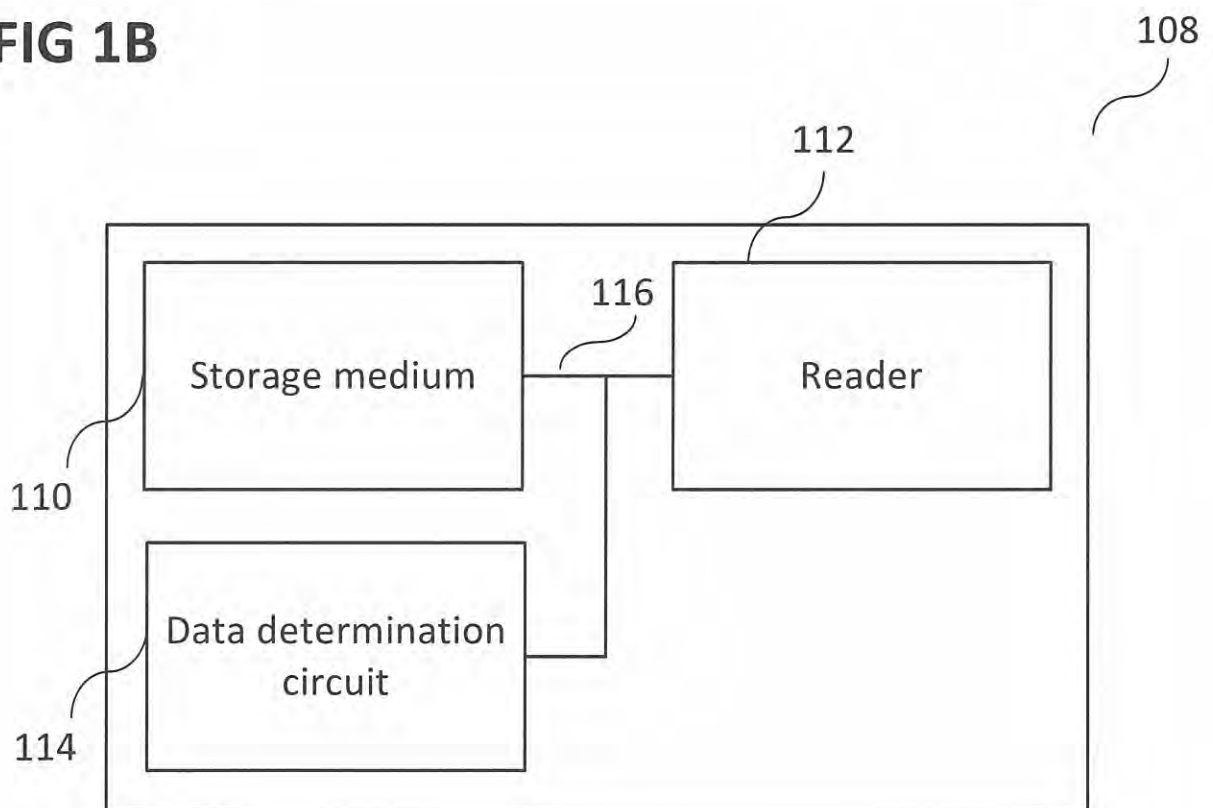
FIG 1A**FIG 1B**

FIG 2

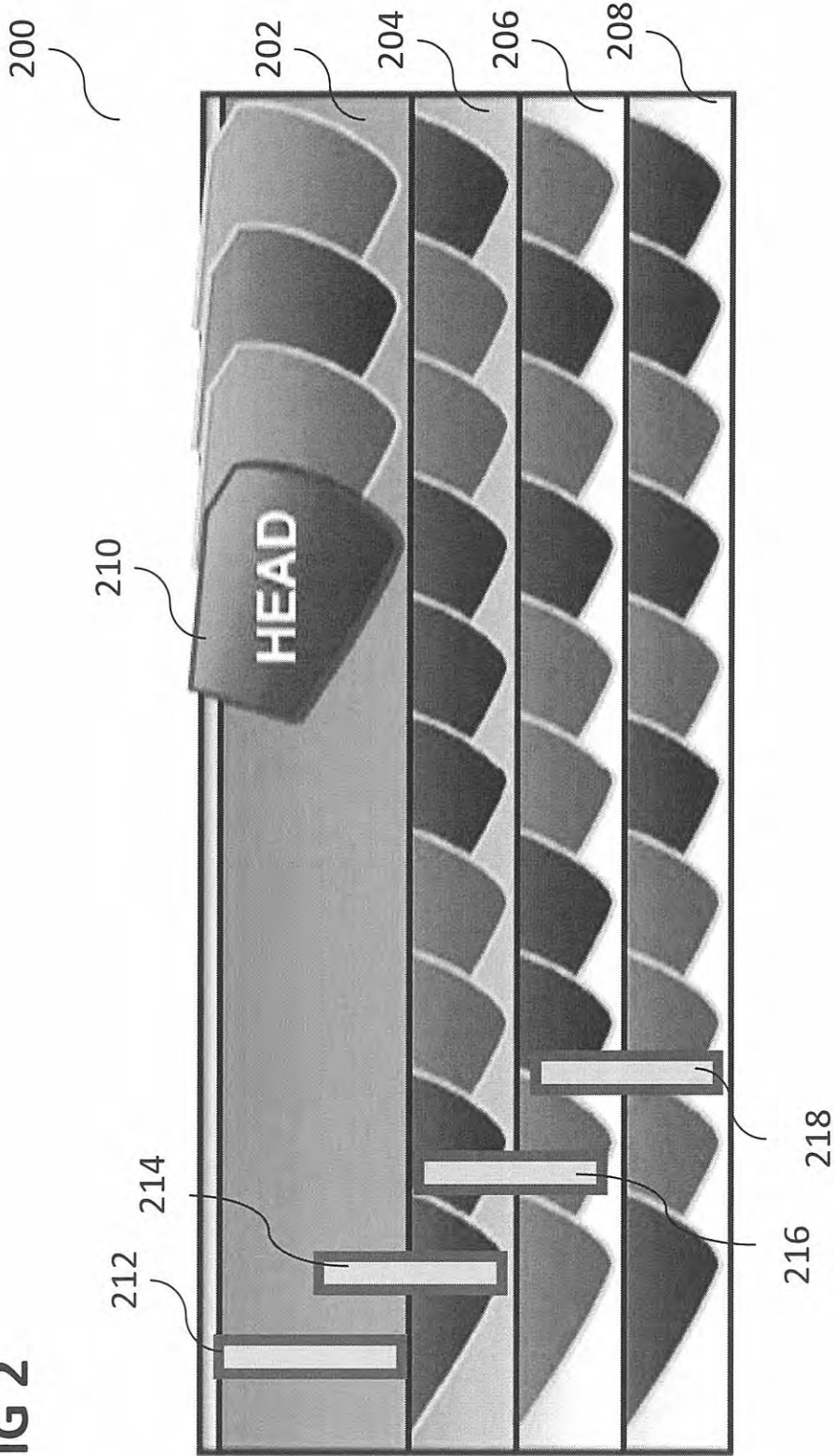


FIG 3

300

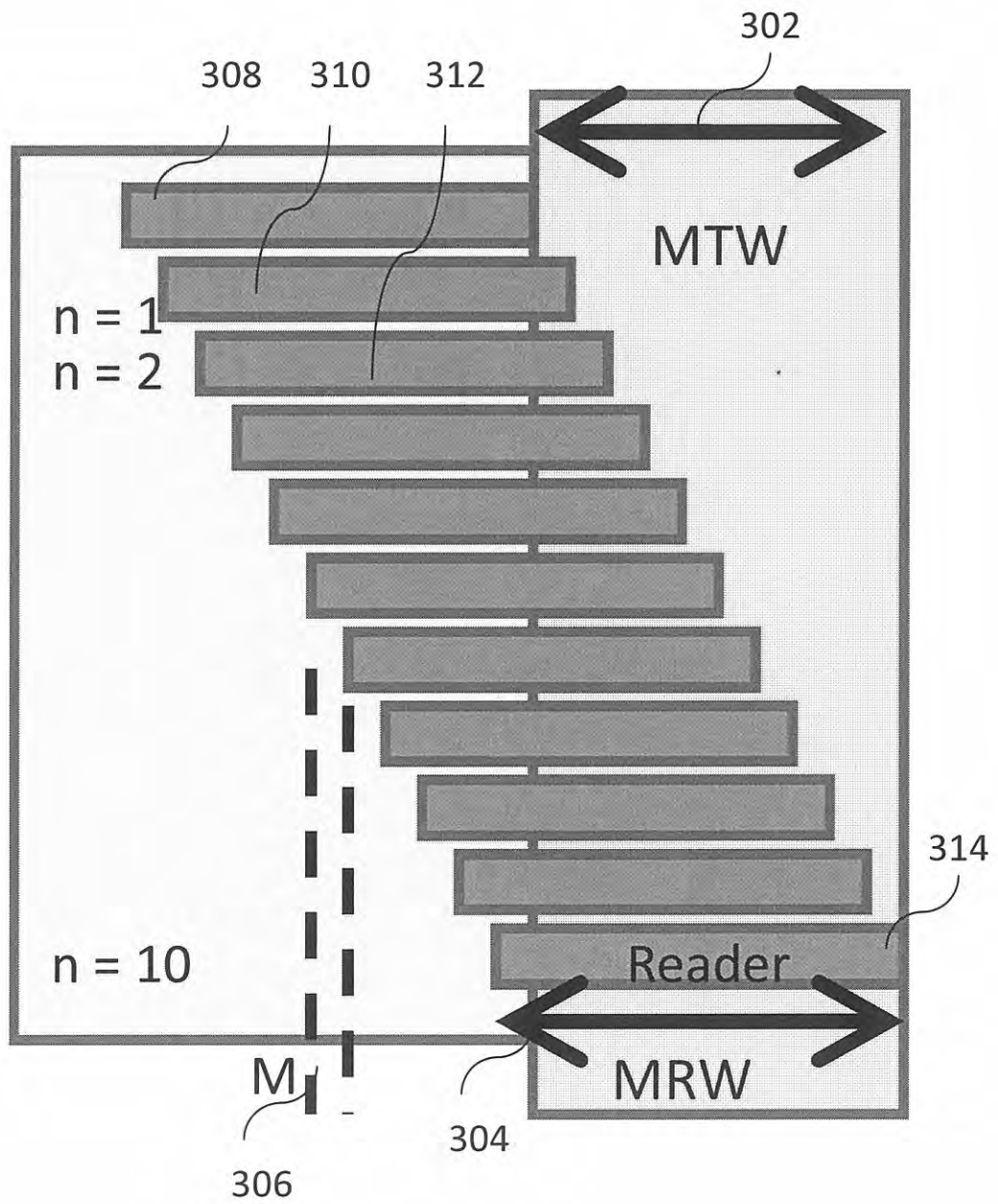


FIG 4

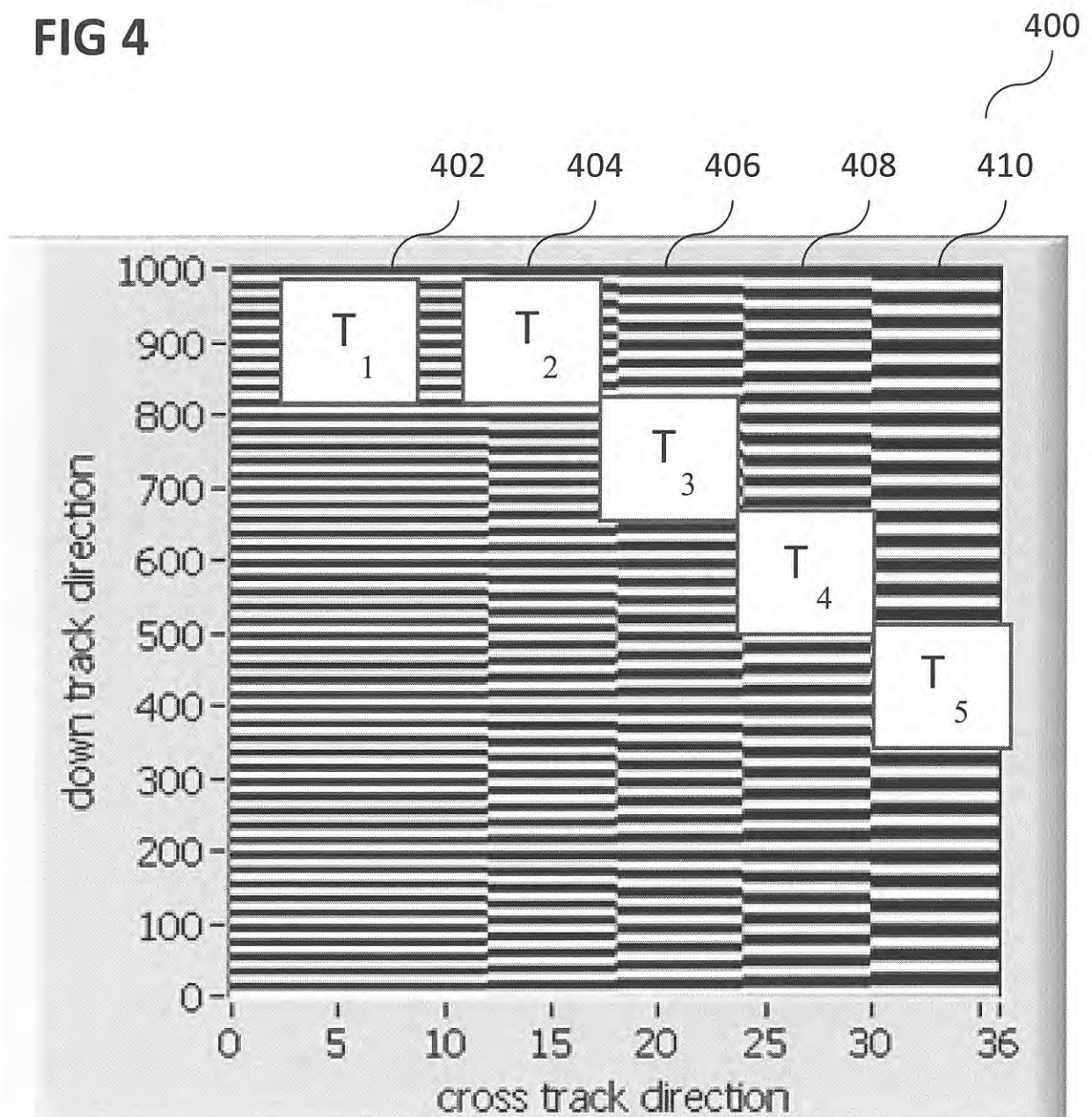
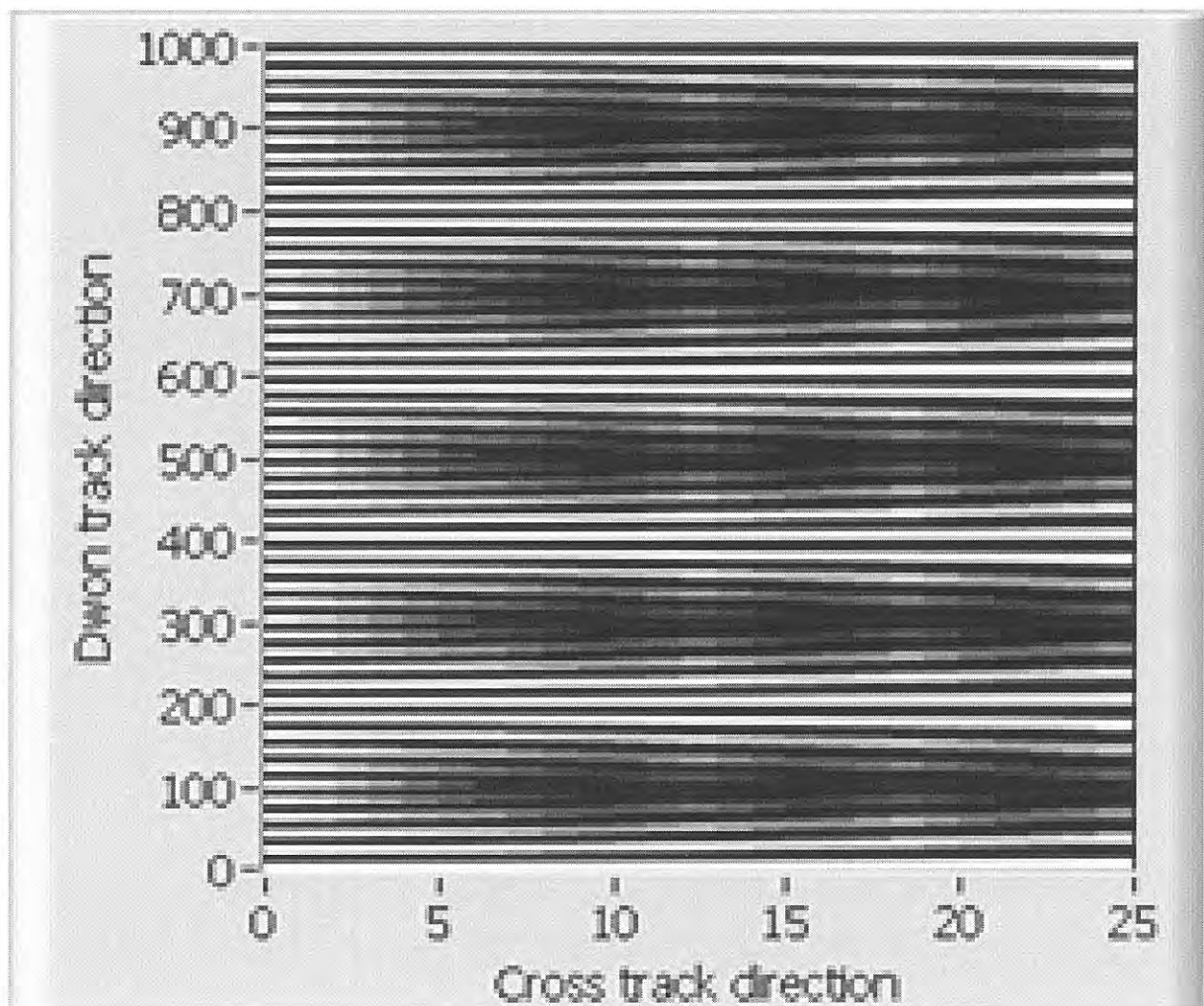


