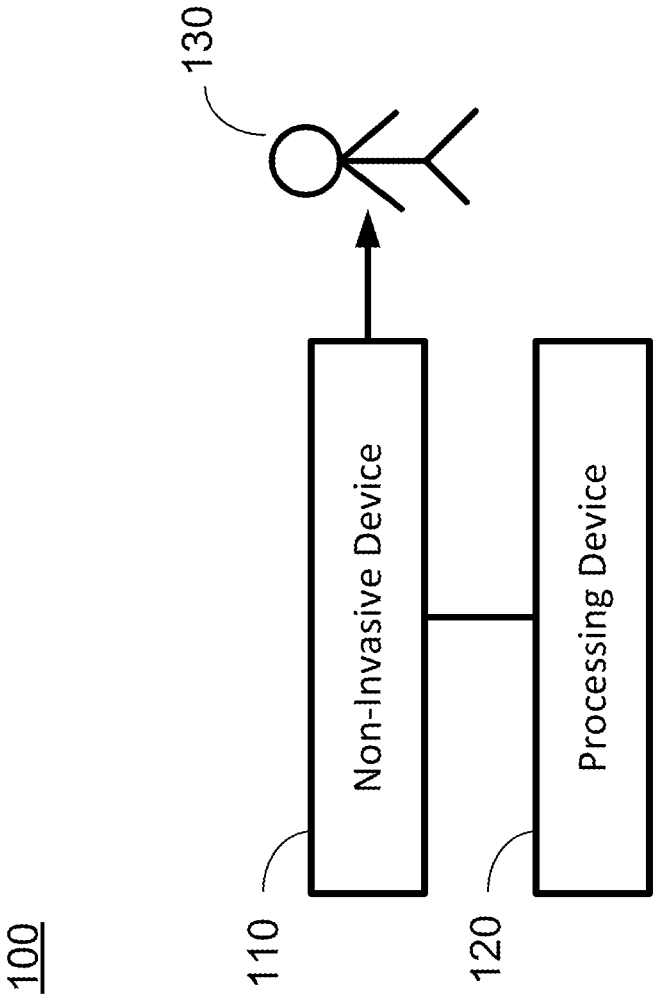


FIG. 1A

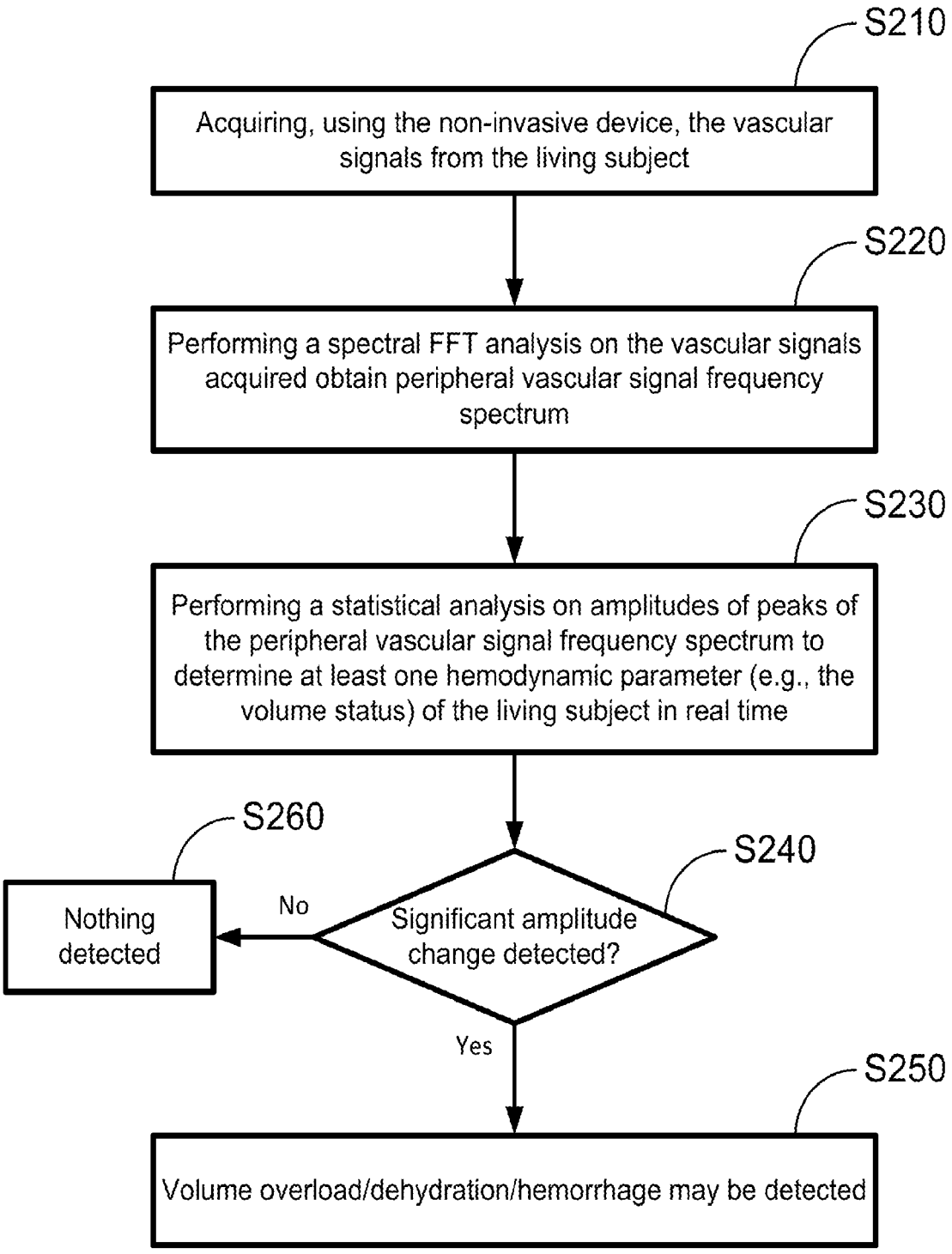

S210
Acquiring, using the non-invasive device, the vascular signals from the living subject
S220
Performing a spectral FFT analysis on the vascular signals acquired obtain peripheral vascular signal frequency spectrum
S230
Performing a statistical analysis on amplitudes of peaks of the peripheral vascular signal frequency spectrum to determine at least one hemodynamic parameter (e.g., the volume status) of the living subject in real time
S240
Significant amplitude change detected?
No
S260
Nothing detected
Yes
S250
Volume overload/dehydration/hemorrhage may be detected

FIG. 2

300

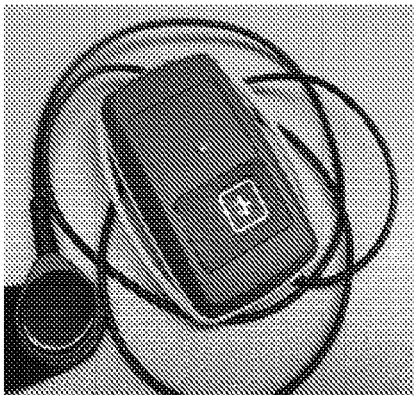


FIG. 3A

300'

