A.



B.

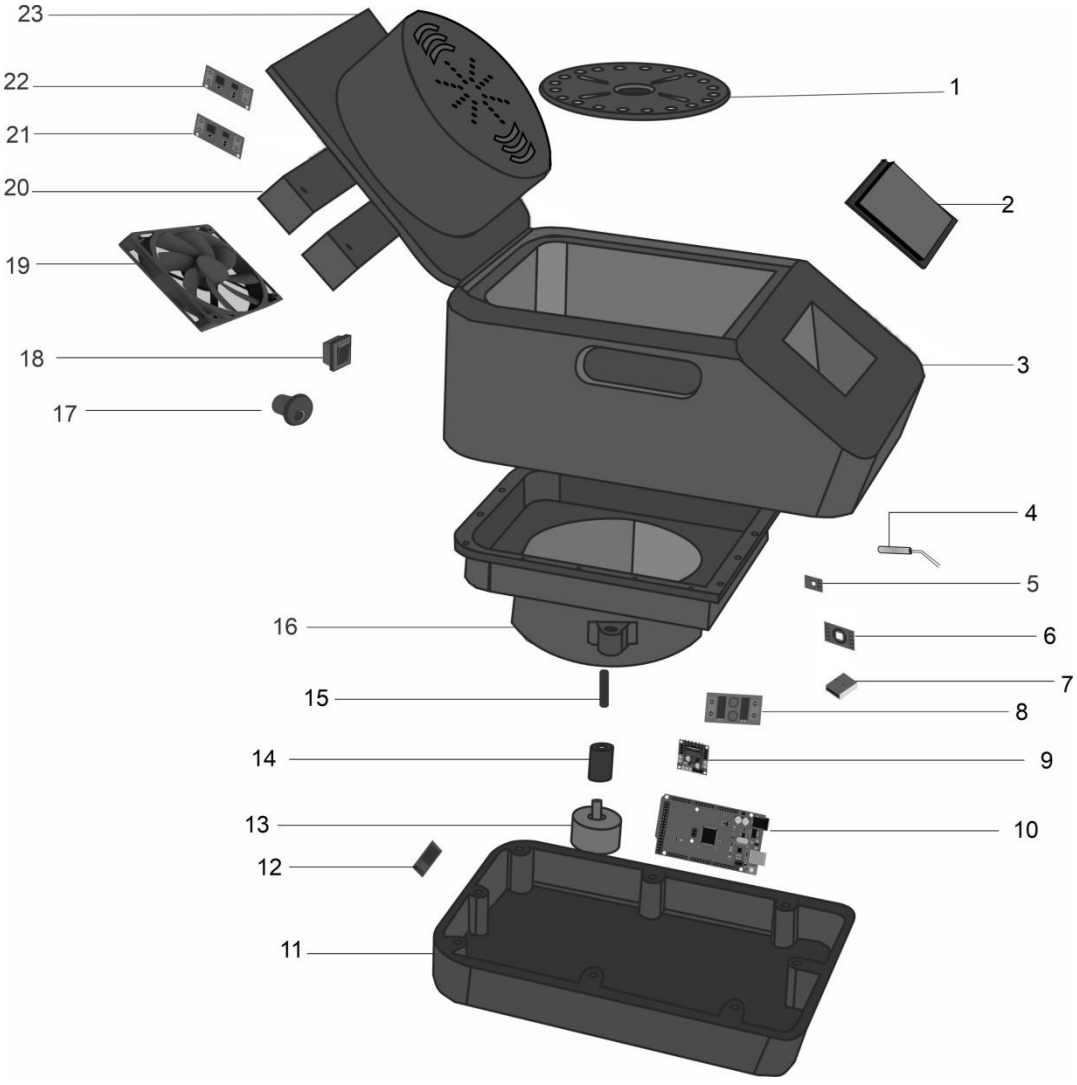


Figure 1

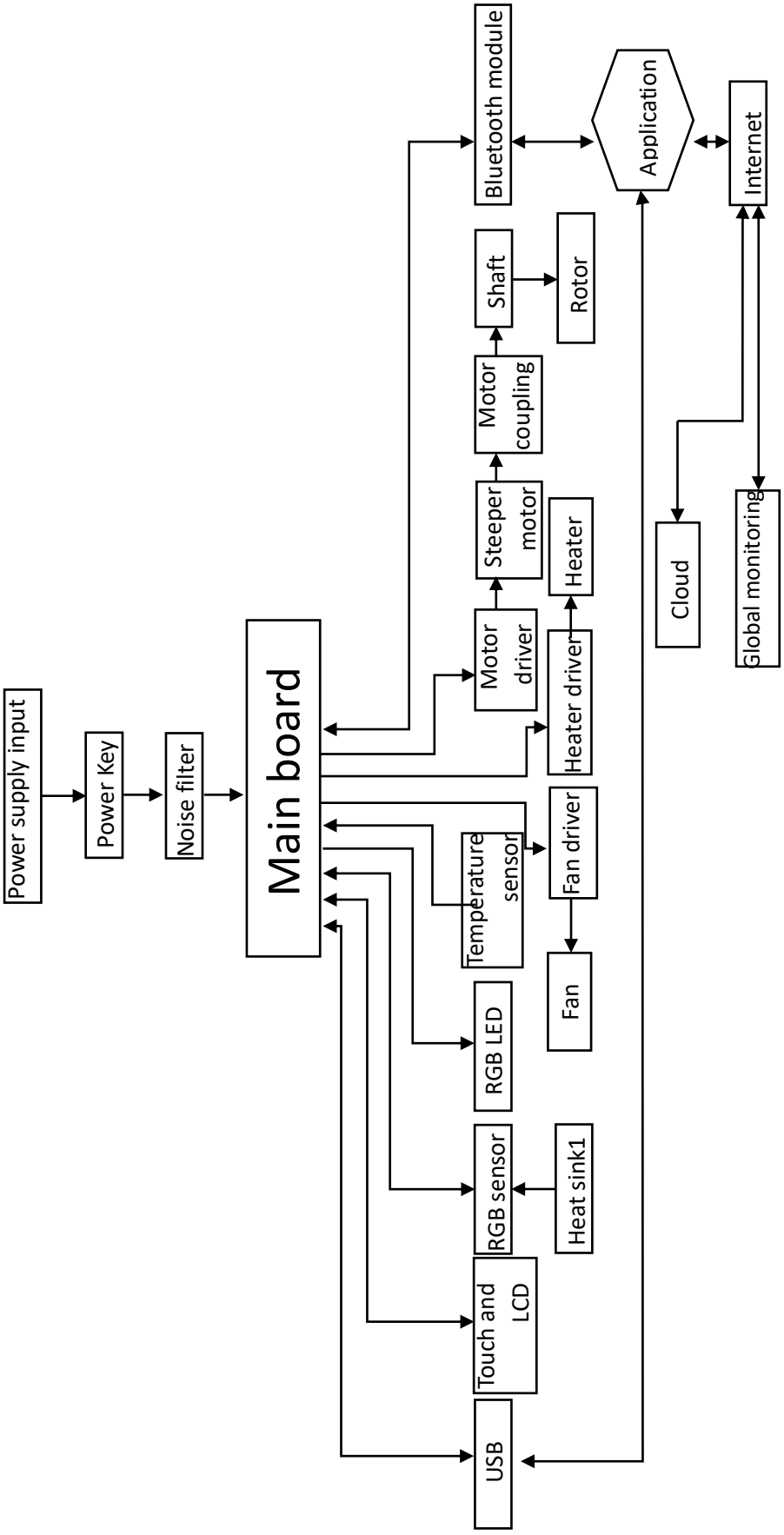

Power supply input
Power Key
Noise filter
Main board
Bluetooth module
Application
Internet
Shaft
Rotor
Motor coupling
Steeper motor
Heater
Motor driver
Heater driver
Cloud
Global monitoring
Temperature sensor
Fan driver
Fan
RGB LED
RGB sensor
Heat sink1
Touch and LCD
USB