FIG 5

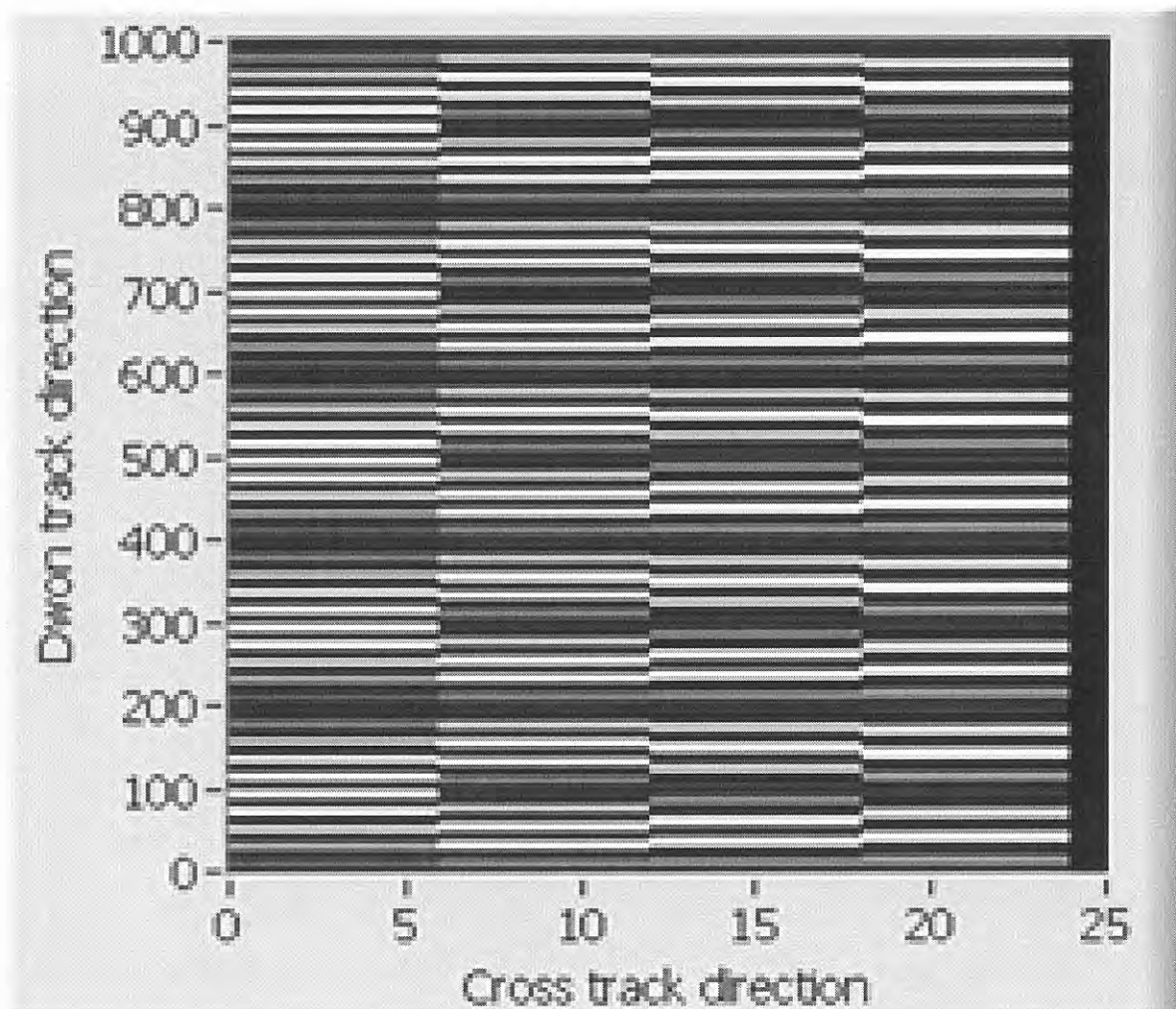
500



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FIG 6

600



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FIG 7

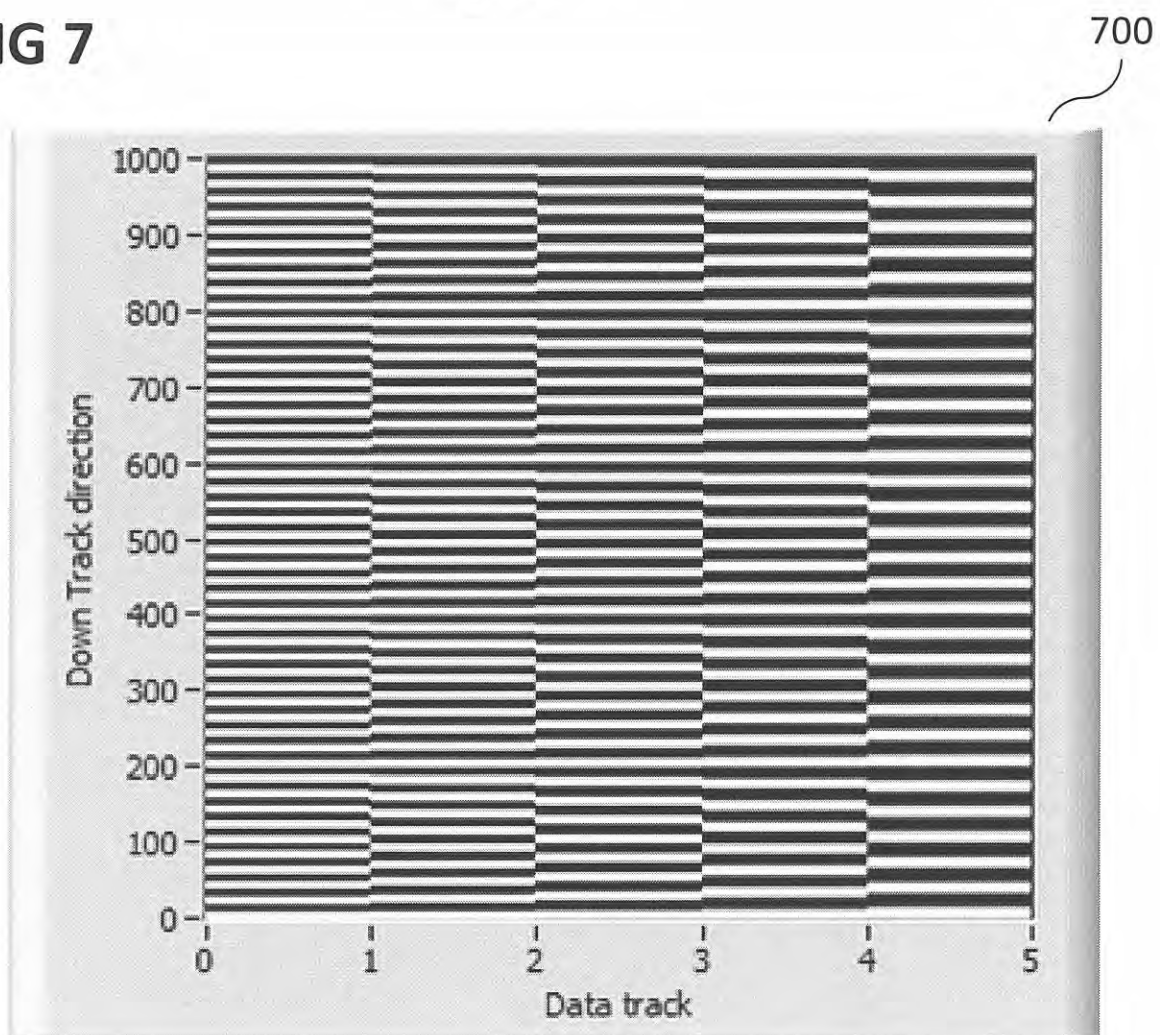


FIG 8

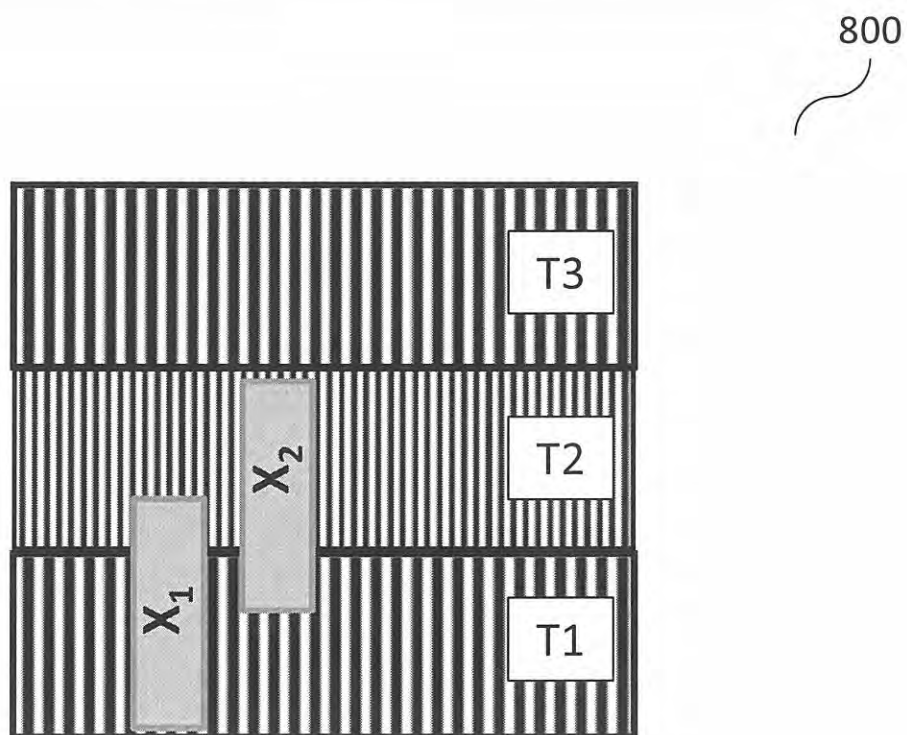


FIG 9

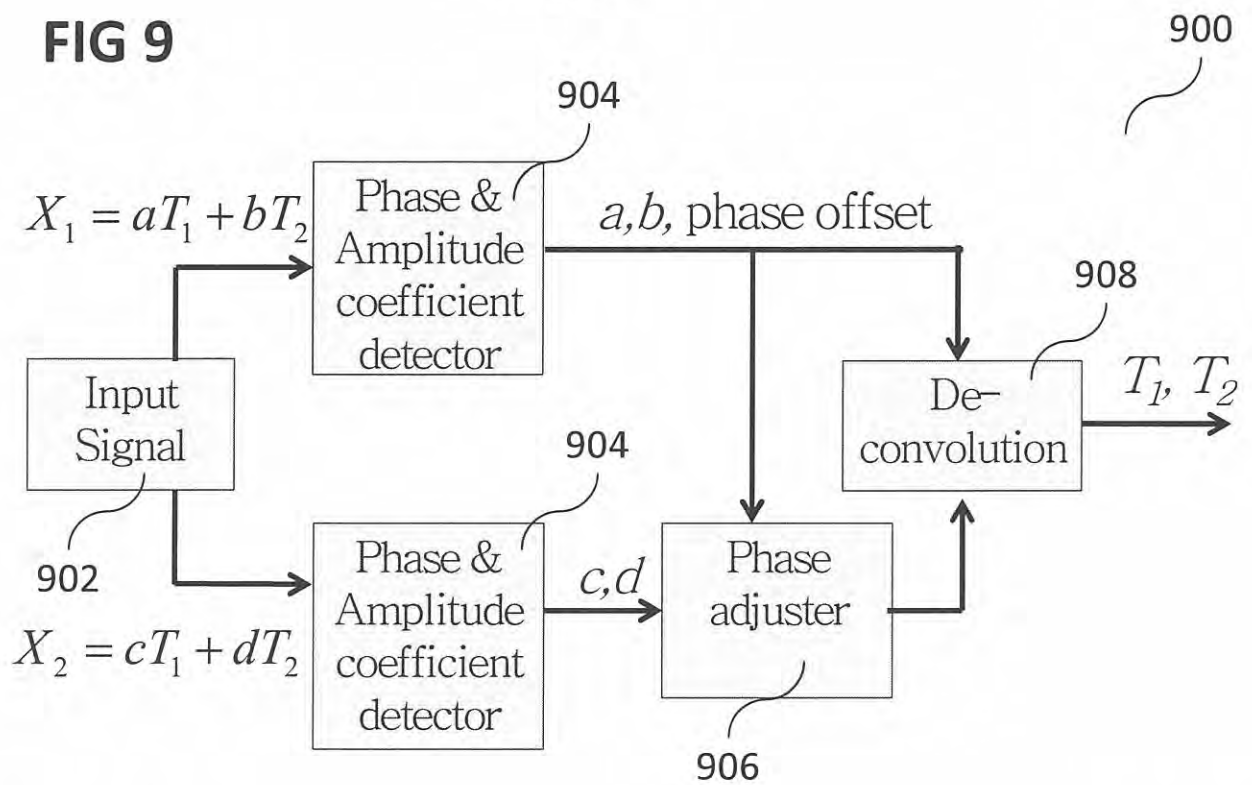
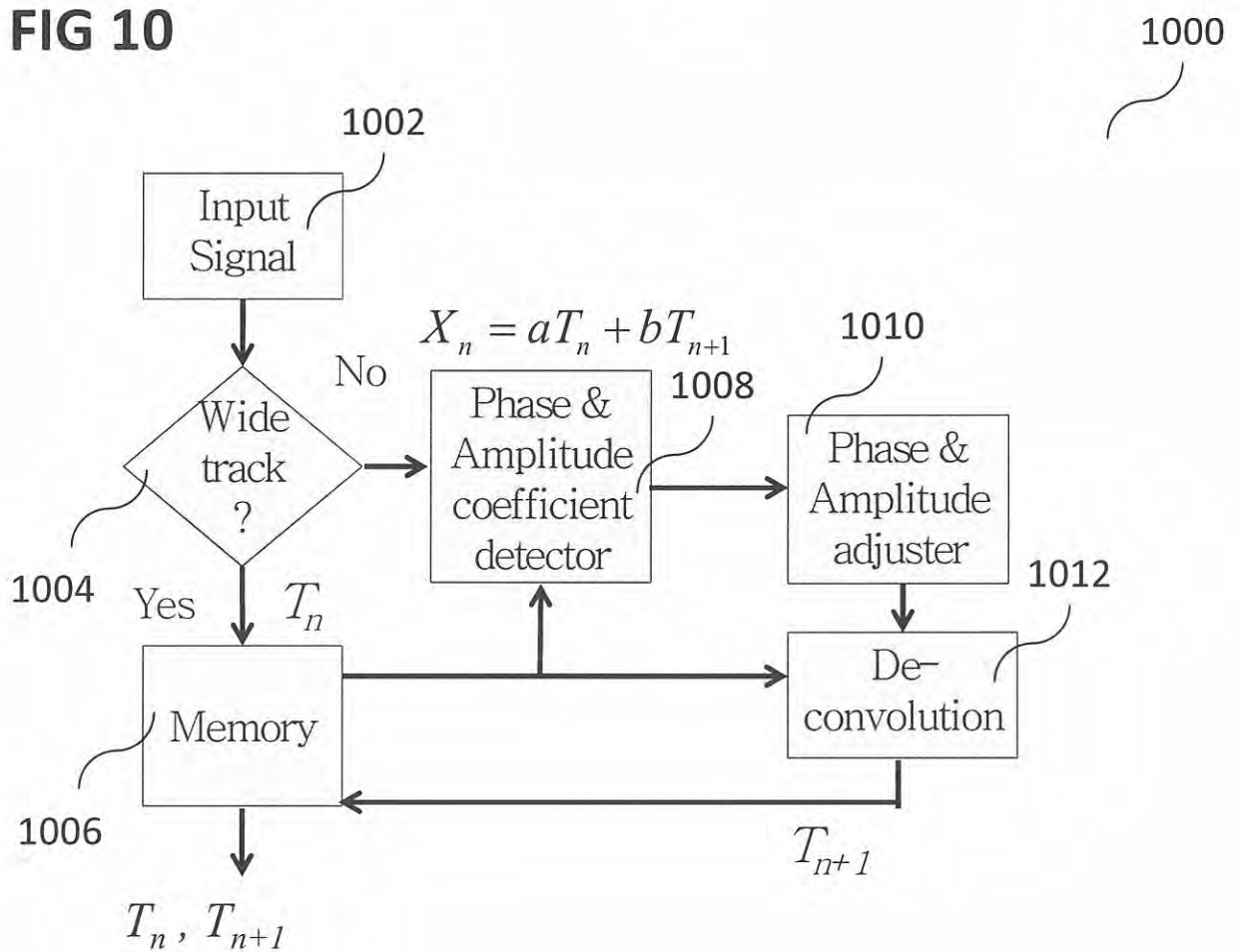


FIG 10



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FIG 11

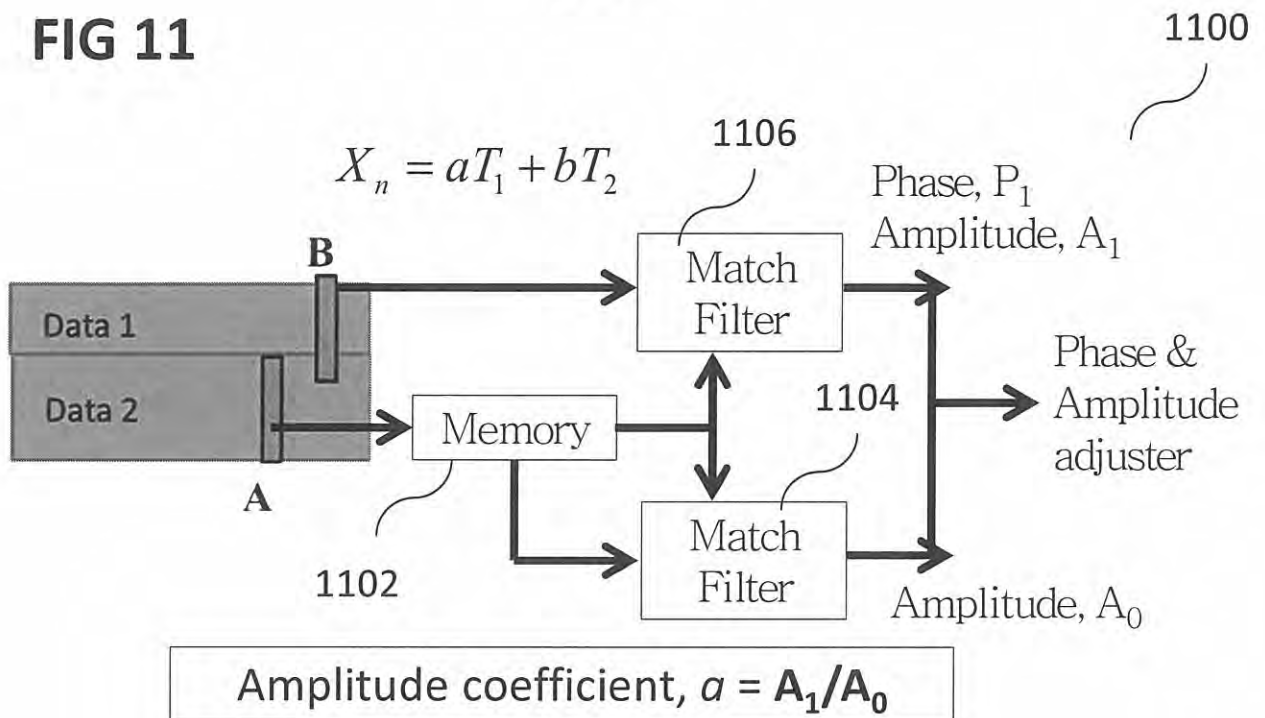
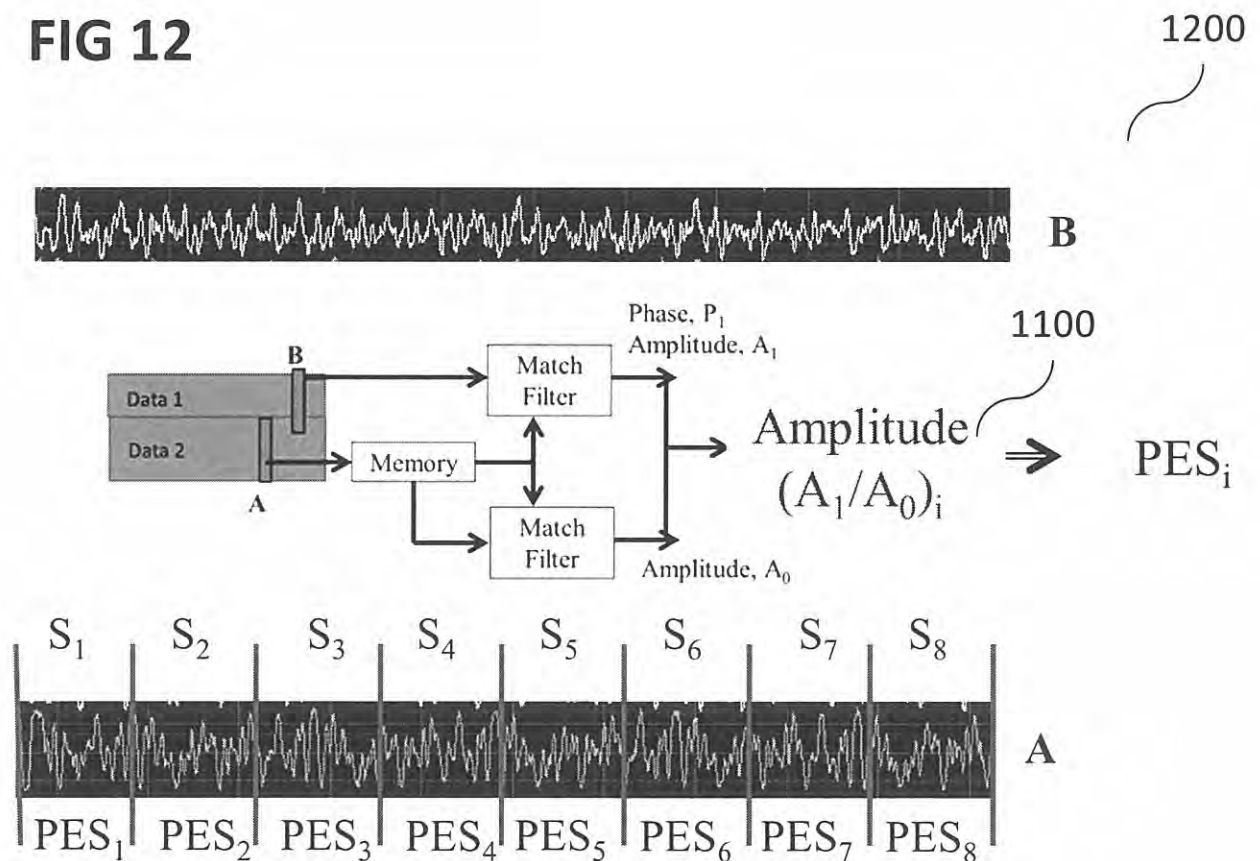