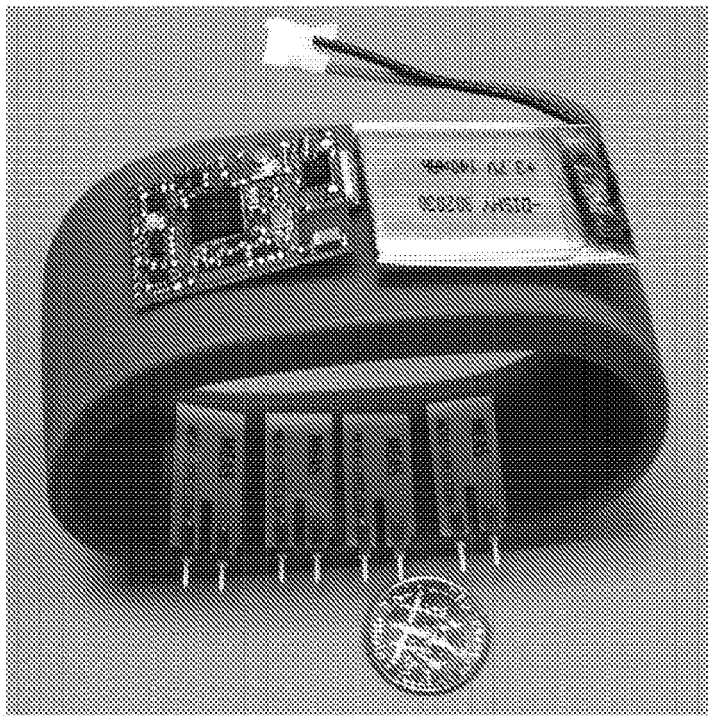


FIG. 3B

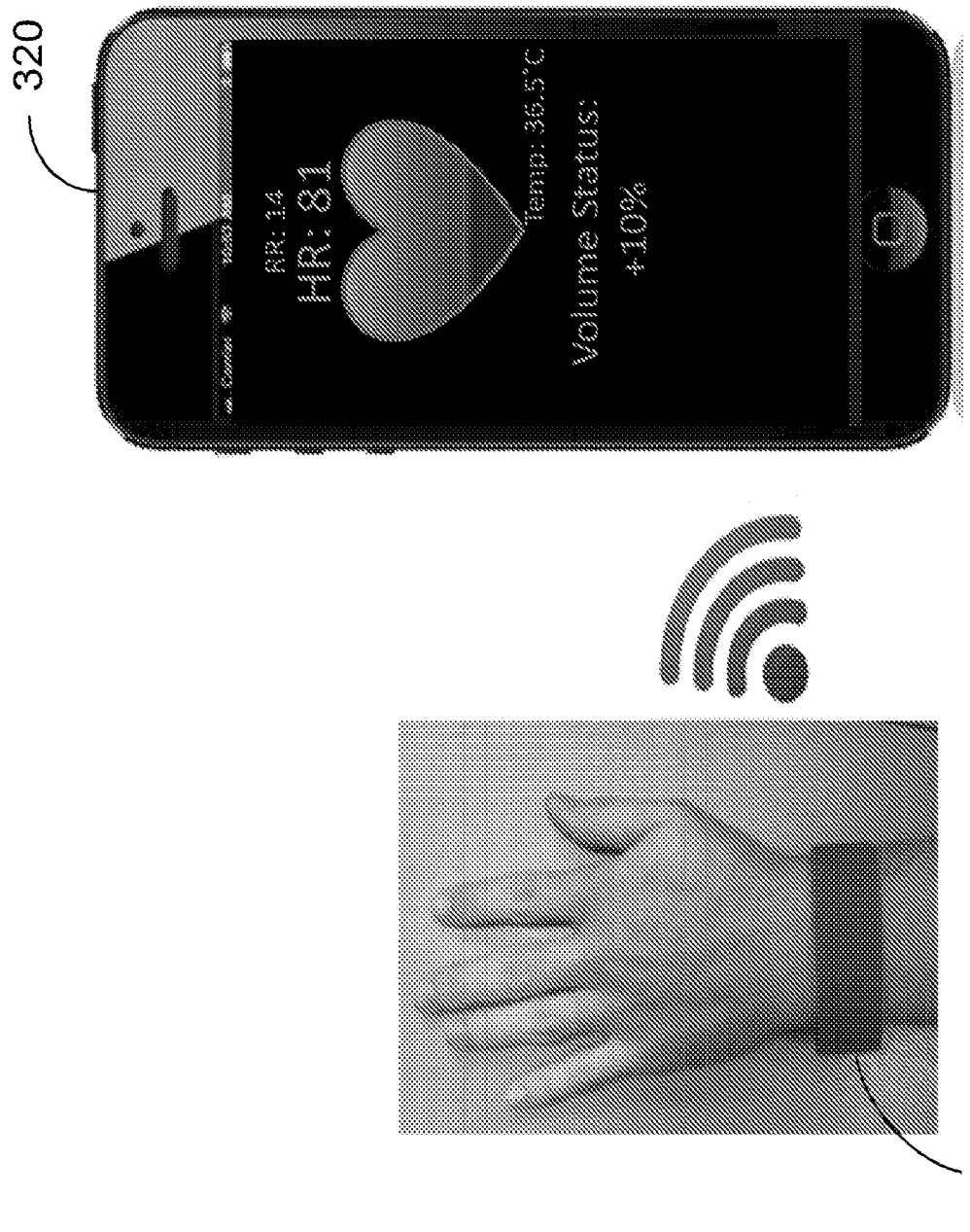


FIG. 3C

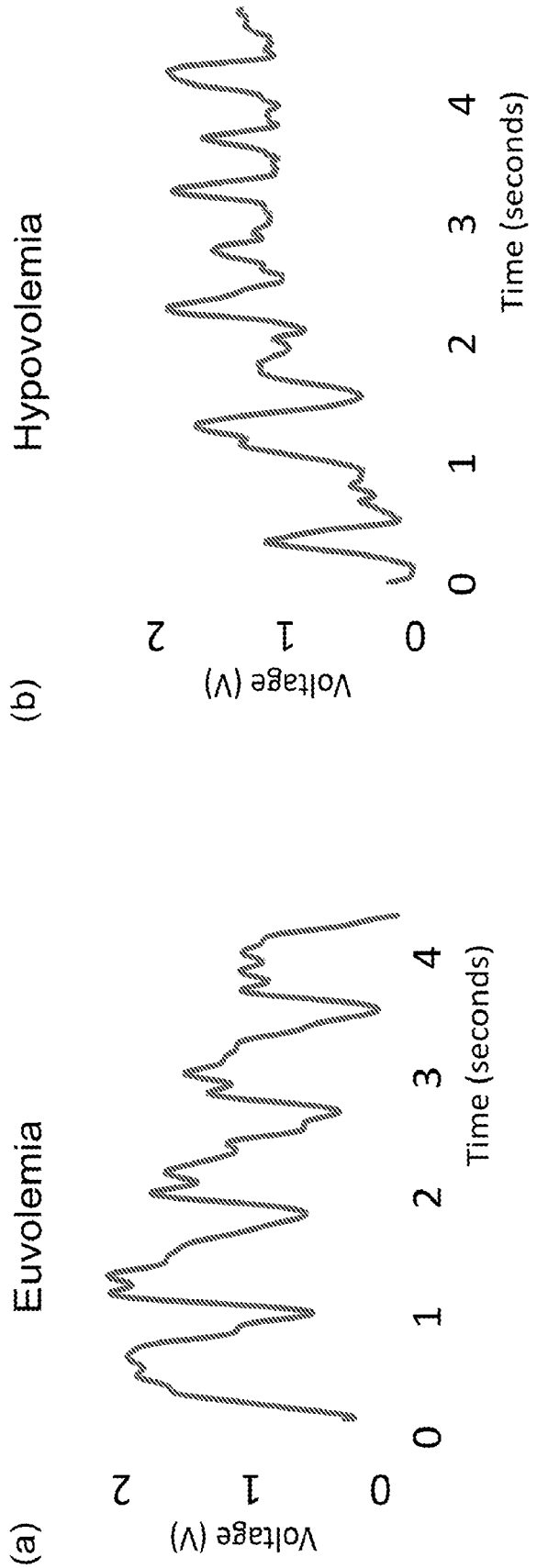

(a)
Euvolemia
Voltage (V)
0
1
2
0
1
2
3
4
Time (seconds)
(b)
Hypovolemia
Voltage (V)
0
1
2
0
1
2
3
4
Time (seconds)