Figure 2

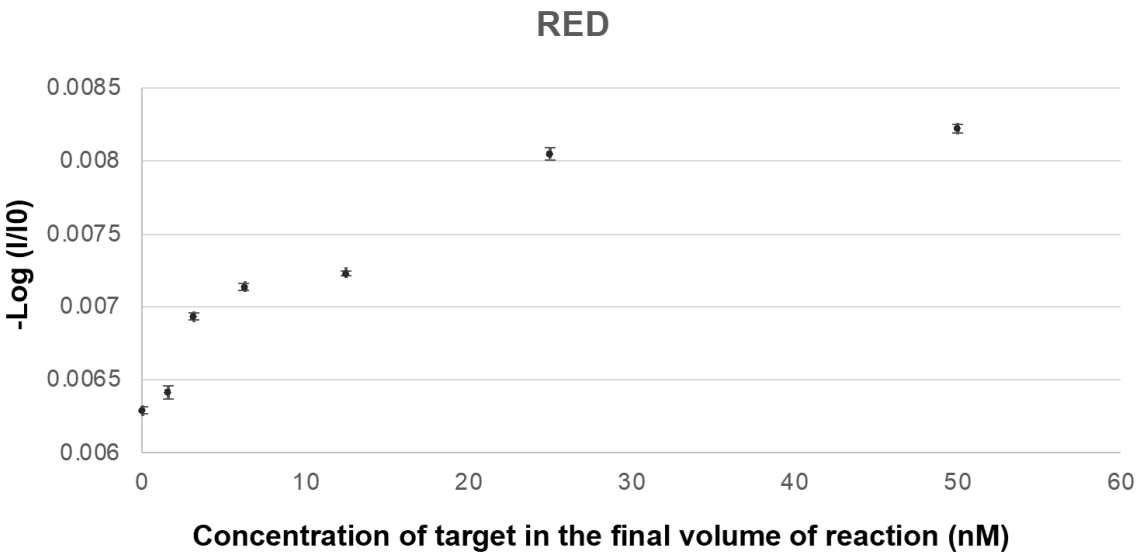

RED
0.0085
0.008
0.0075
0.007
0.0065
0.006
-Log (I/I0)
0
10
20
30
40
50
60
Concentration of target in the final volume of reaction (nM)

Figure 3

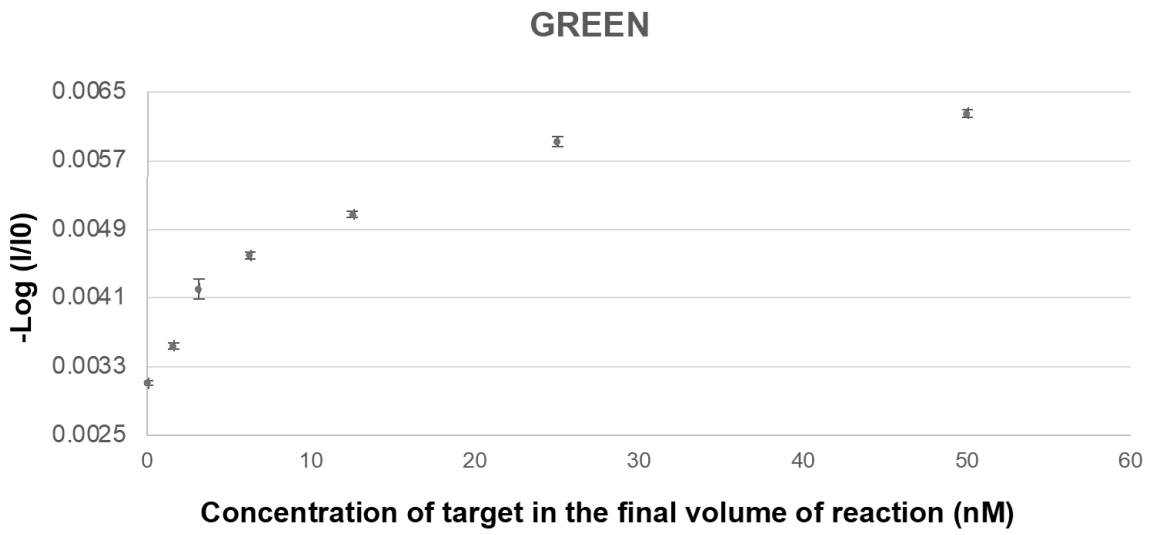

GREEN
0.0065
0.0057
0.0049
0.0041
0.0033
0.0025
-Log (I/I0)
0
10
20
30
40
50
60
Concentration of target in the final volume of reaction (nM)

Figure 4

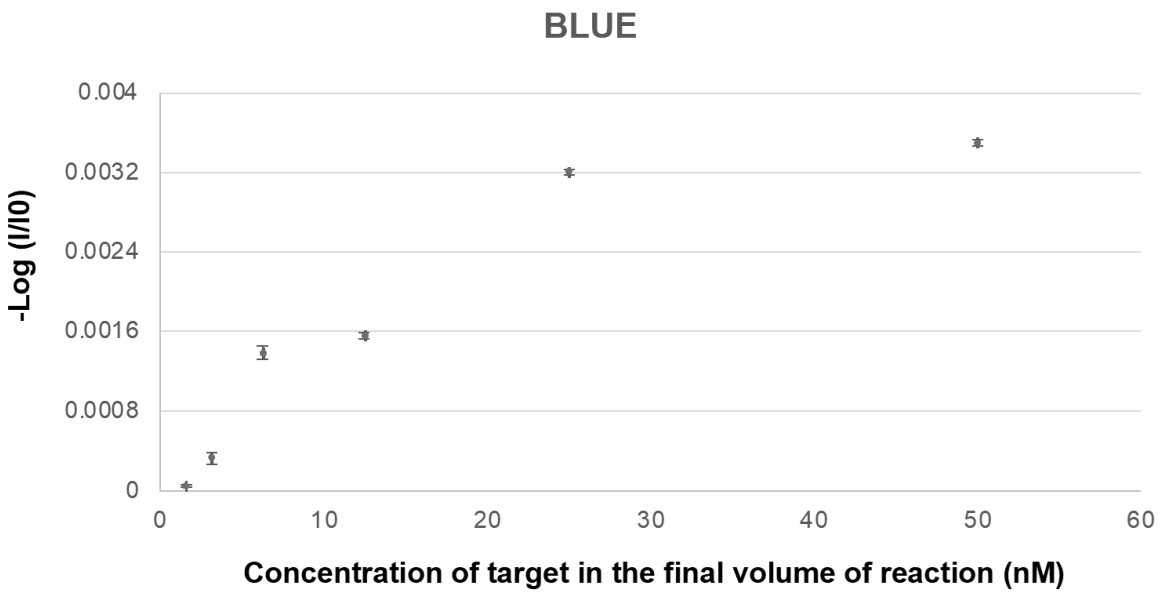

BLUE
0.004
0.0032
0.0024
0.0016
0.0008
0
-Log (I/I0)
0
10
20
30
40
50
60
Concentration of target in the final volume of reaction (nM)

Figure 5

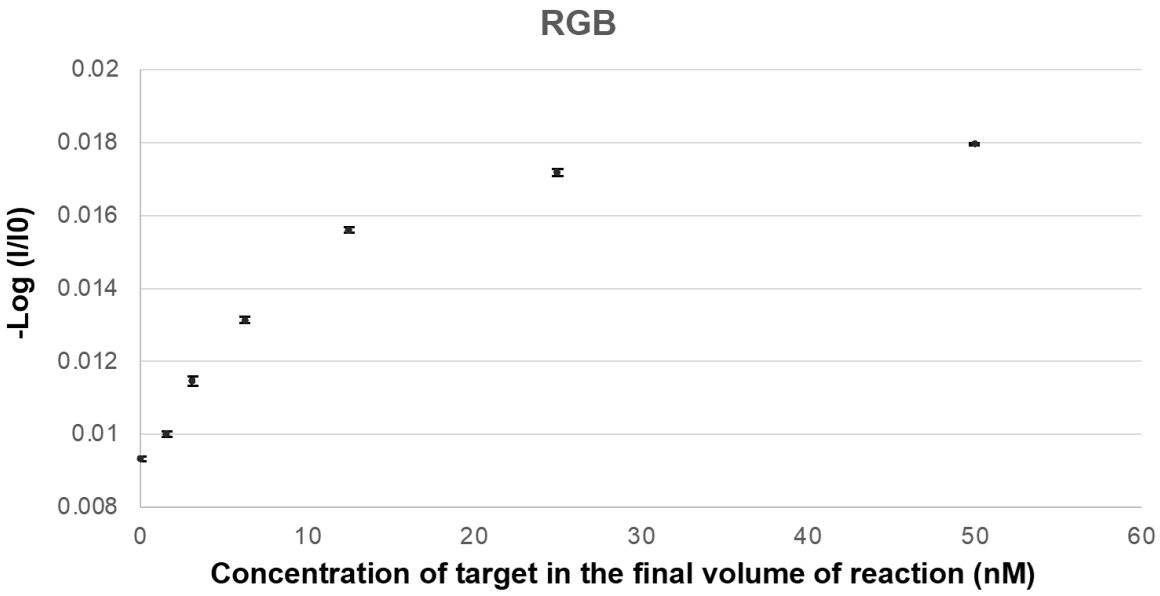

RGB
0.02
0.018
0.016
0.014
0.012
0.01
0.008
-Log (I/I0)
0
10
20
30
40
50
60
Concentration of target in the final volume of reaction (nM)