FIG 12



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FIG 13

1300

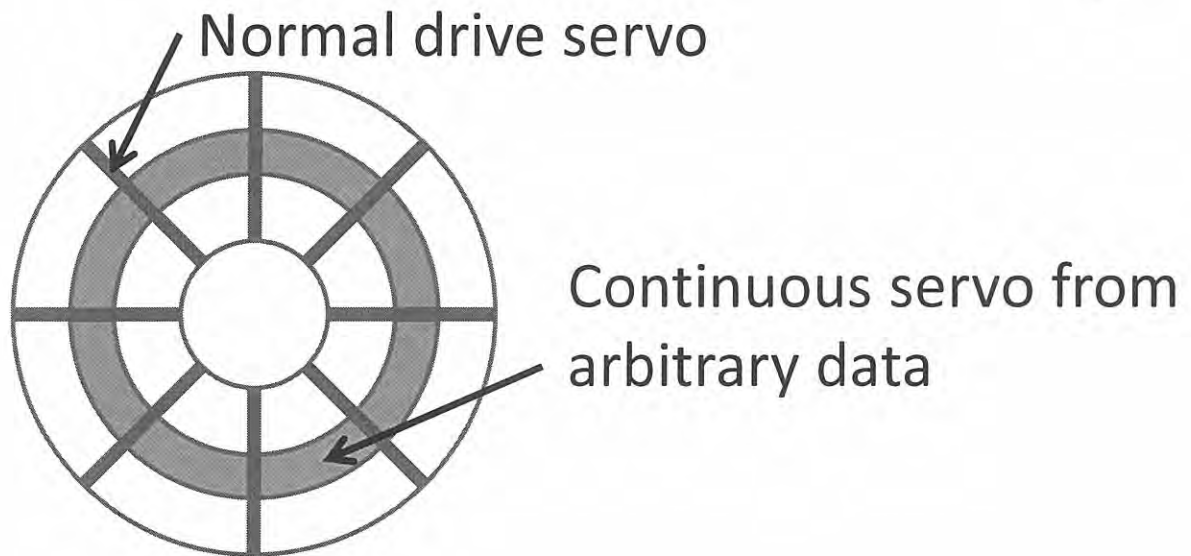
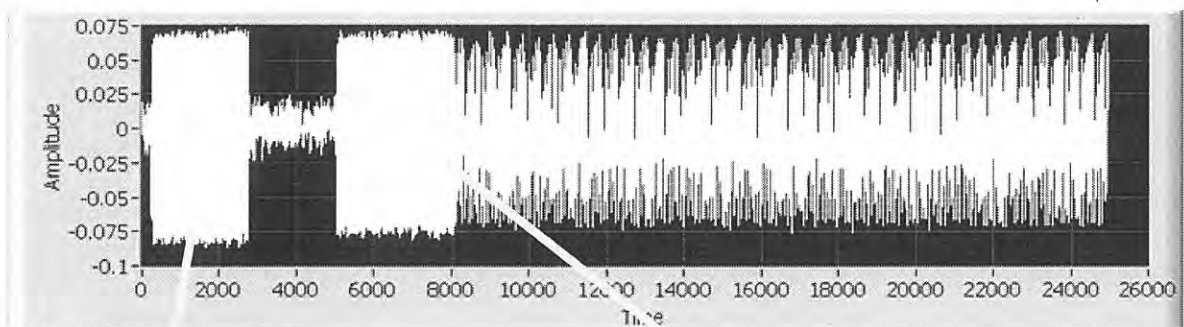
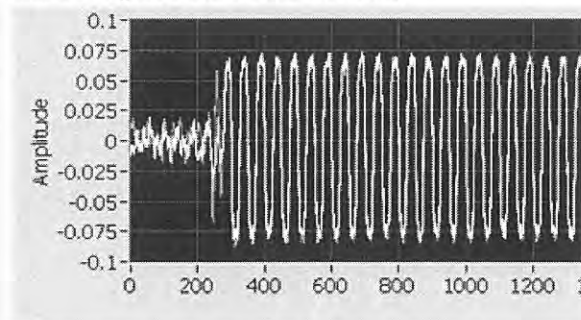


FIG 14

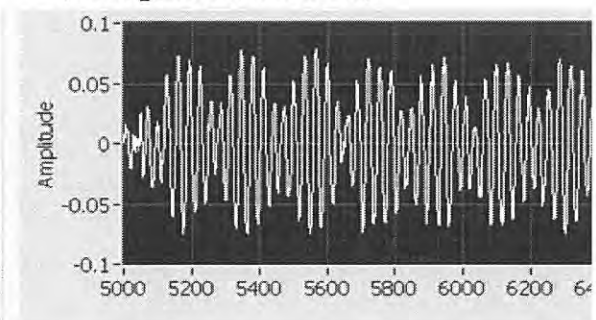
1400



Down Track location
(Phase synchronization):



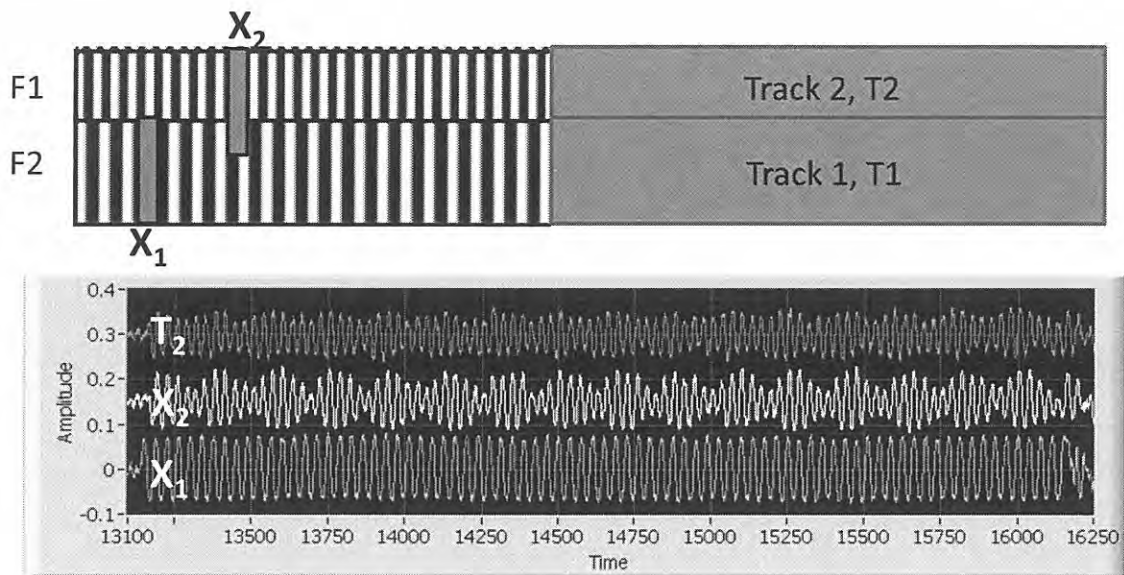
Cross Track location
(Amplitude ratio)