FIG. 4A

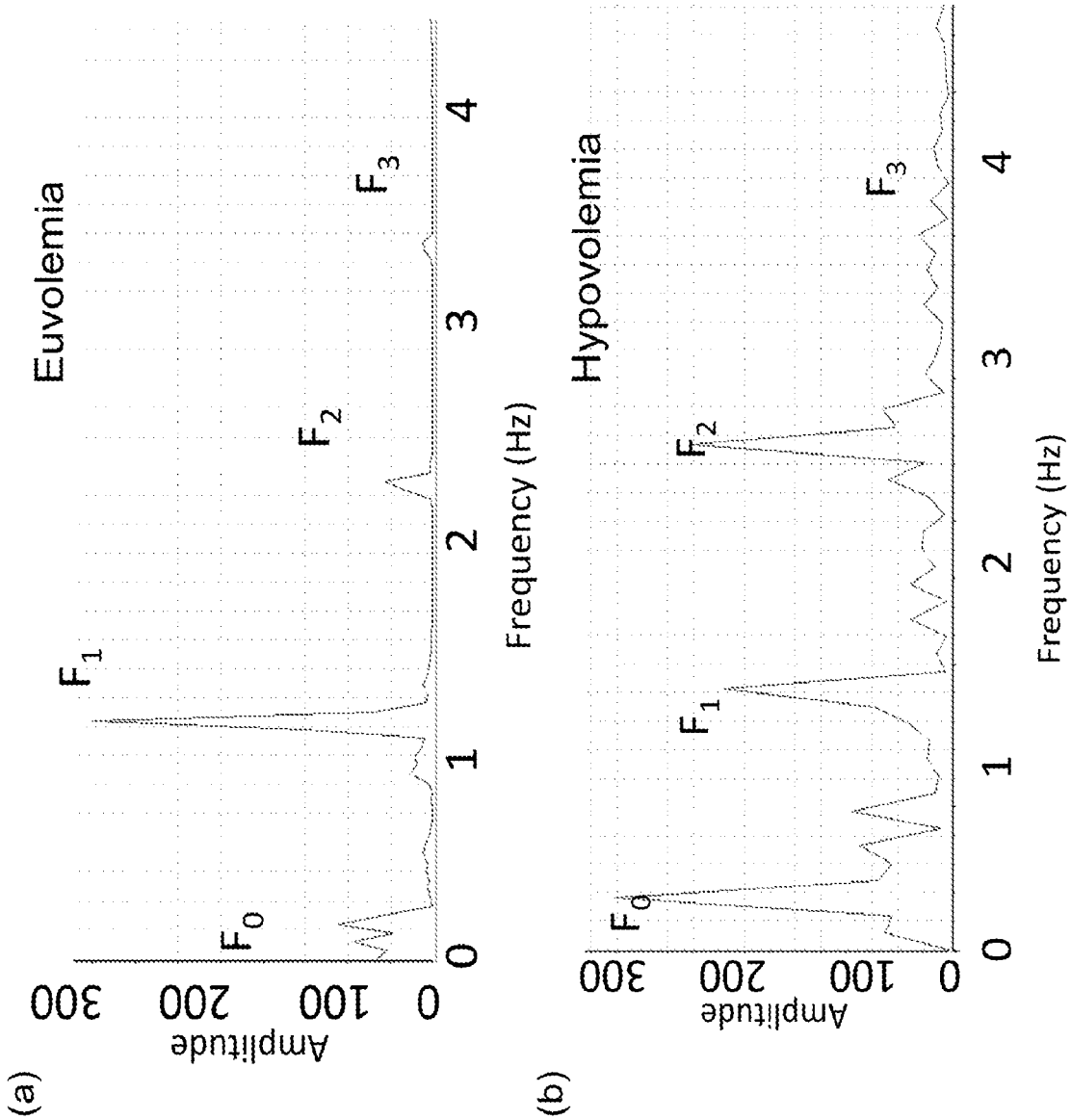

(a)
Euvolemia
Amplitude
0
100
200
300
F_0
F_1
F_2
F_3
0
1
2
3
4
Frequency (Hz)
(b)
Hypovolemia
Amplitude
0
100
200
300
F_0
F_1
F_2
F_3
0
1
2
3
4
Frequency (Hz)

FIG. 4B

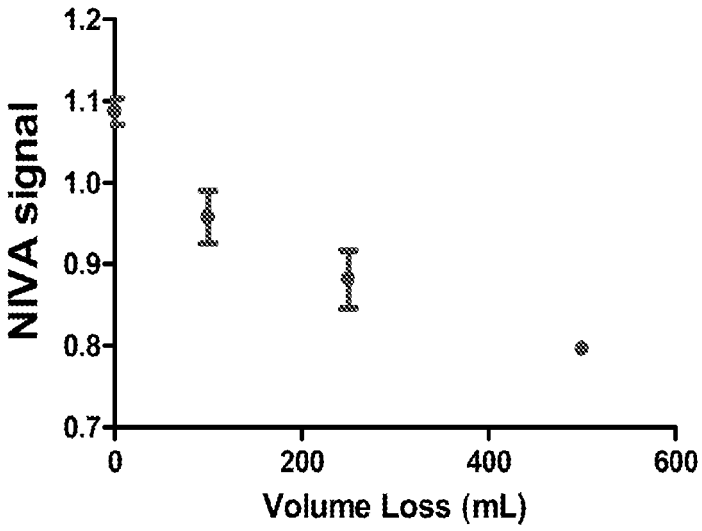

NIVA signal
1.2
1.1
1.0
0.9
0.8
0.7
0
200
400
600
Volume Loss (mL)