Figure 6

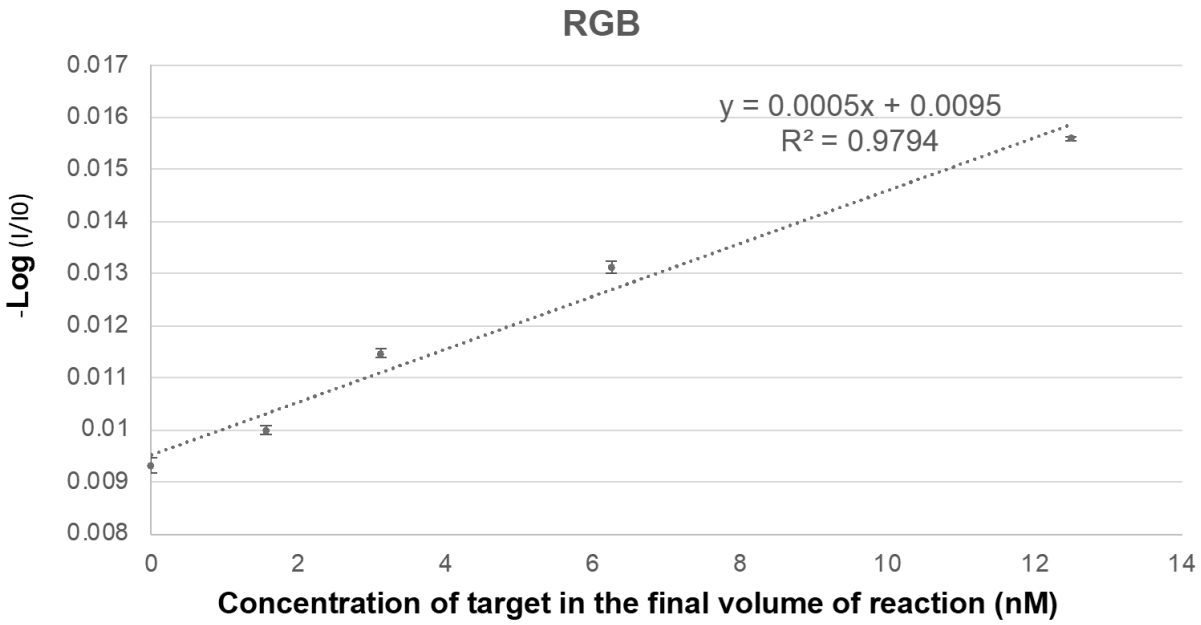

RGB
y = 0.0005x + 0.0095
R² = 0.9794
-Log (I/I0)
0.017
0.016
0.015
0.014
0.013
0.012
0.011
0.01
0.009
0.008
0
2
4
6
8
10
12
14
Concentration of target in the final volume of reaction (nM)

Figure 7

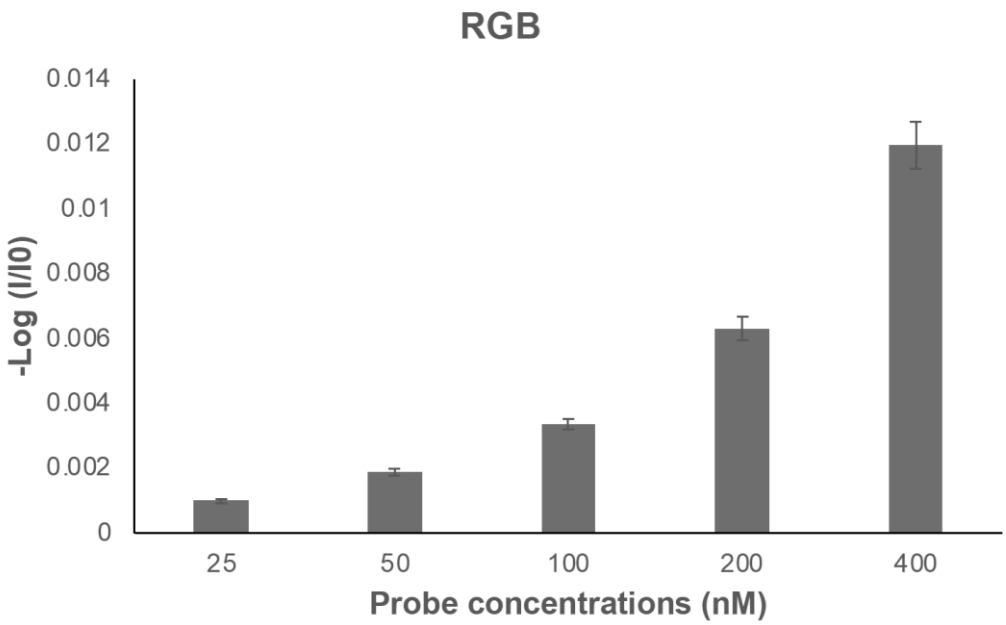
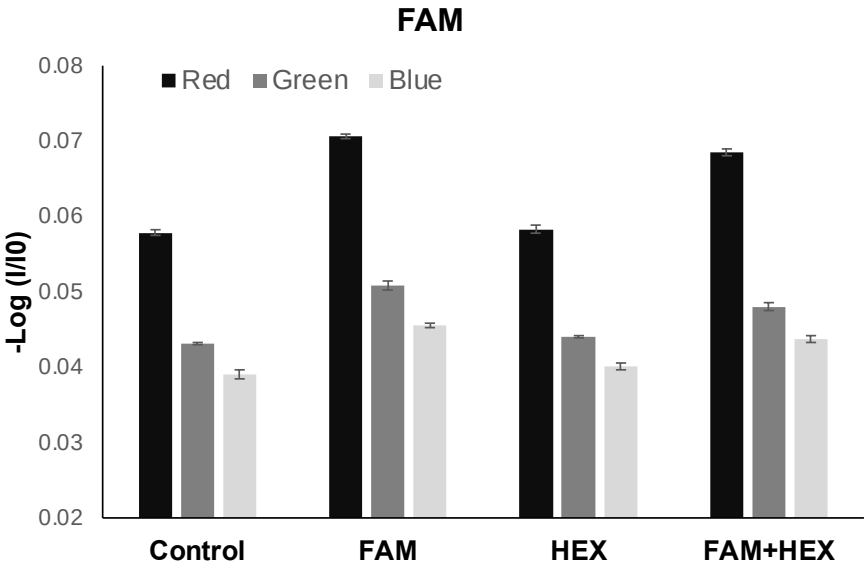

RGB
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
-Log (I/I0)
25
50
100
200
400
Probe concentrations (nM)

Figure 8

A.


FAM
Red
Green
Blue
-Log (I/I0)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
Control
FAM
HEX
FAM+HEX

B.