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FIG 15

1500



$$T_2 = X_2 - aT_1$$

FIG 16

1600

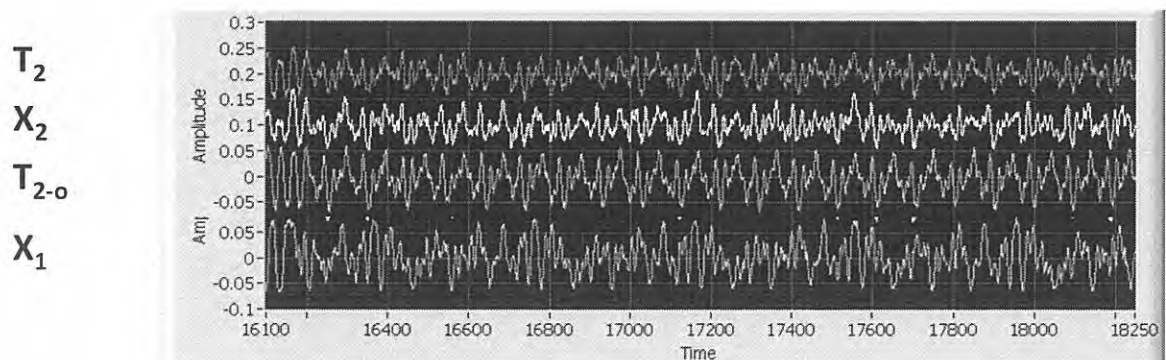


FIG 17

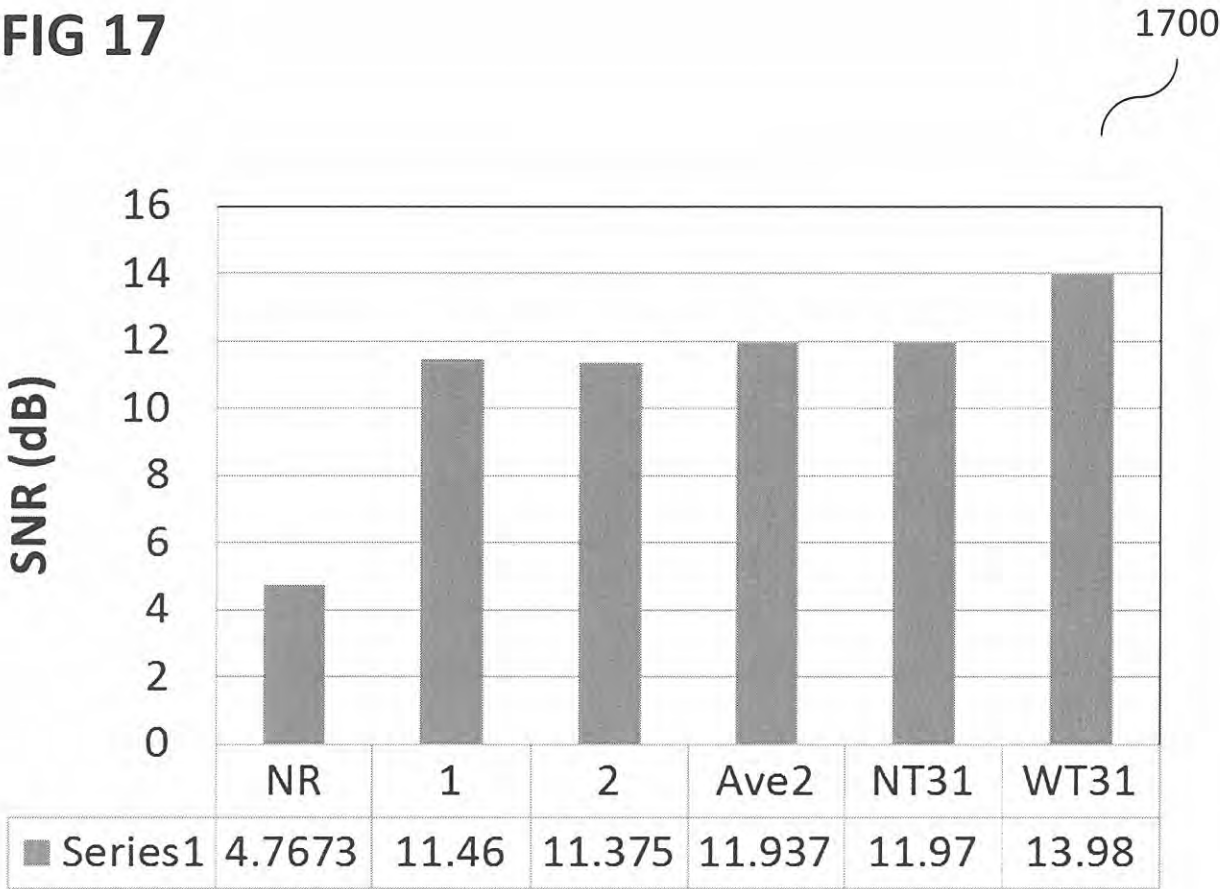


FIG 19

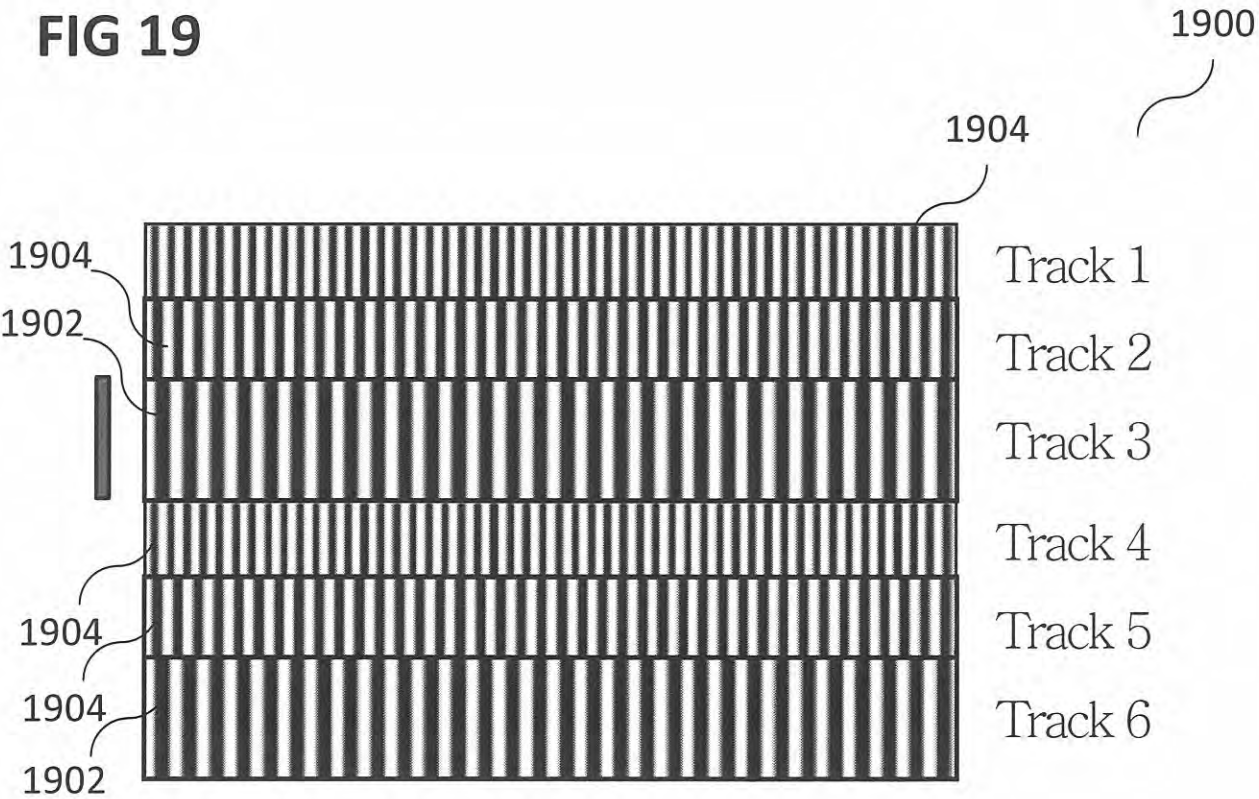
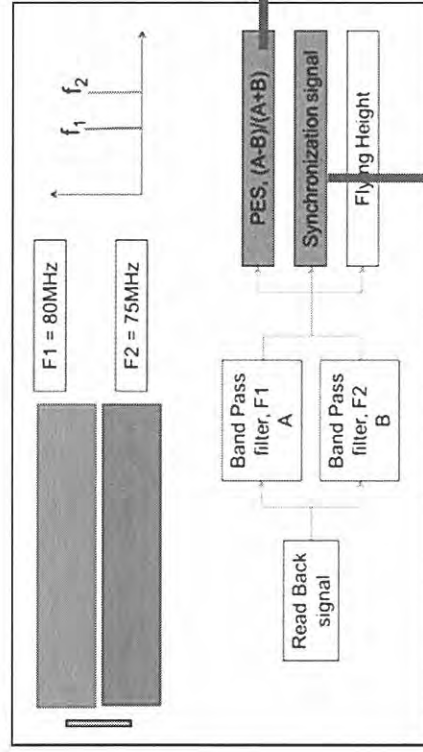
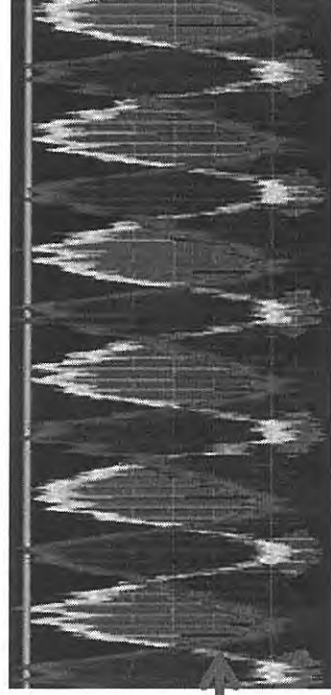


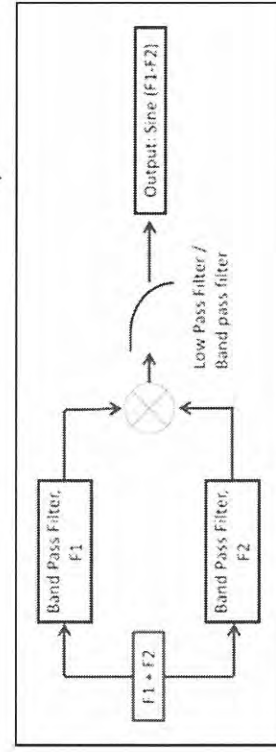
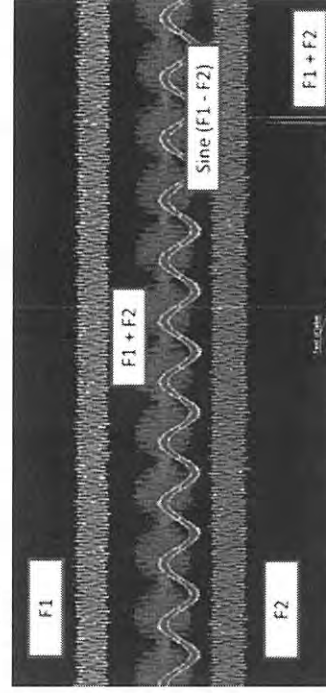
FIG 18



Cross-track location synchronize signal - PES
Amplitude



Down-track location synchronize signal
Phase



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FIG 20

2000

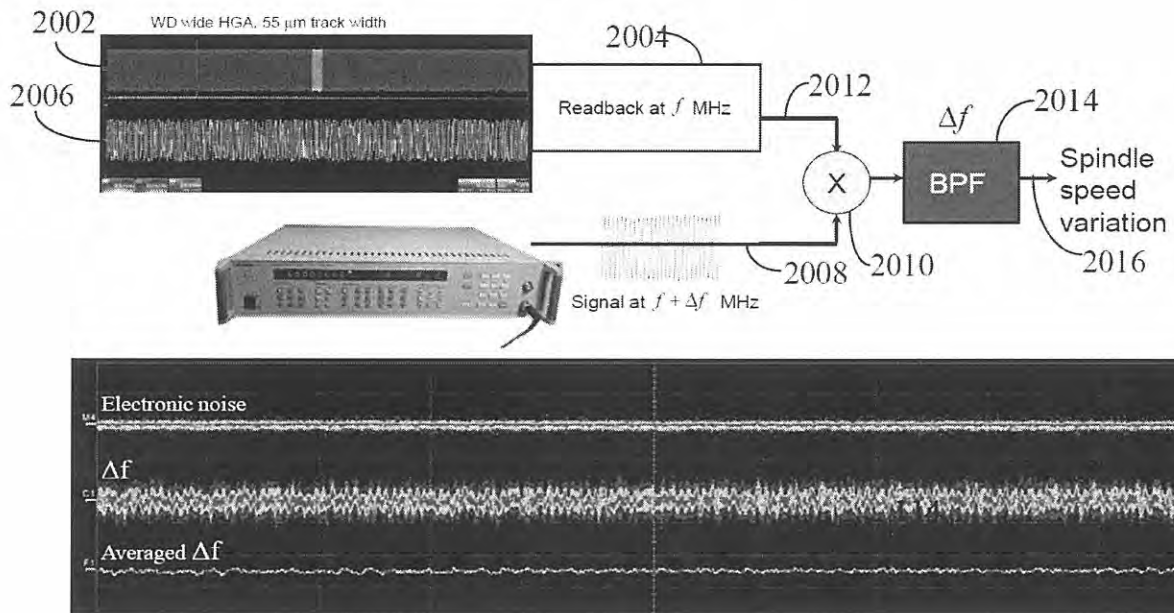


FIG 21

2100

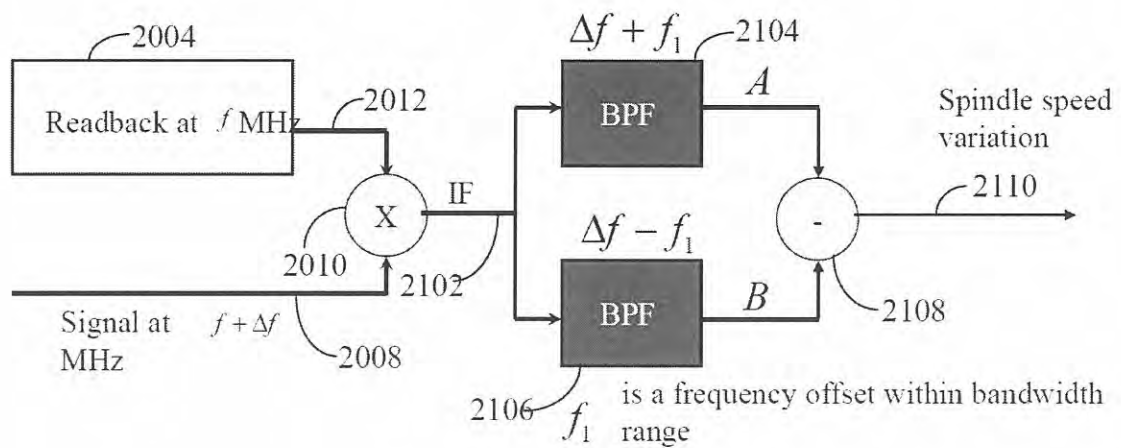


FIG 22

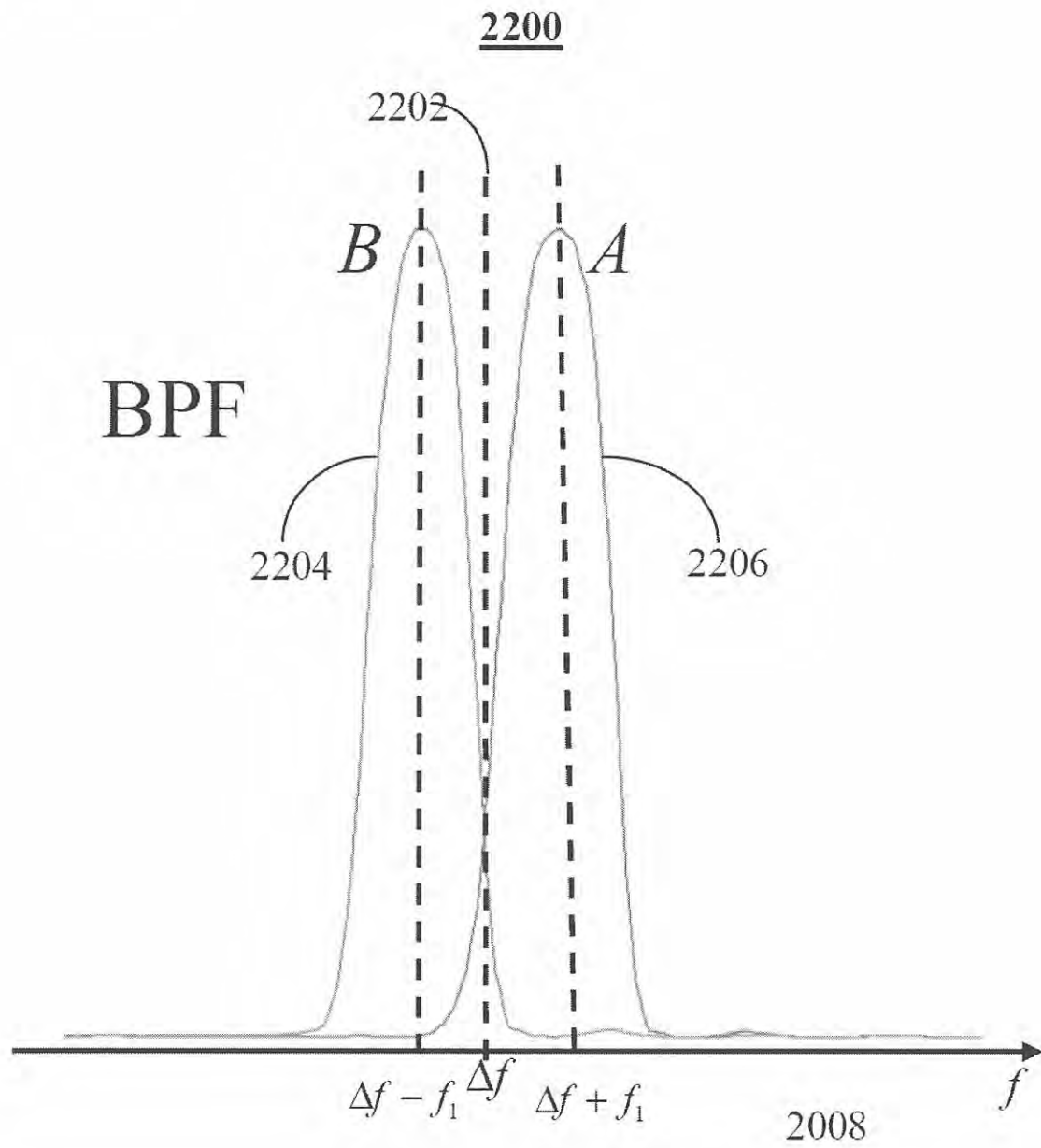
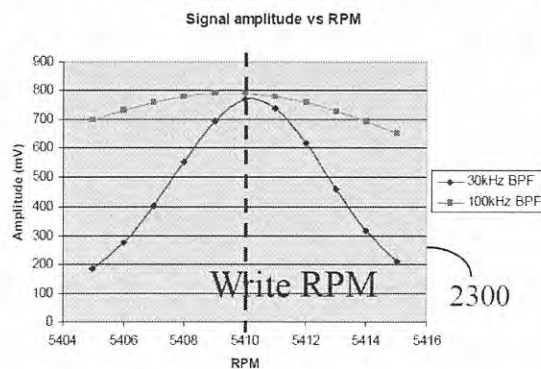
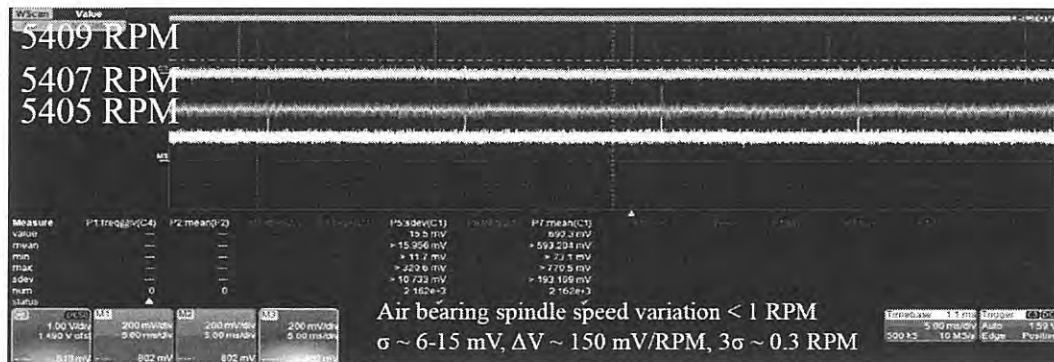