FIG. 5A

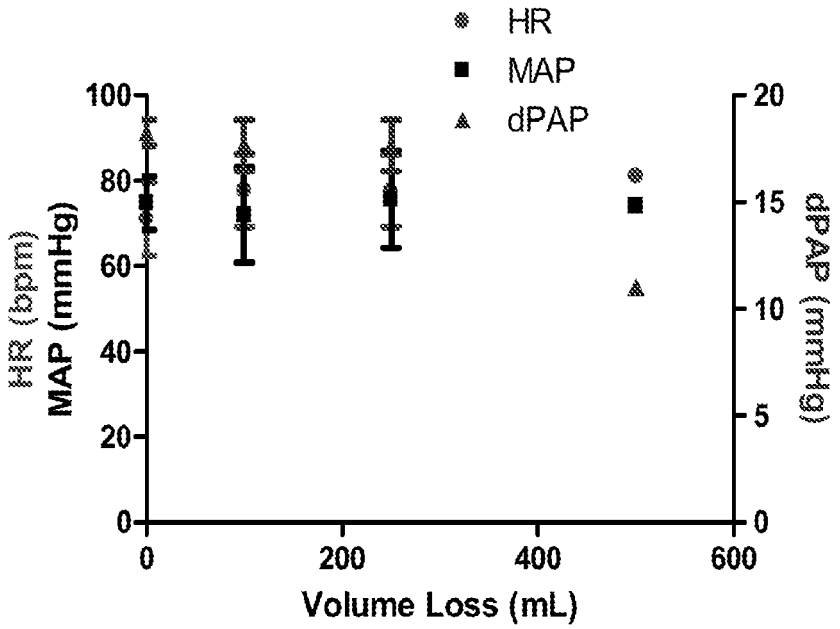

HR
MAP
dPAP
HR (bpm)
MAP (mmHg)
dPAP (mmHg)
100
80
60
40
20
0
20
15
10
5
0
0
200
400
600
Volume Loss (mL)

FIG. 5B

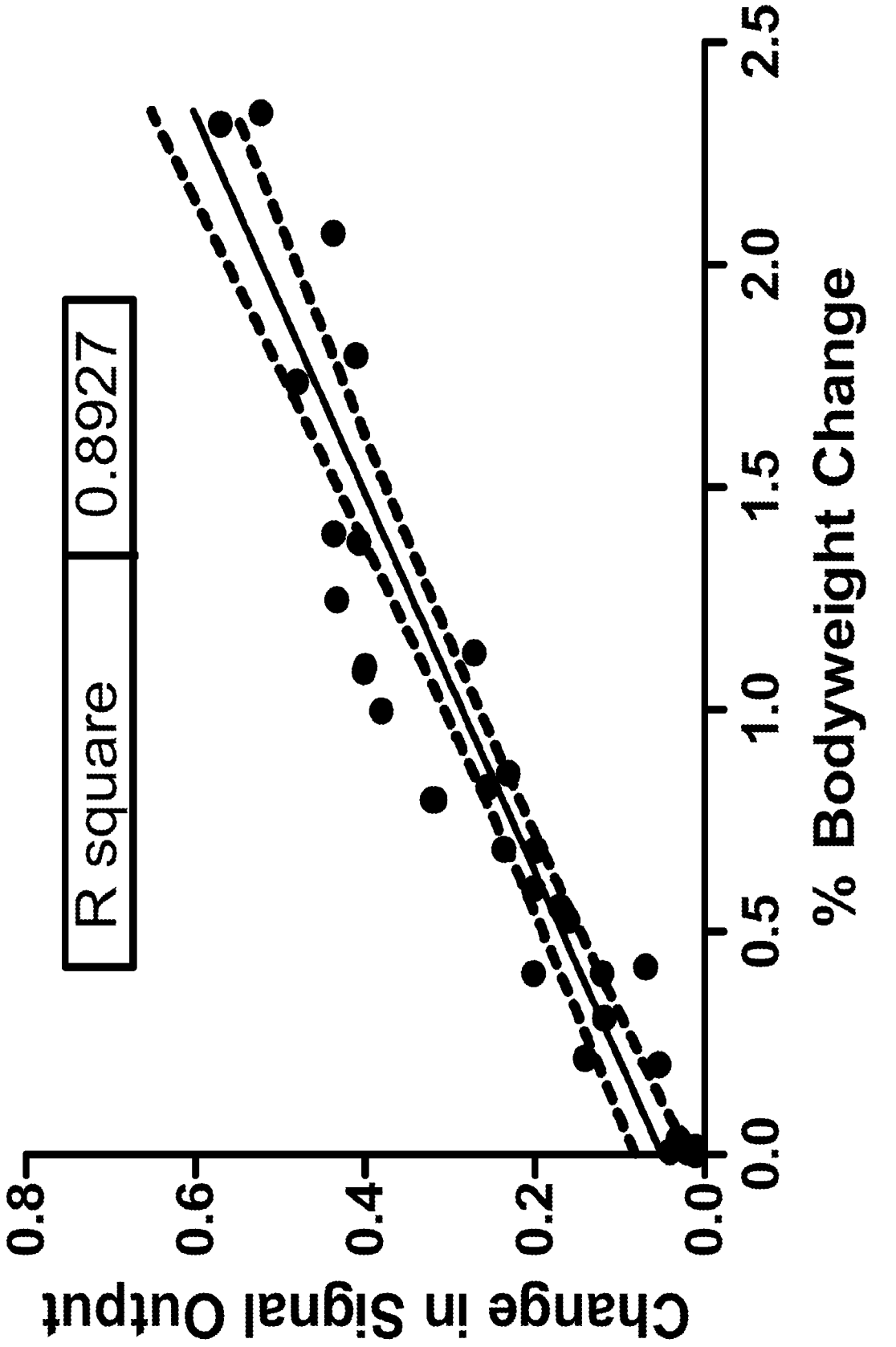

R square
0.8927
Change in Signal Output
0.0
0.2
0.4
0.6
0.8
% Bodyweight Change
0.0
0.5
1.0
1.5
2.0
2.5