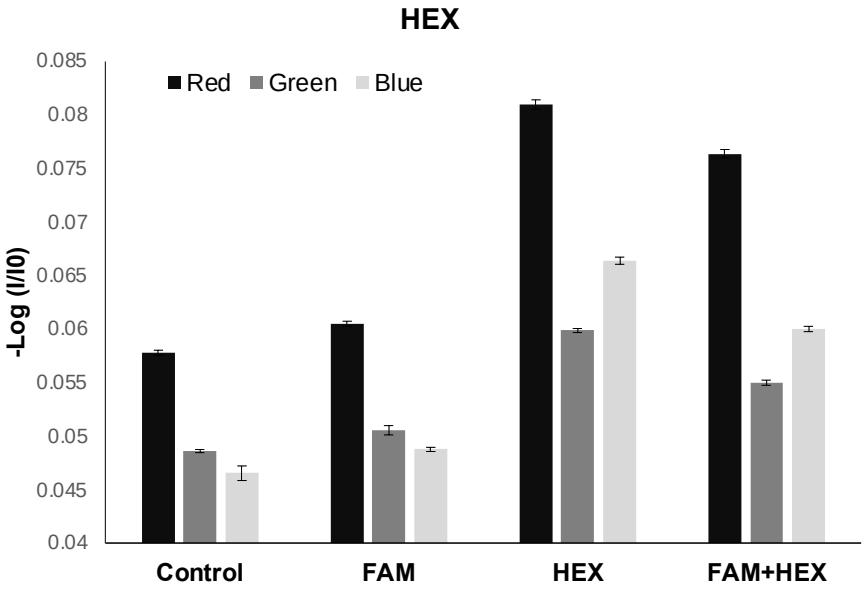

HEX
Red
Green
Blue
-Log (I/I0)
0.085
0.08
0.075
0.07
0.065
0.06
0.055
0.05
0.045
0.04
Control
FAM
HEX
FAM+HEX

Figure 9

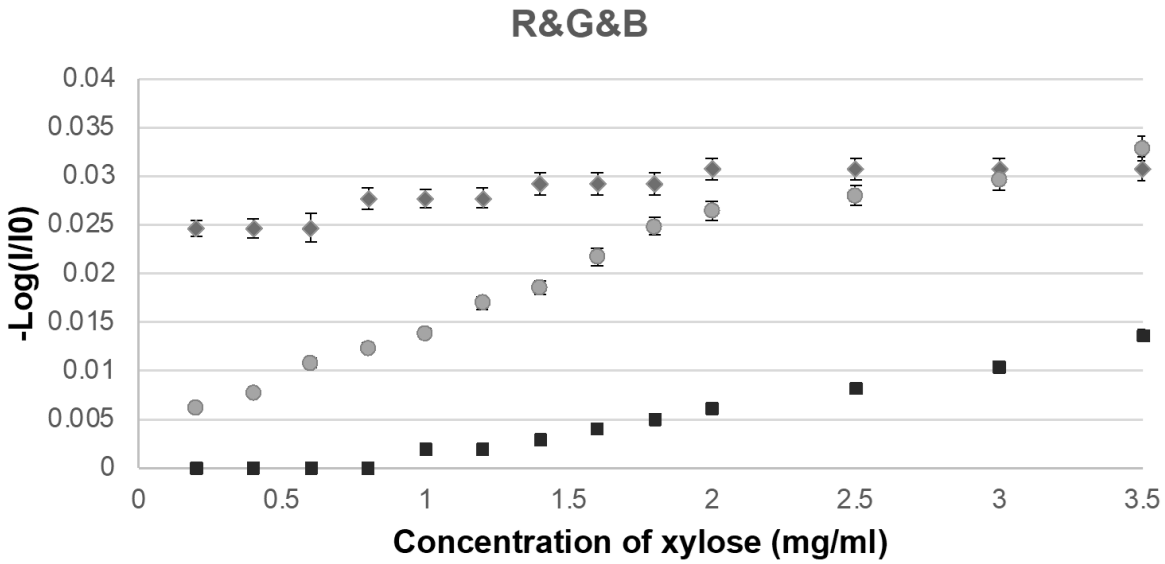

R&G&B
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
-Log(I/I0)
0
0.5
1
1.5
2
2.5
3
3.5
Concentration of xylose (mg/ml)

Figure 10

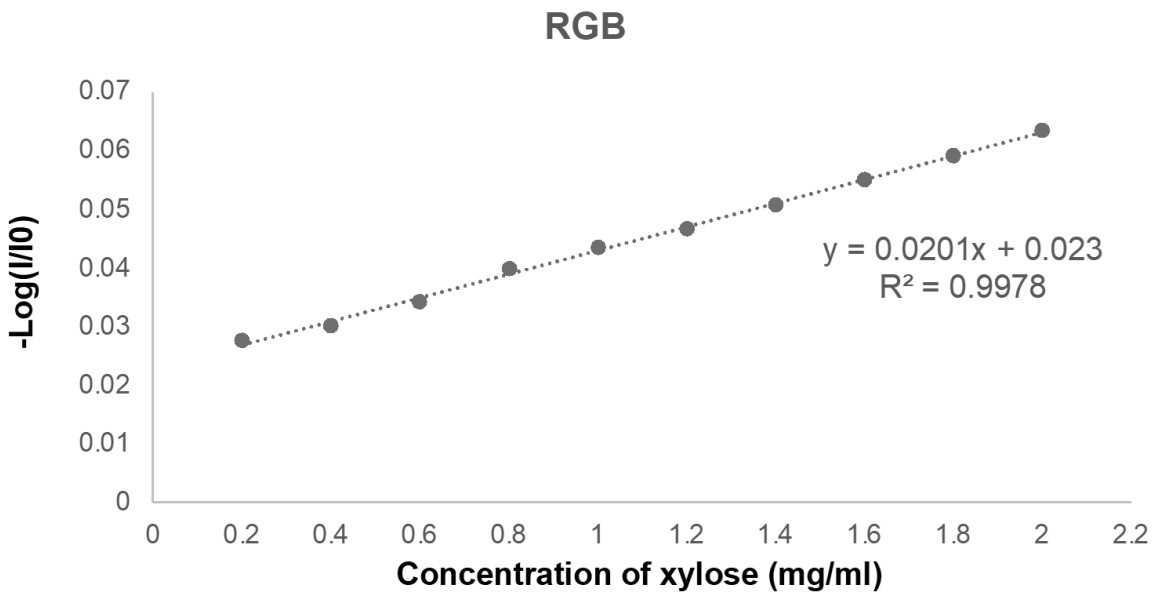

RGB
-Log(I/I0)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
Concentration of xylose (mg/ml)
y = 0.0201x + 0.023
R² = 0.9978

Figure 11

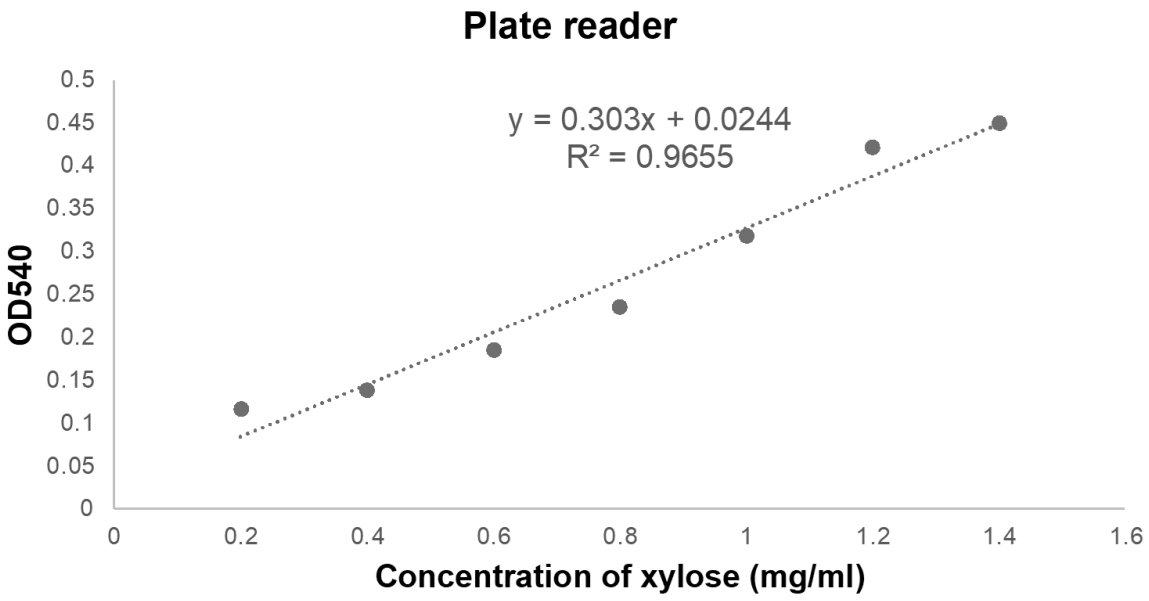
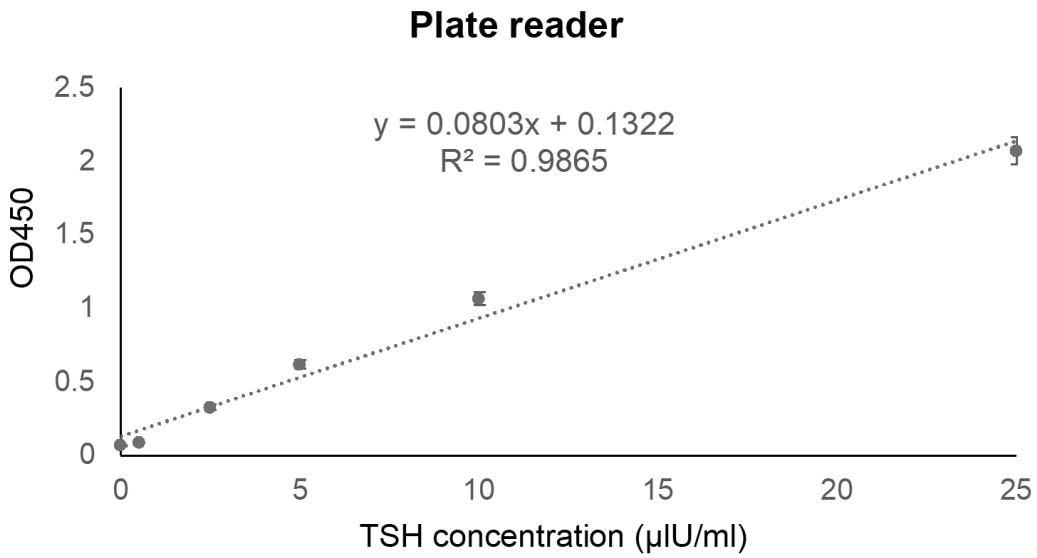