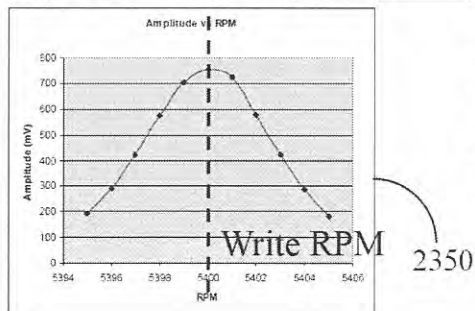
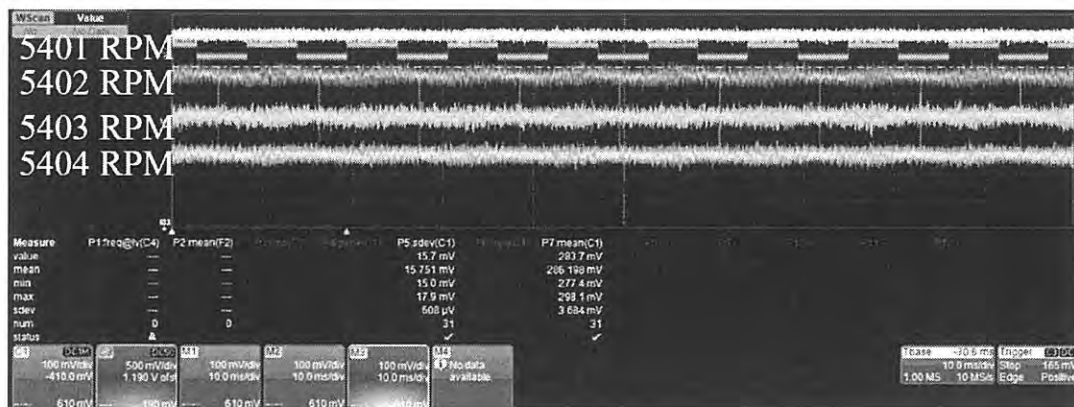
FIG 23A



150mV ~ 1 RPM

$$0.3 \text{ RPM} = 0.3/5400 \\ = 0.005\%$$

FIG 23B



HDD with cover open
 Tested by Media Tester
 head loaded onto spinning
 disk in HDD

FIG 24

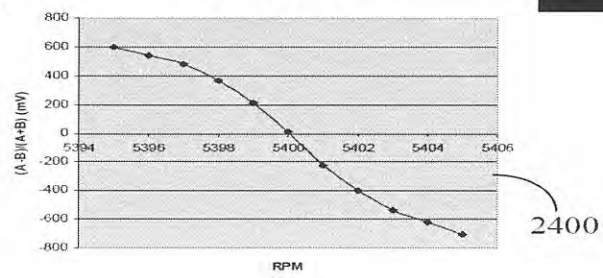
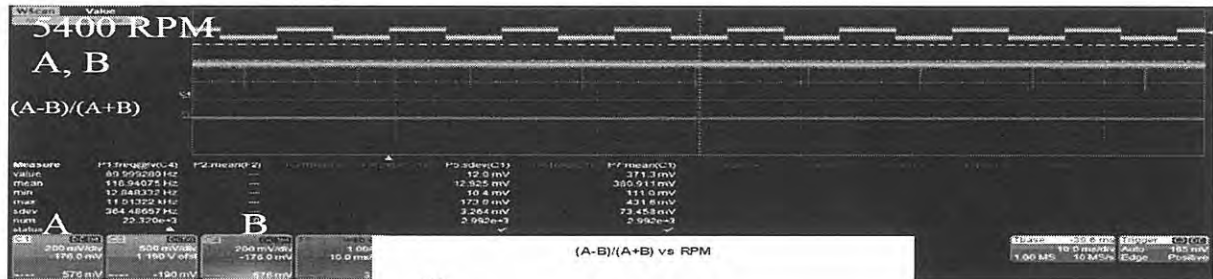


FIG 25

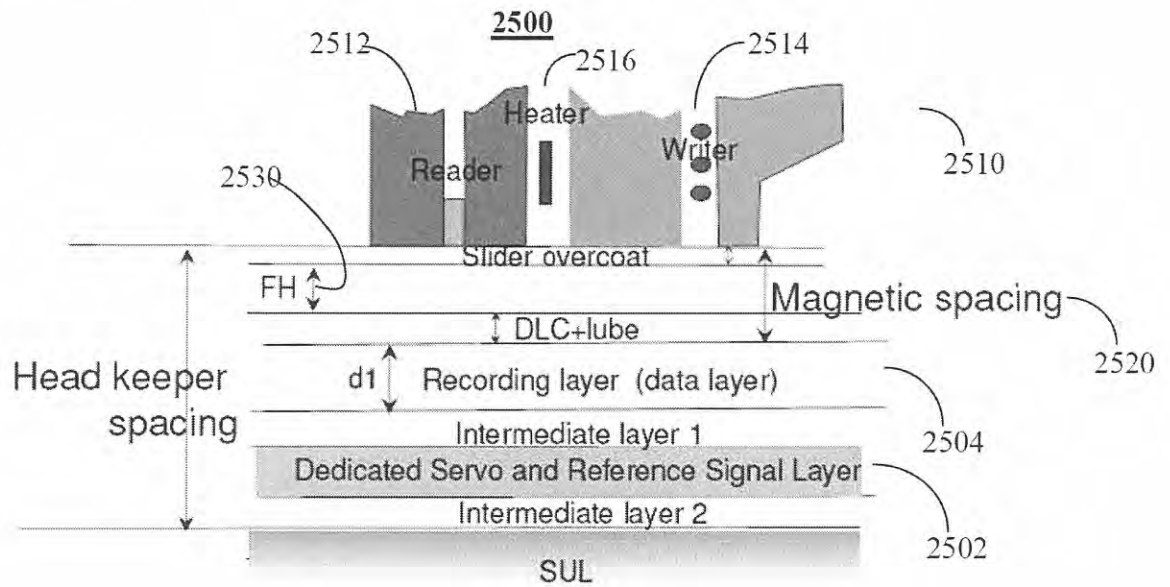


FIG 26

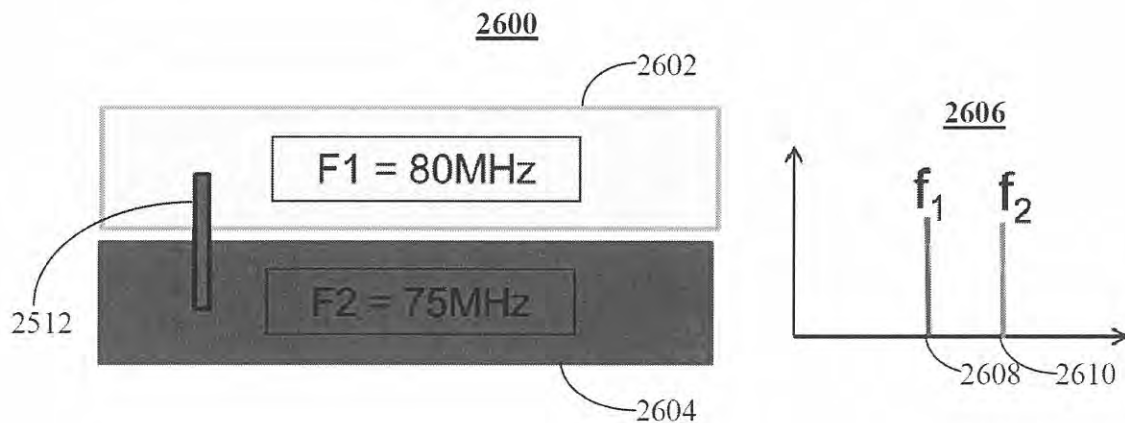


FIG 27A

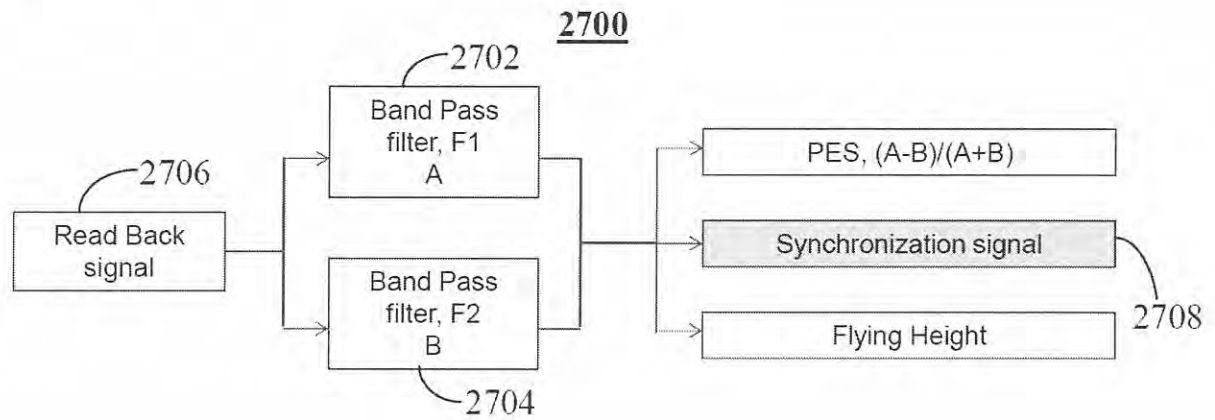
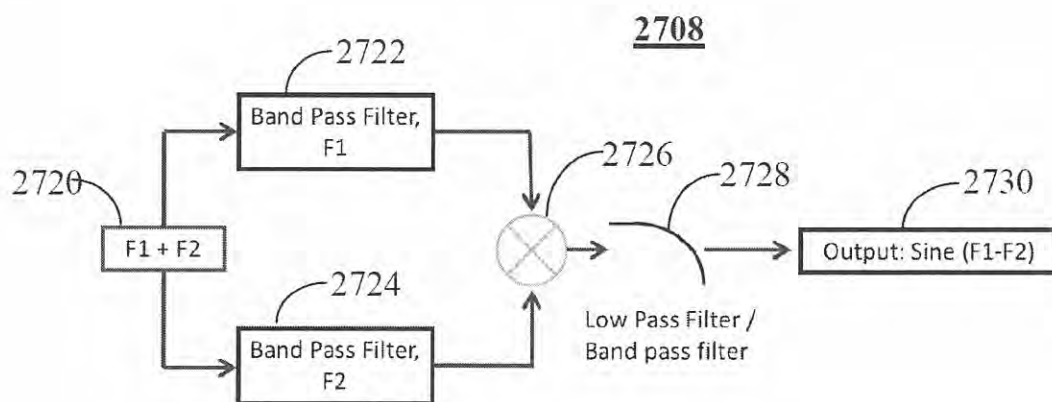