FIG. 6

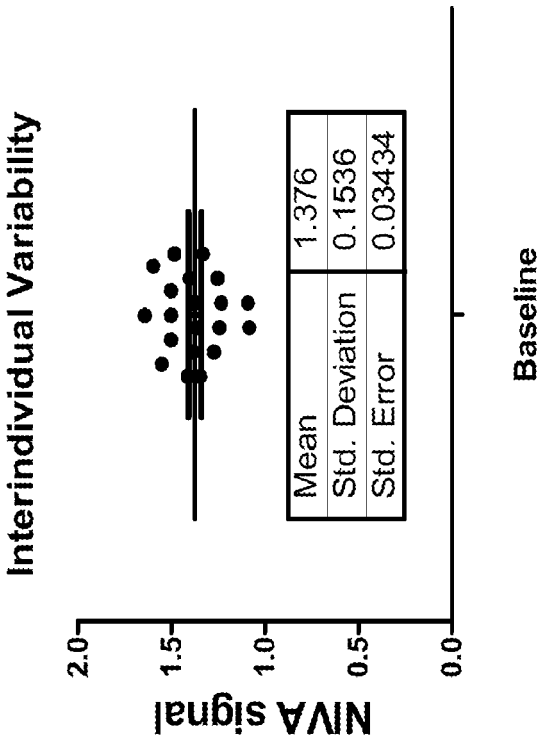
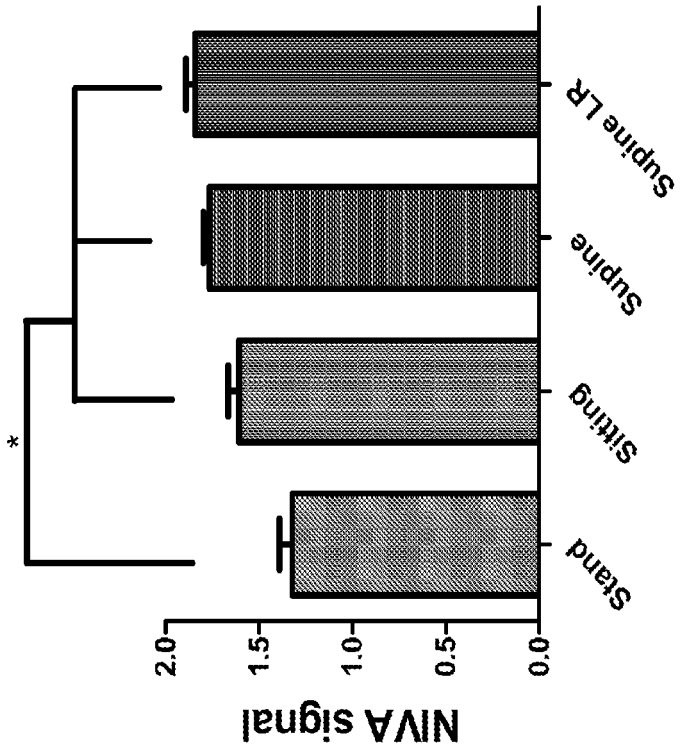

Interindividual Variability
NIVA signal
2.0
1.5
1.0
0.5
0.0
Mean 1.376
Std. Deviation 0.1536
Std. Error 0.03434
Baseline

FIG. 7



Tukey's Multiple Comparison Test	Mean Diff.	q	Significant? P < 0.05?	Summary	95% CI of diff
Stand vs Sitting	-0.2847	11.75	Yes	***	-0.4033 to -0.1660
Stand vs Supine	-0.4433	18.30	Yes	***	-0.5620 to -0.3247
Stand vs Supine LR	-0.5213	21.52	Yes	***	-0.6400 to -0.4027
Sitting vs Supine	-0.1587	6.548	Yes	*	-0.2773 to -0.04004
Sitting vs Supine LR	-0.2367	9.768	Yes	**	-0.3553 to -0.1180
Supine vs Supine LR	-0.07800	3.219	No	ns	-0.1966 to 0.04063