Plate reader
y = 0.303x + 0.0244
R² = 0.9655
OD540
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
Concentration of xylose (mg/ml)

Figure 12

A.


Plate reader
y = 0.0803x + 0.1322
R² = 0.9865
OD450
2.5
2
1.5
1
0.5
0
0
5
10
15
20
25
TSH concentration (μIU/ml)

B.

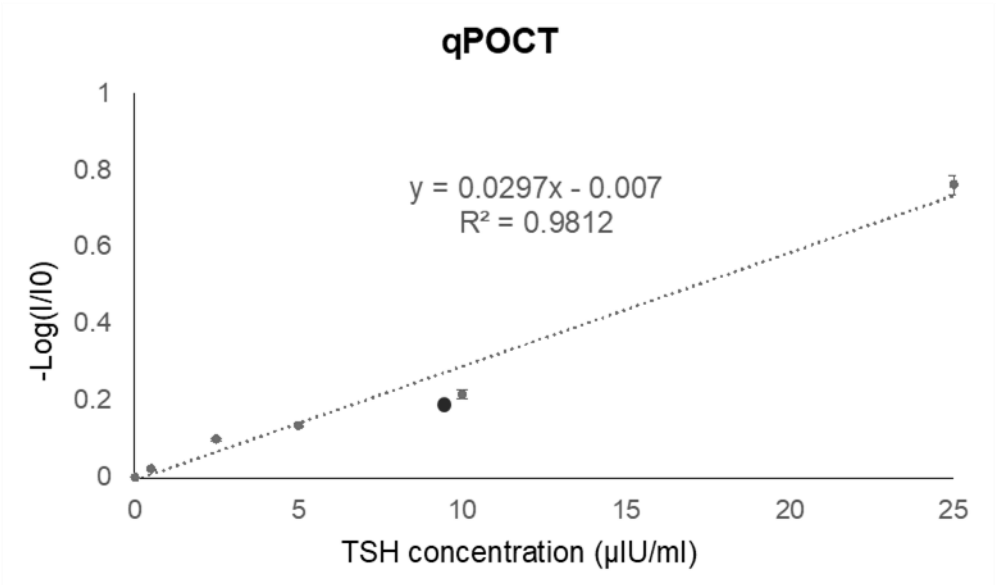

qPOCT
y = 0.0297x - 0.007
R² = 0.9812
-Log(I/I0)
1
0.8
0.6
0.4
0.2
0
0
5
10
15
20
25
TSH concentration (μIU/ml)

Figure 13

Pathogen	Fluorophore	Probe w/ quencher (F-Q)	Probe w/o quencher (F)
BRSV	AlexaFluor350		
BPIV3	6-VIC		
BIDV	TexRd-X		
BHV1	CY5.5		
BAdV7	CY3.5		
BToV	ATTO 620		
BCoV	ATTO 655		
BVDV	6-TET		
Mycoplasma bovis	6-FAM		
Mannheimia haemolytica	6-TAMRA		
Pasteurella multocida	ATTO 647N		
Histophilus somni	Alexa 750 NHS		