FIG 27B



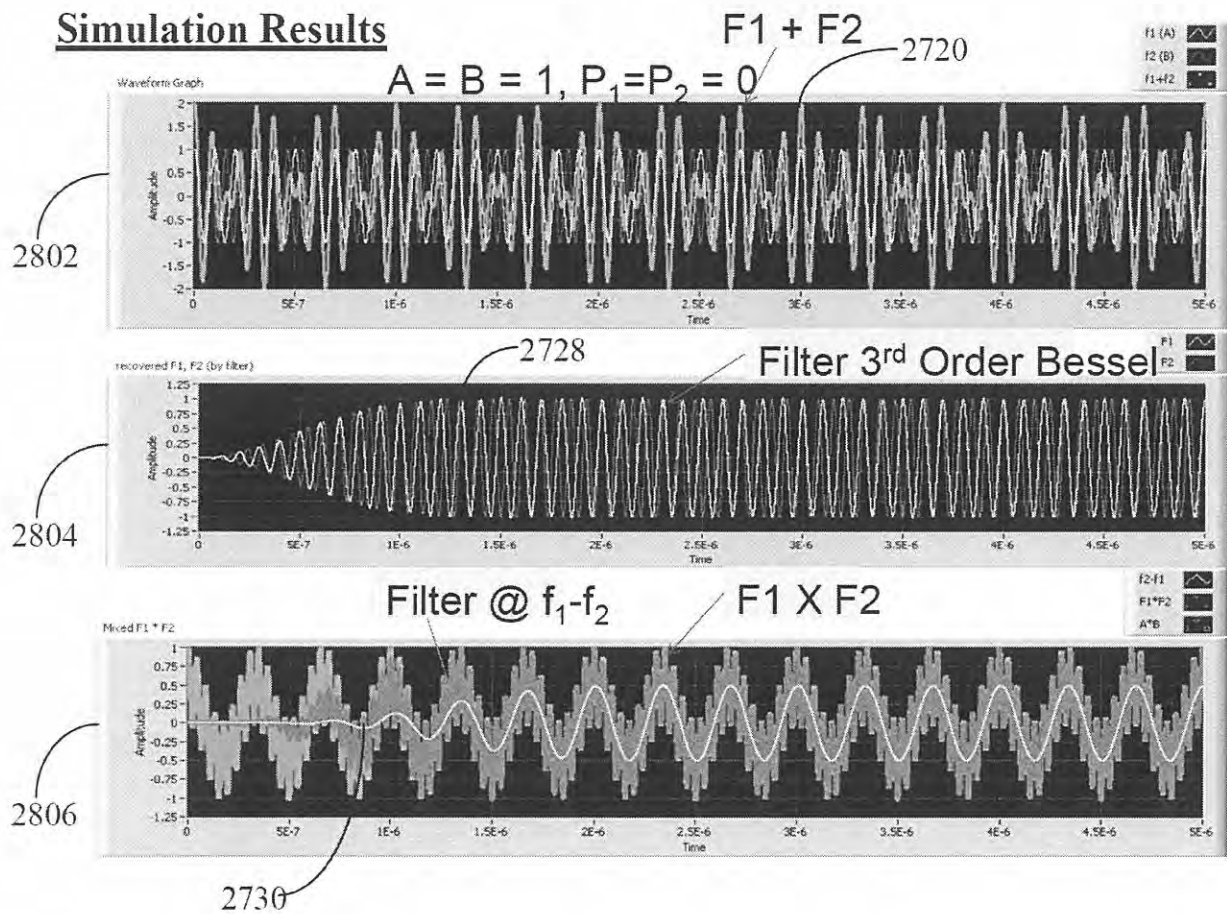
$$F1 + F2$$


FIG 29

Simulation Results

$$f1: A \cdot \cos(2\pi \cdot f1t + P1)$$

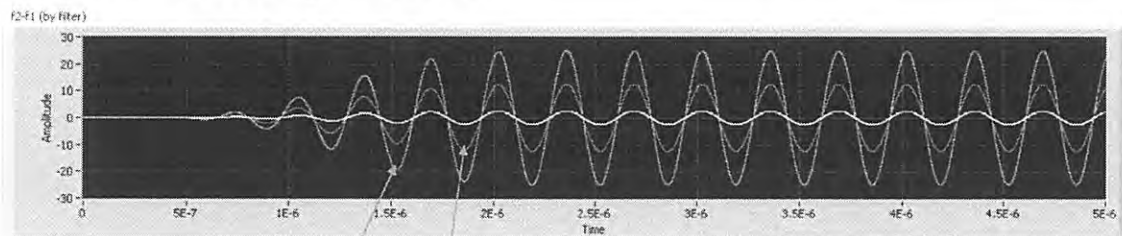
$$f2: B \cdot \cos(2\pi \cdot f2t + P2)$$