FIG. 8

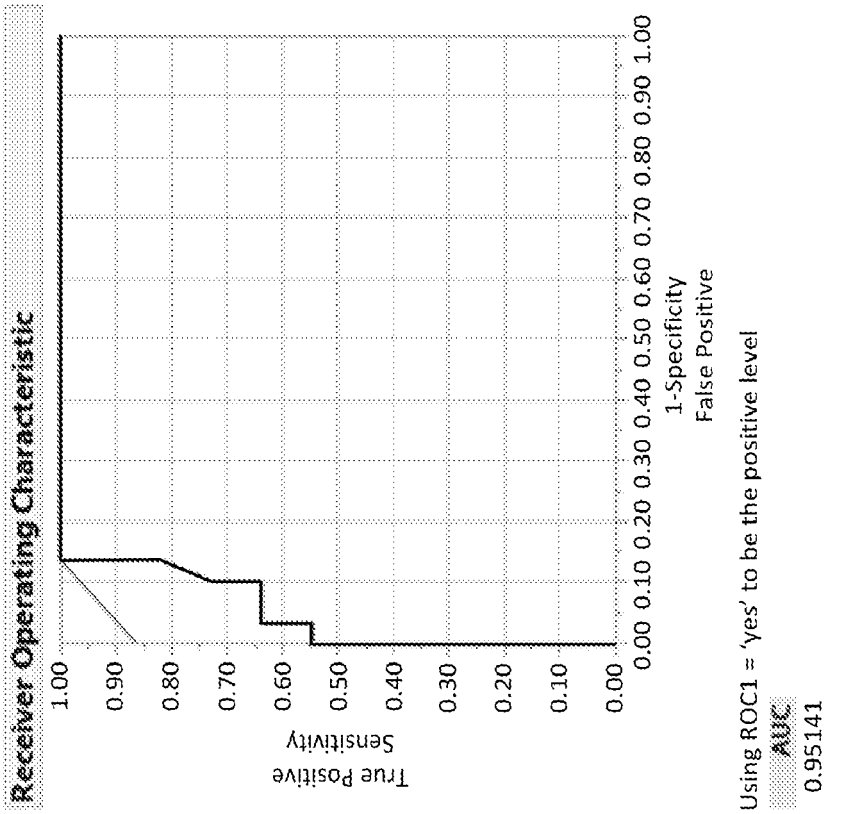

Receiver Operating Characteristic
True Positive Sensitivity
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00
1-Specificity
False Positive
Using ROC1 = 'yes' to be the positive level
AUC
0.95141

FIG. 9

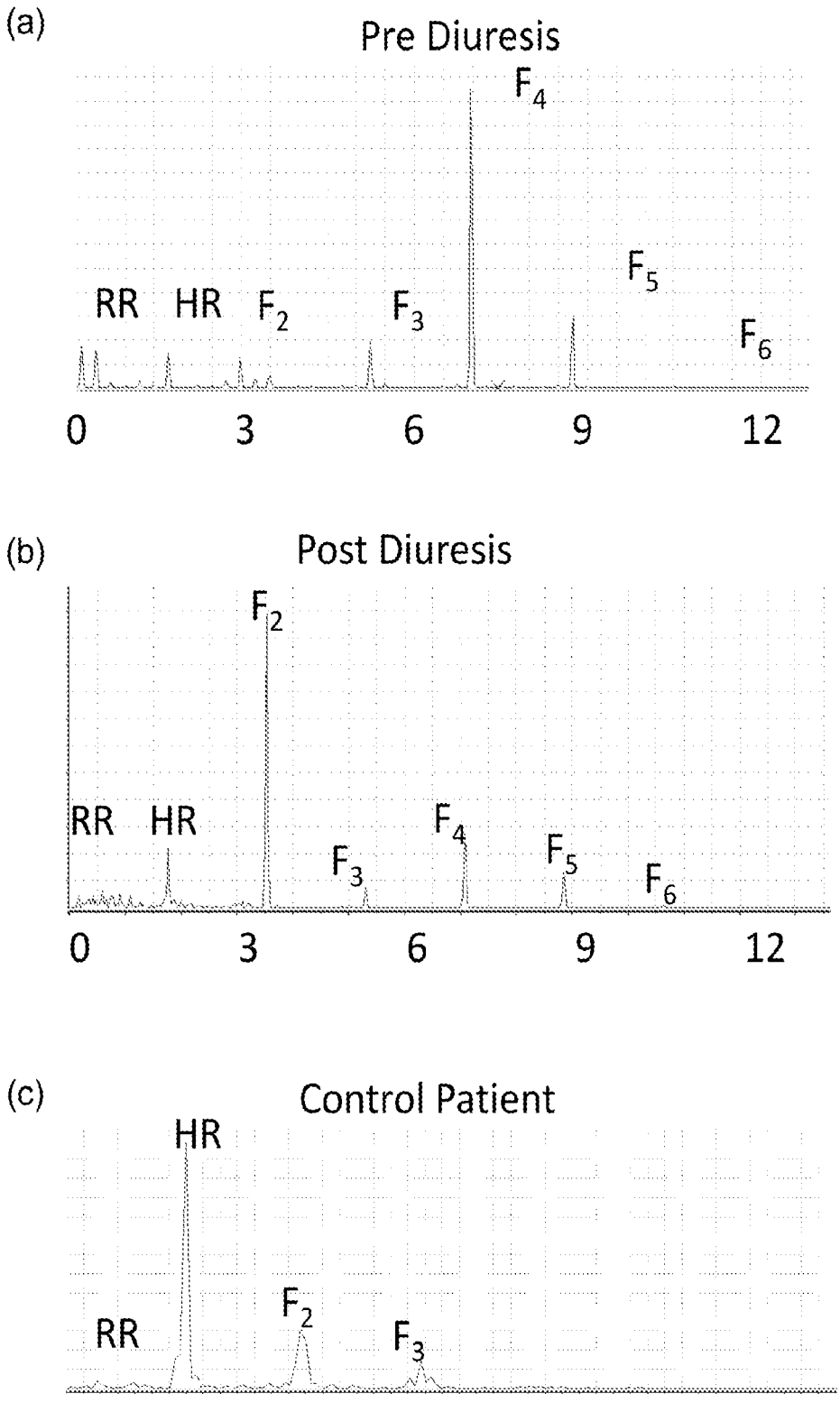

(a)
Pre Diuresis
F4
F5
RR
HR
F2
F3
F6
0
3
6
9
12
(b)
Post Diuresis
F2
RR
HR
F4
F3
F5
F6
0
3
6
9
12
(c)
Control Patient
HR
F2
RR
F3