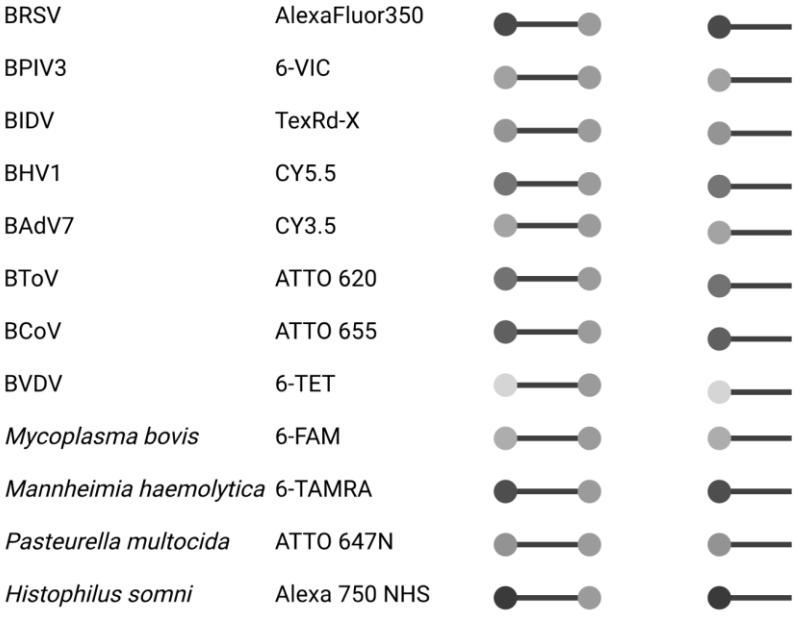


Figure 14

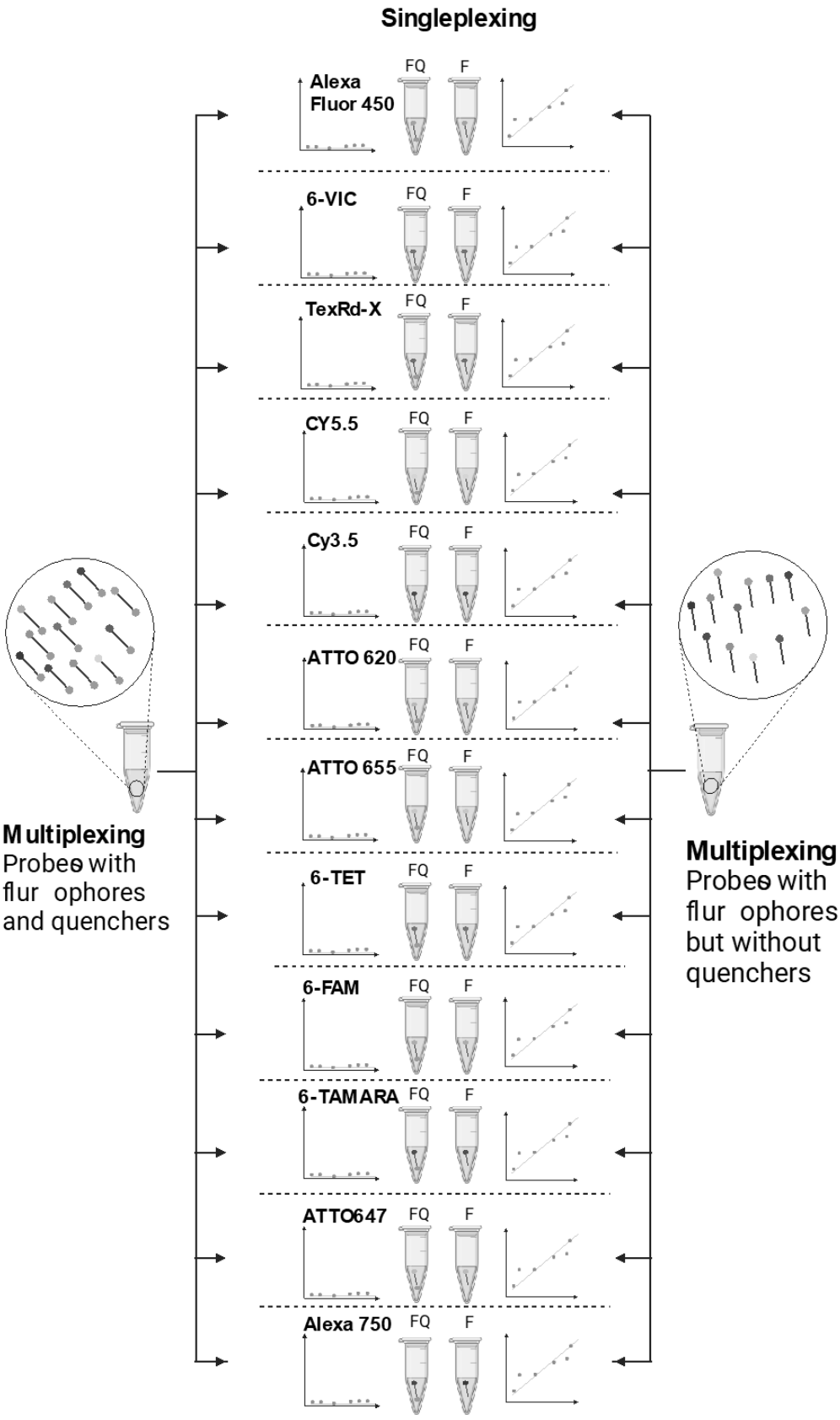
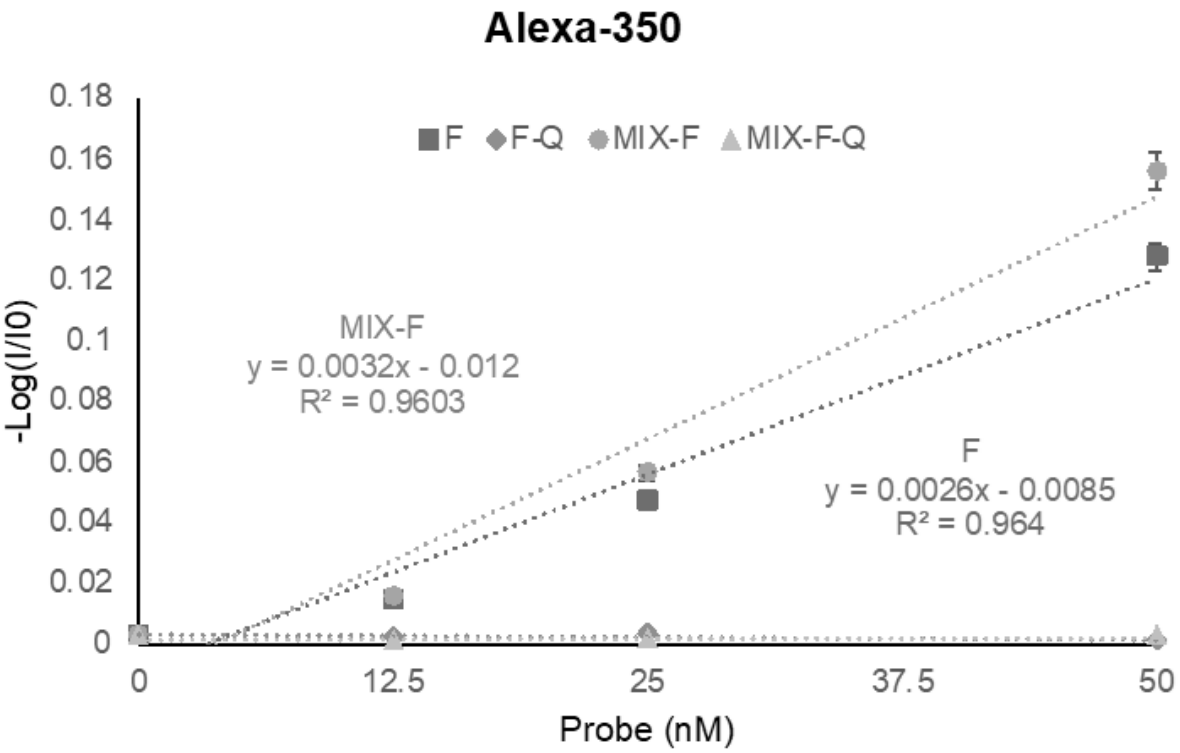

Singleplexing
Alexa Fluor 450
6-VIC
TexRd-X
CY5.5
Cy3.5
ATTO 620
ATTO 655
6-TET
6-FAM
6-TAMARA
ATTO647
Alexa 750
FQ
F
Multiplexing
Probes with flur ophores and quenchers
Multiplexing
Probes with flur ophores but without quenchers

Figure 15

A.


Alexa-350
F
F-Q
MIX-F
MIX-F-Q
-Log(I/I0)
Probe (nM)
MIX-F
y = 0.0032x - 0.012
R² = 0.9603
F
y = 0.0026x - 0.0085
R² = 0.964
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
12.5
25
37.5
50

B.

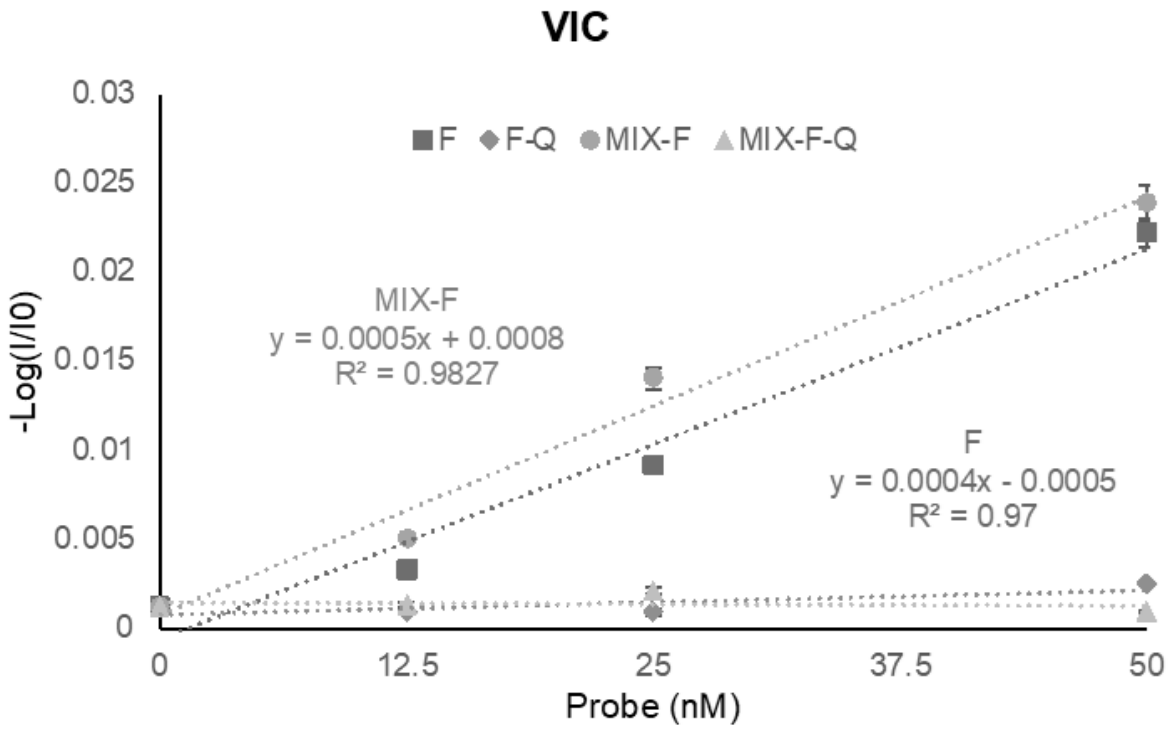
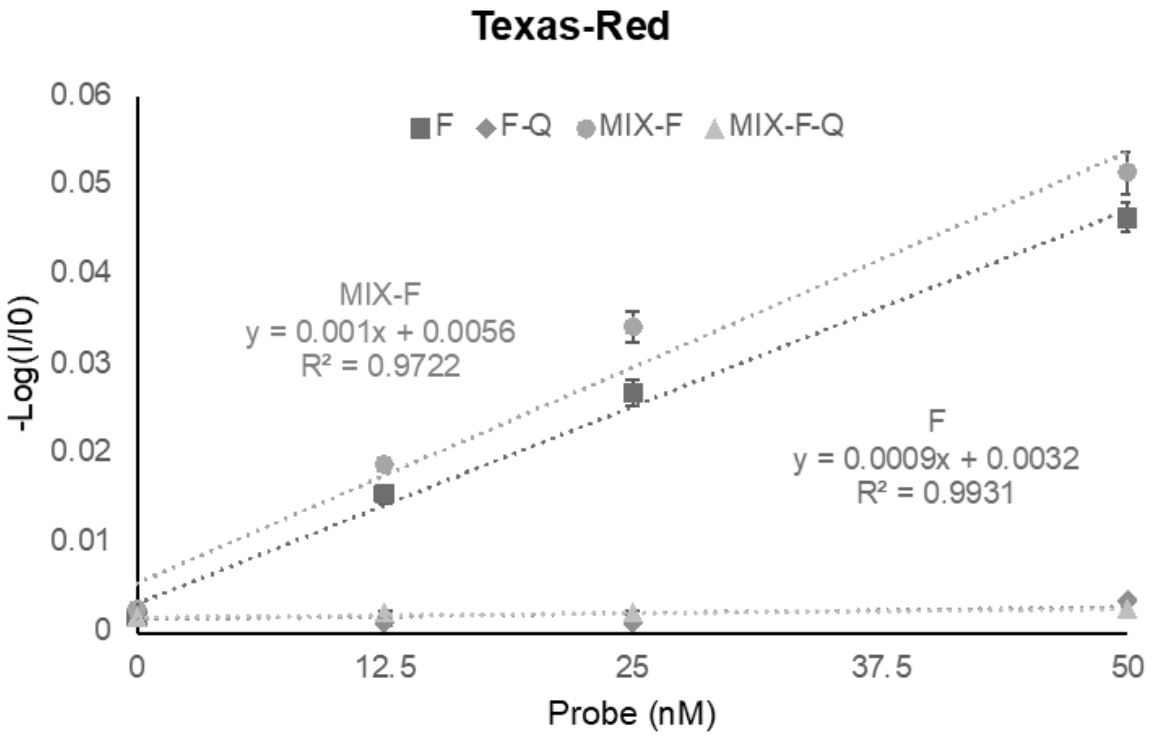