2900

$$A = 1, 5, 10,$$

$$B = 1,$$

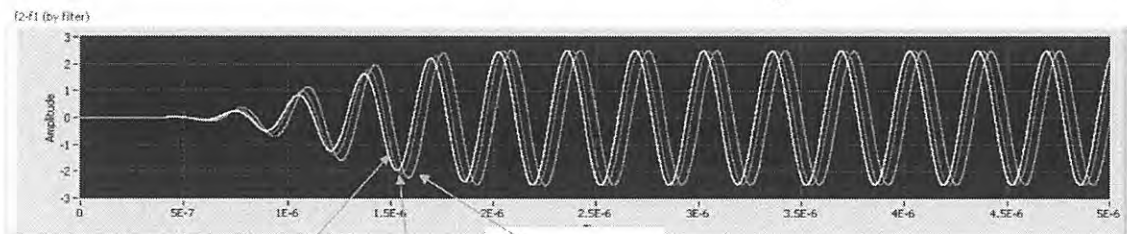
$$P_1 = P_2 = 0$$

 $A=10$ $A=5$ 2950

$$A = 1, B = 1,$$

$$P_1 = 0, 0.75, 1.5,$$

$$P_2 = 0$$

 $P1=0$ $P1=0.75$ $P1=1.5$

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FIG 30

3000

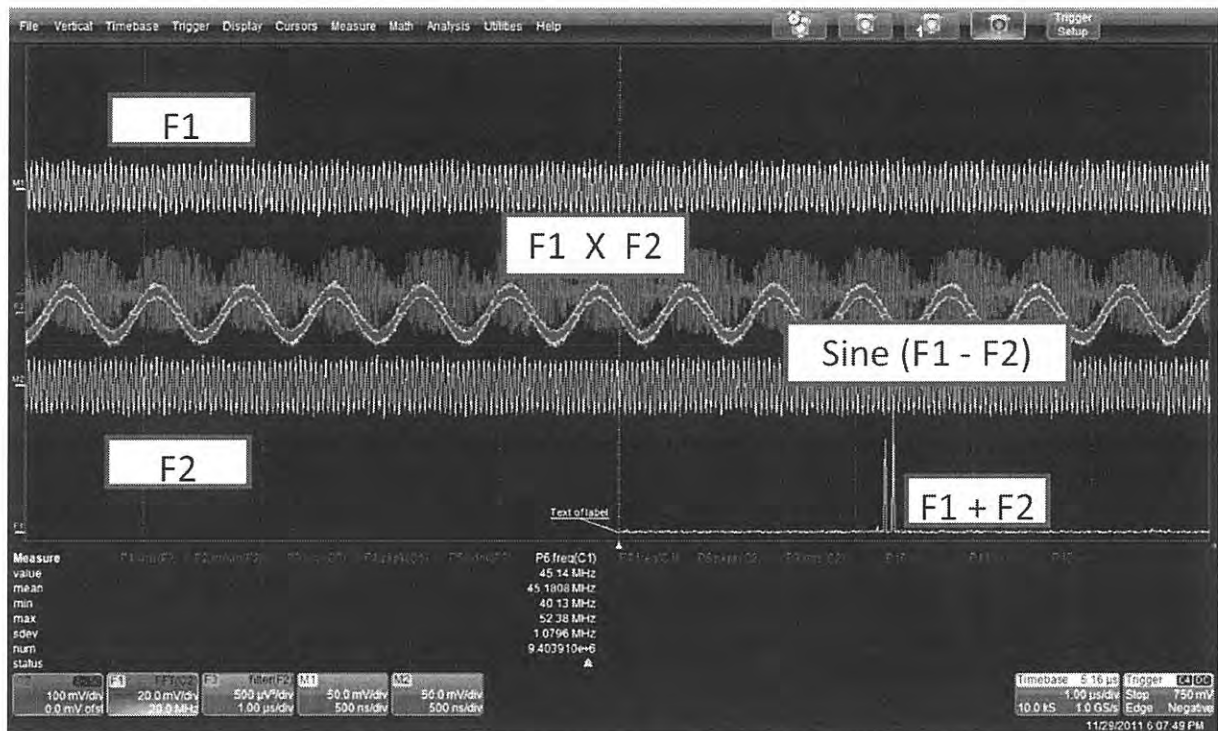


FIG 31

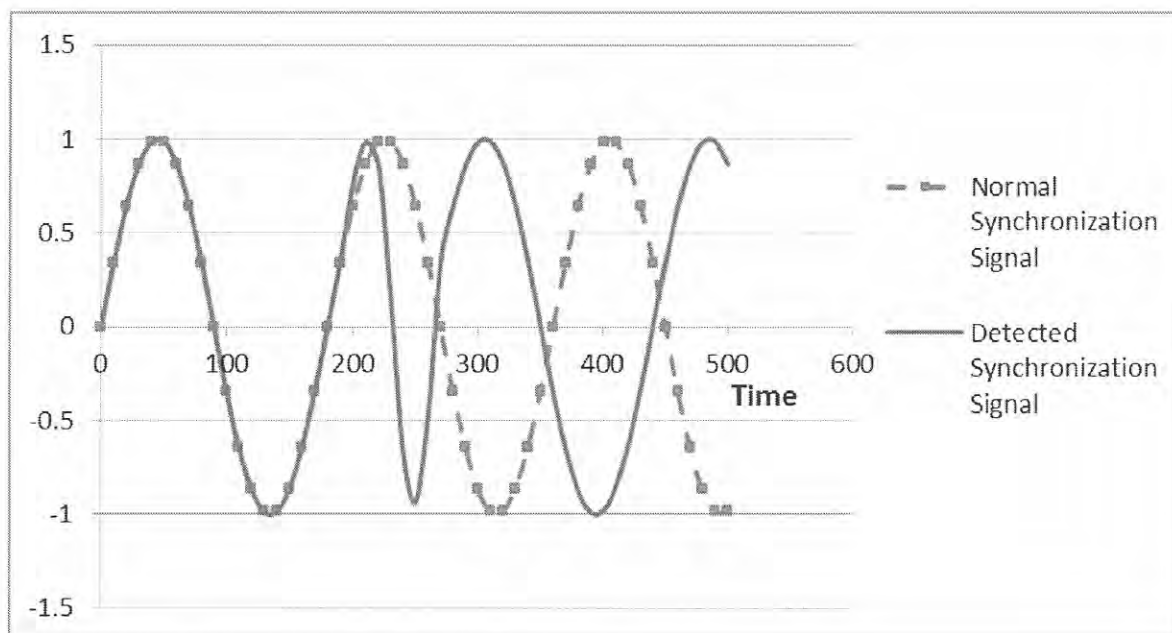
3100

FIG 32

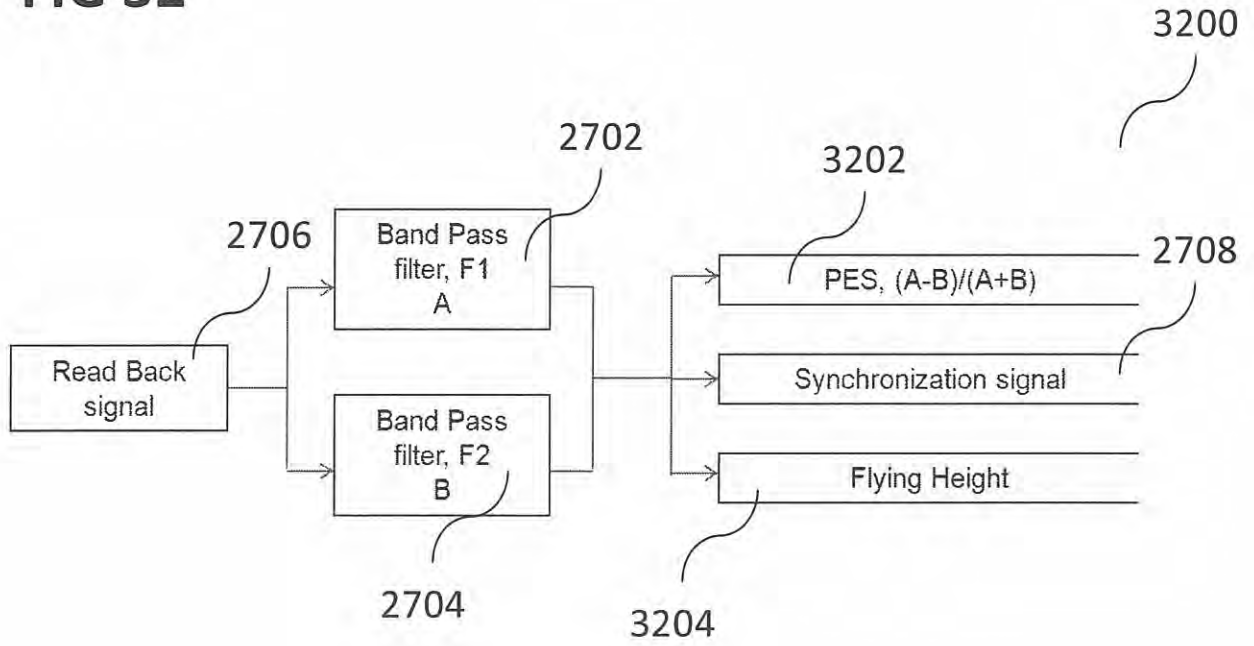


FIG 33