FIG. 10

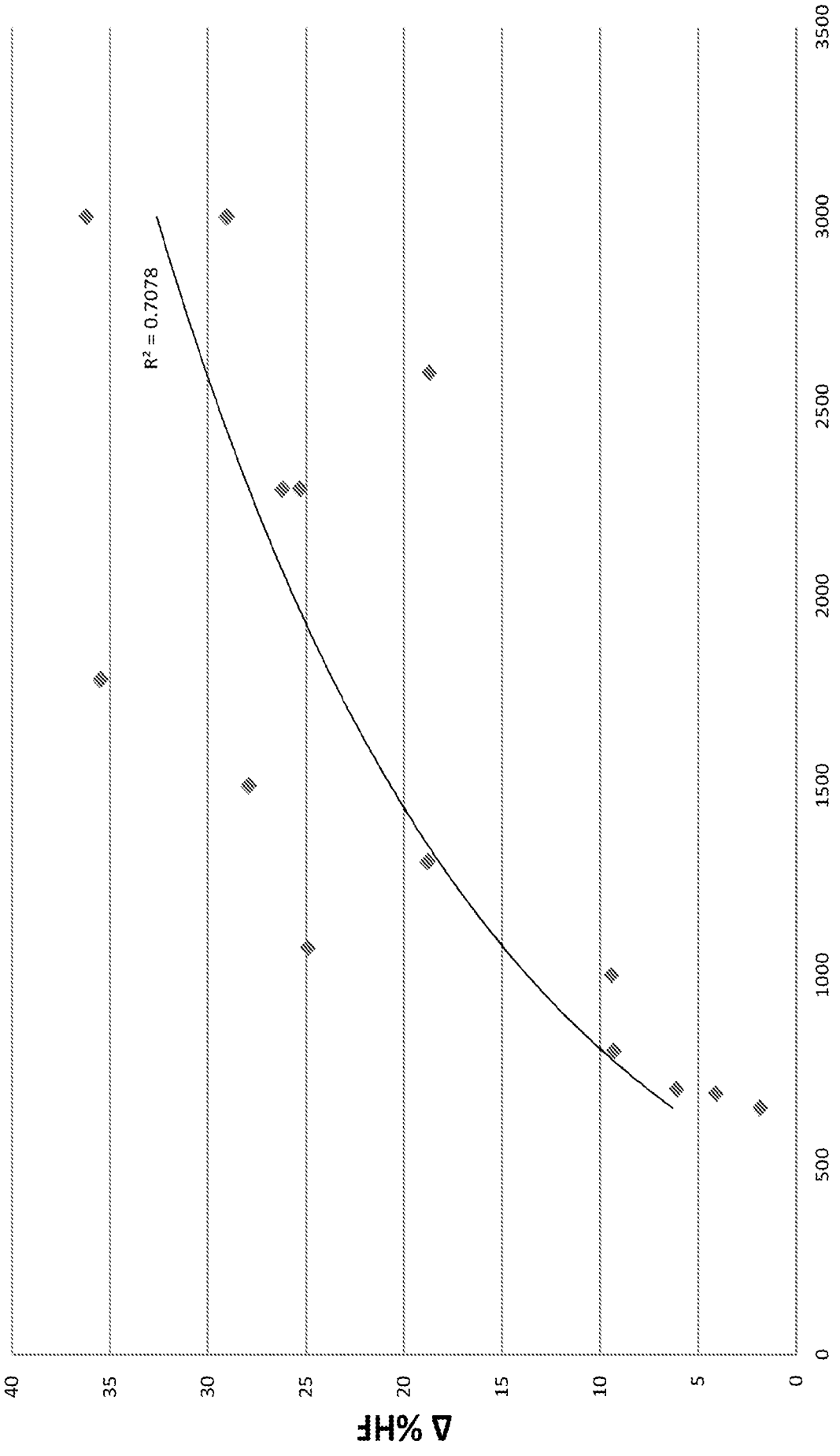

R² = 0.7078
Δ %HF
Volume Removed (mL)
0
5
10
15
20
25
30
35
40
0
500
1000
1500
2000
2500
3000
3500

FIG. 11

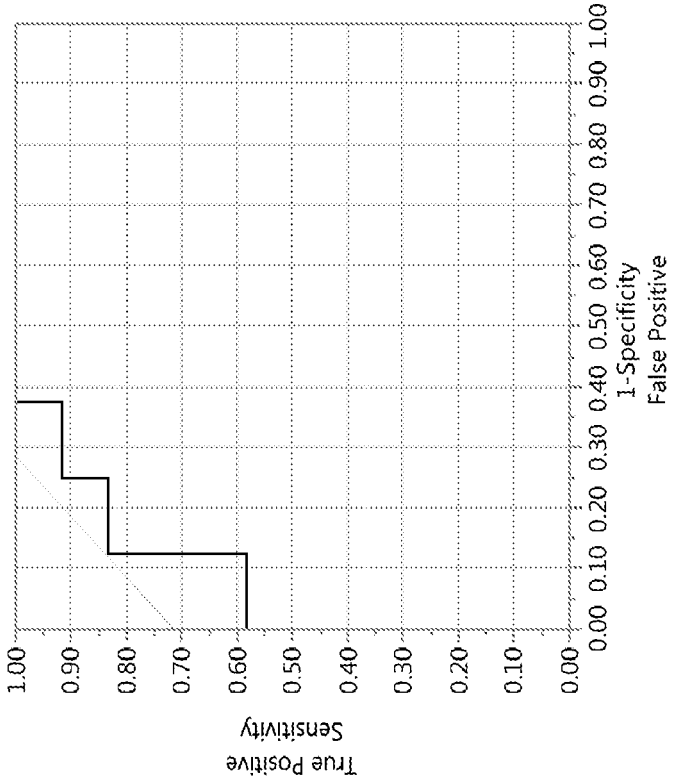

True Positive
Sensitivity
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00
1-Specificity
False Positive

FIG. 12