VIC
F
F-Q
MIX-F
MIX-F-Q
-Log(I/I0)
Probe (nM)
MIX-F
y = 0.0005x + 0.0008
R² = 0.9827
F
y = 0.0004x - 0.0005
R² = 0.97
0.03
0.025
0.02
0.015
0.01
0.005
0
0
12.5
25
37.5
50

Figure 16

C.



D.

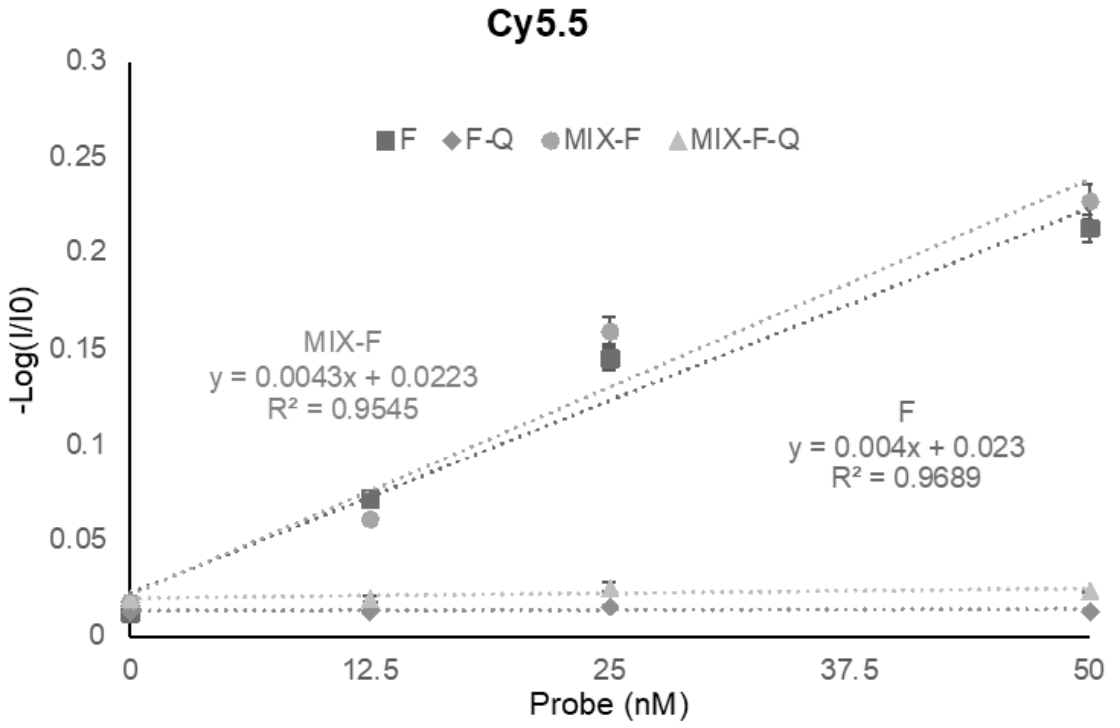
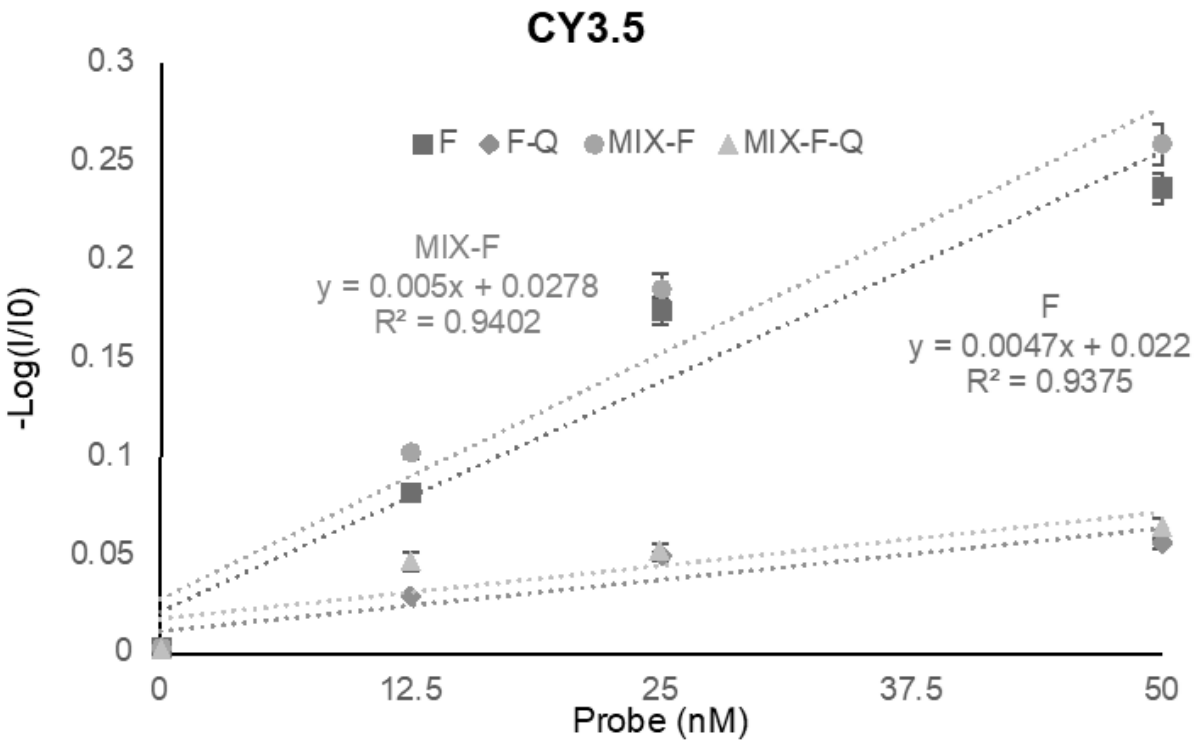


Figure 16 (continued)

E.



F.