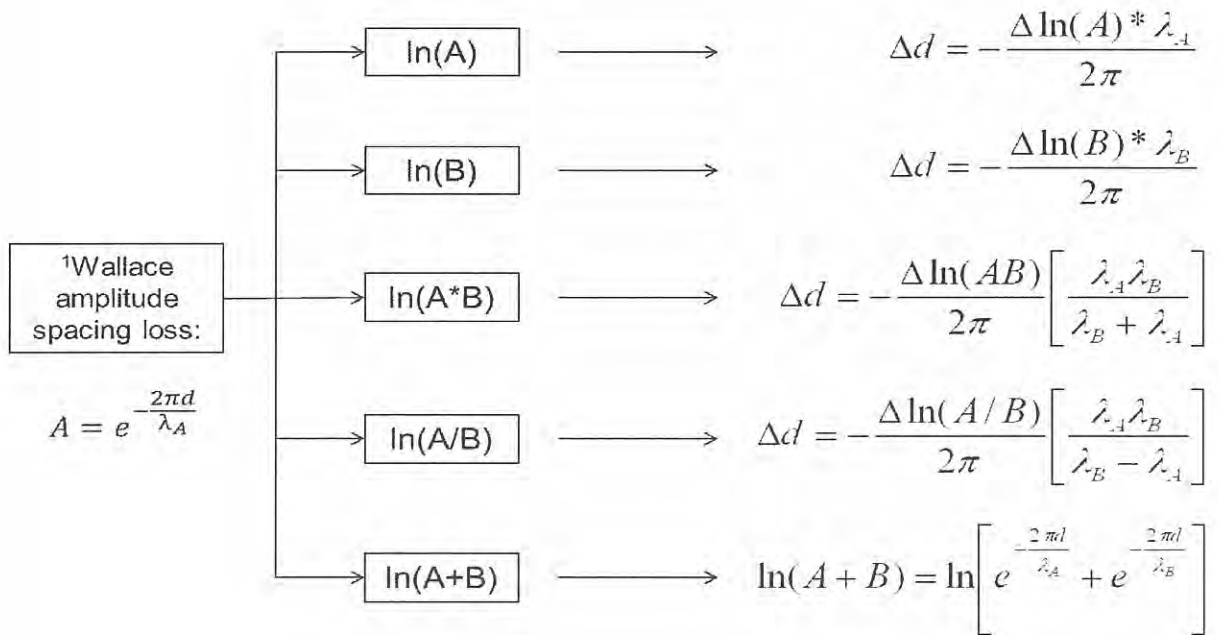


FIG 34A

3400

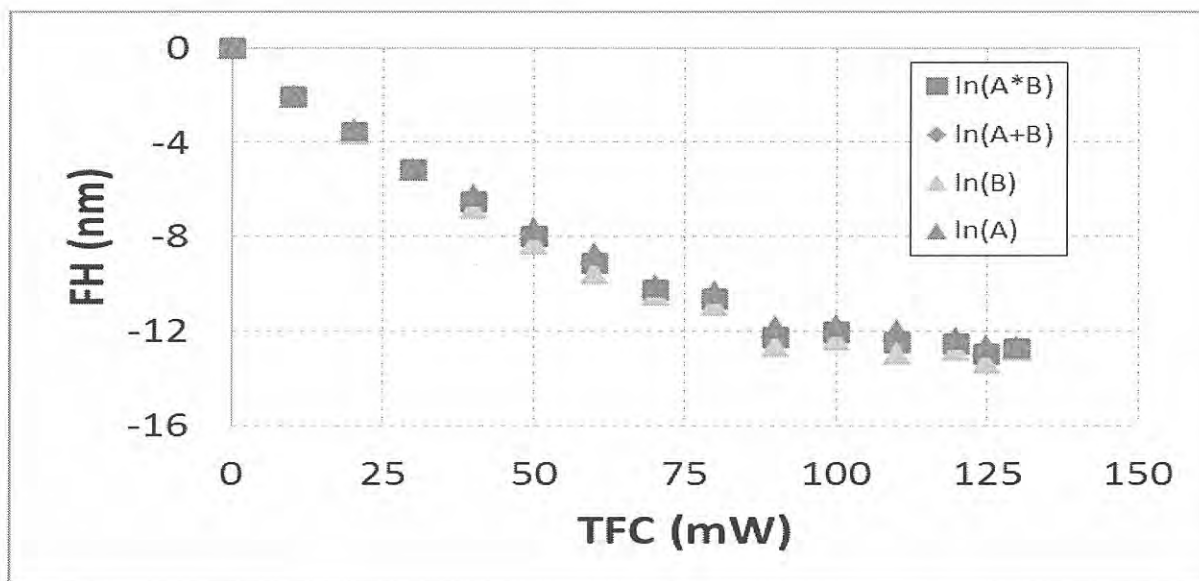


FIG 34B

3450

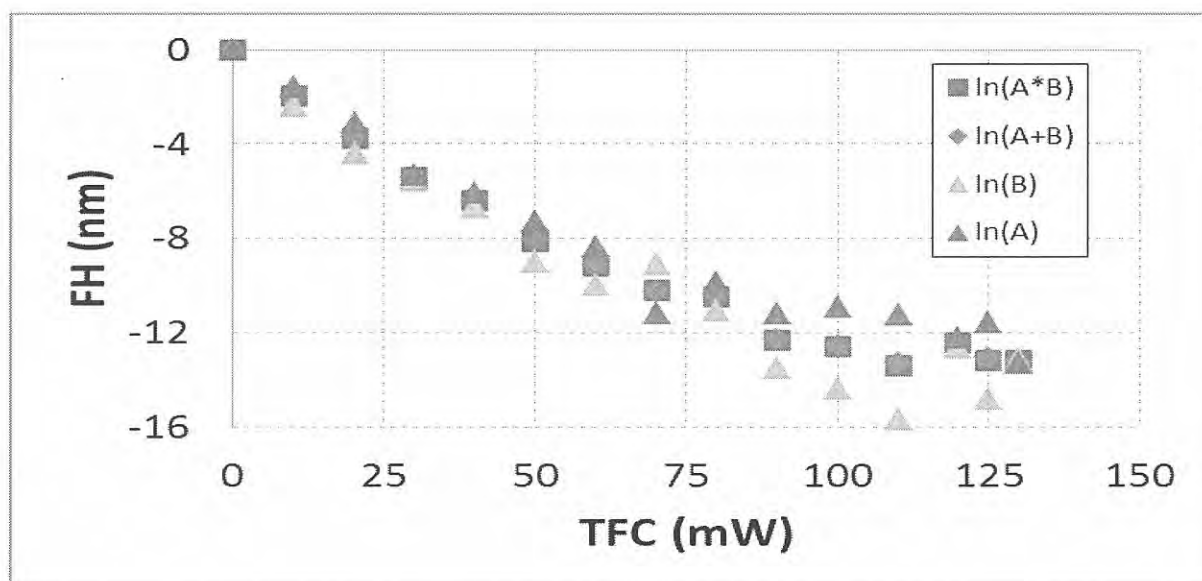


FIG 35

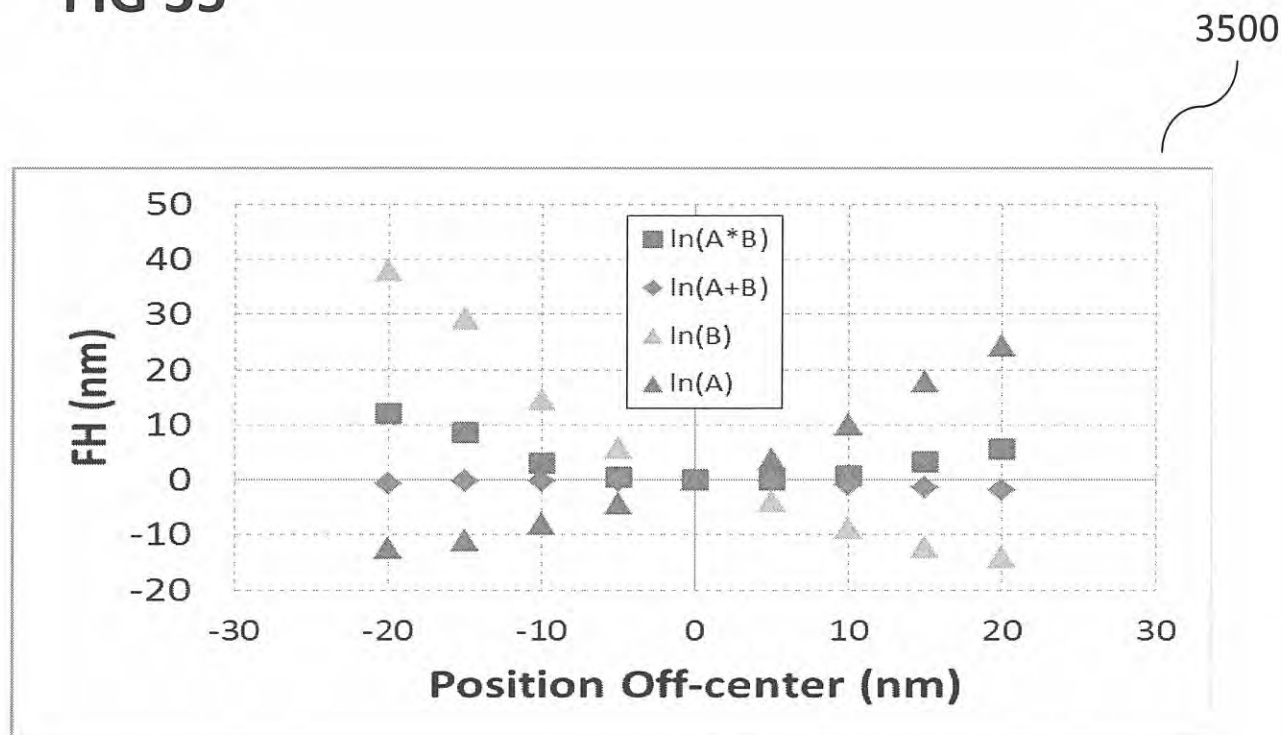


FIG 36A

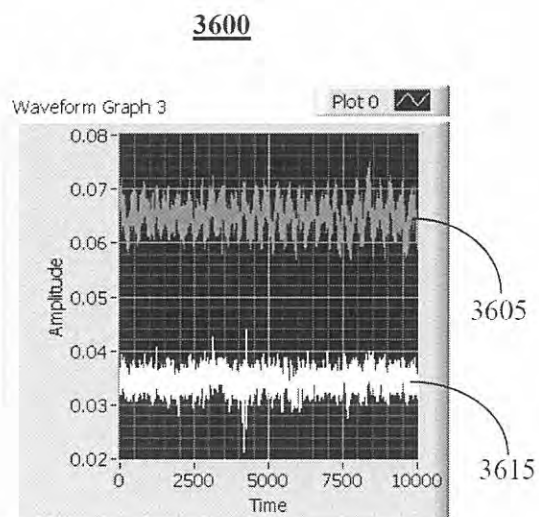


FIG 36B

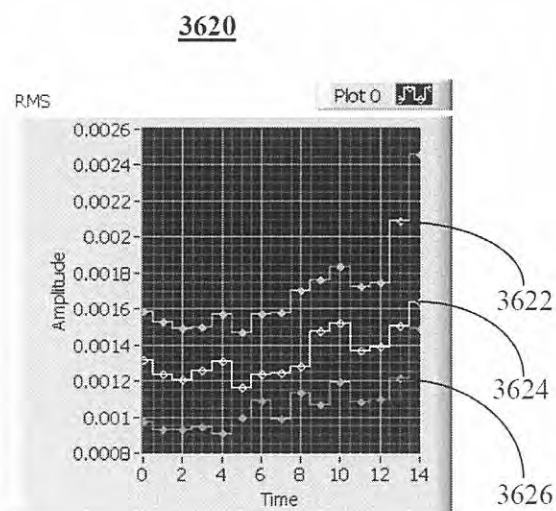


FIG 37

3700

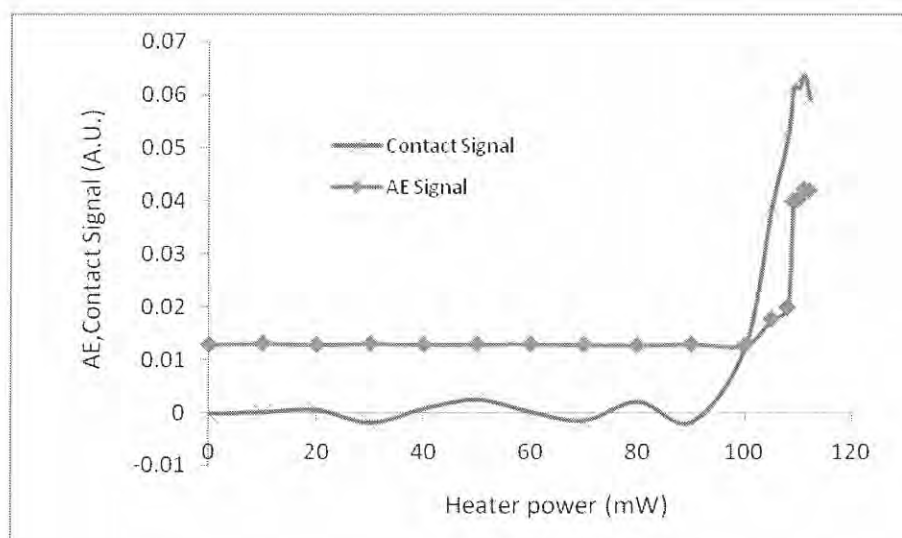
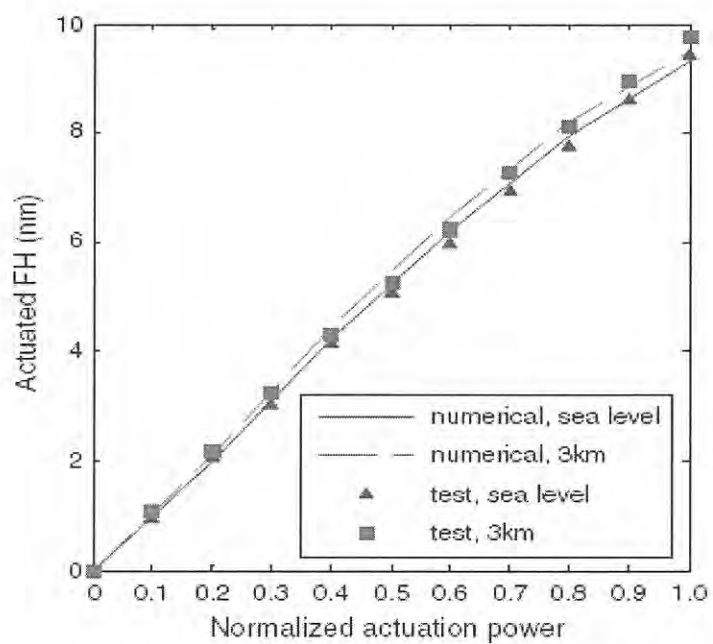


FIG 38

3800



PRIOR ART