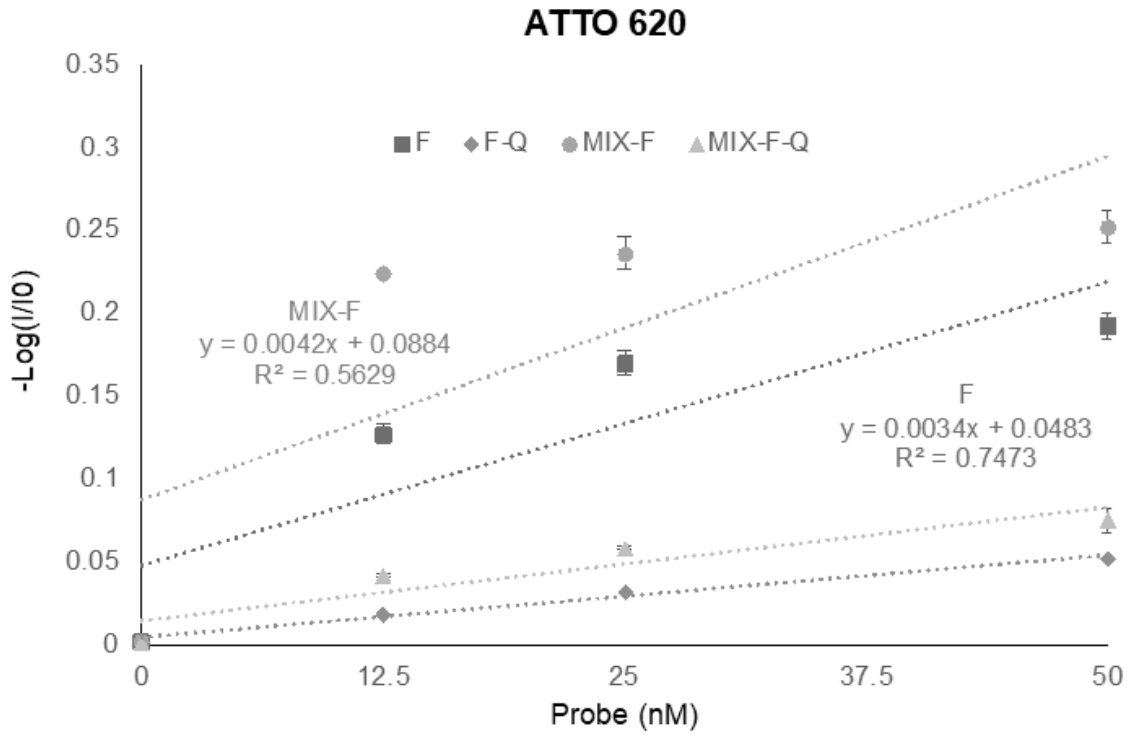
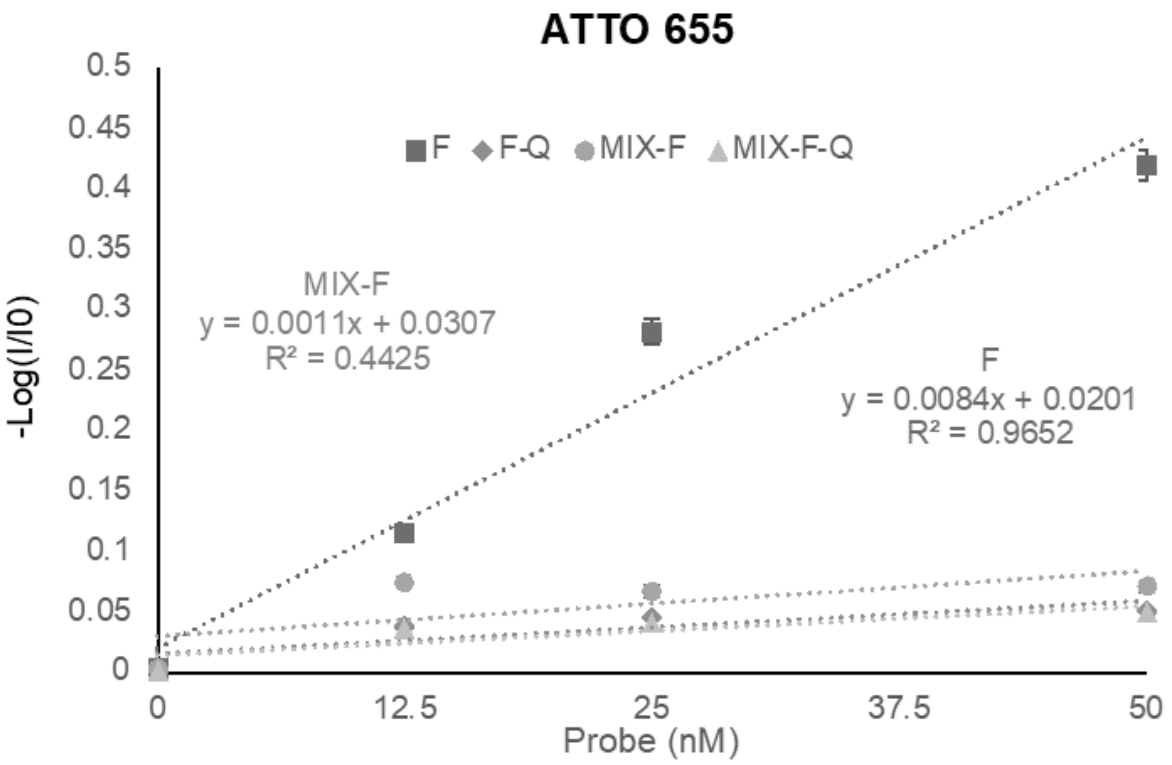


Figure 16 (continued)

G.



H.

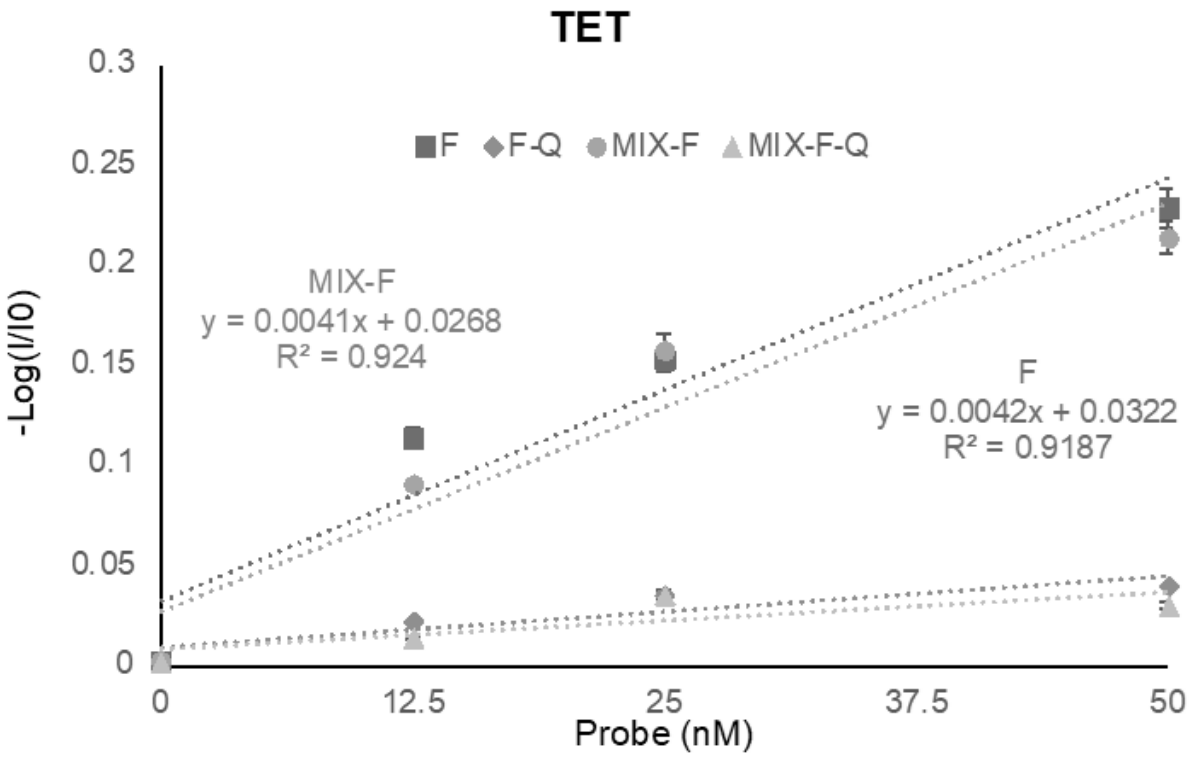
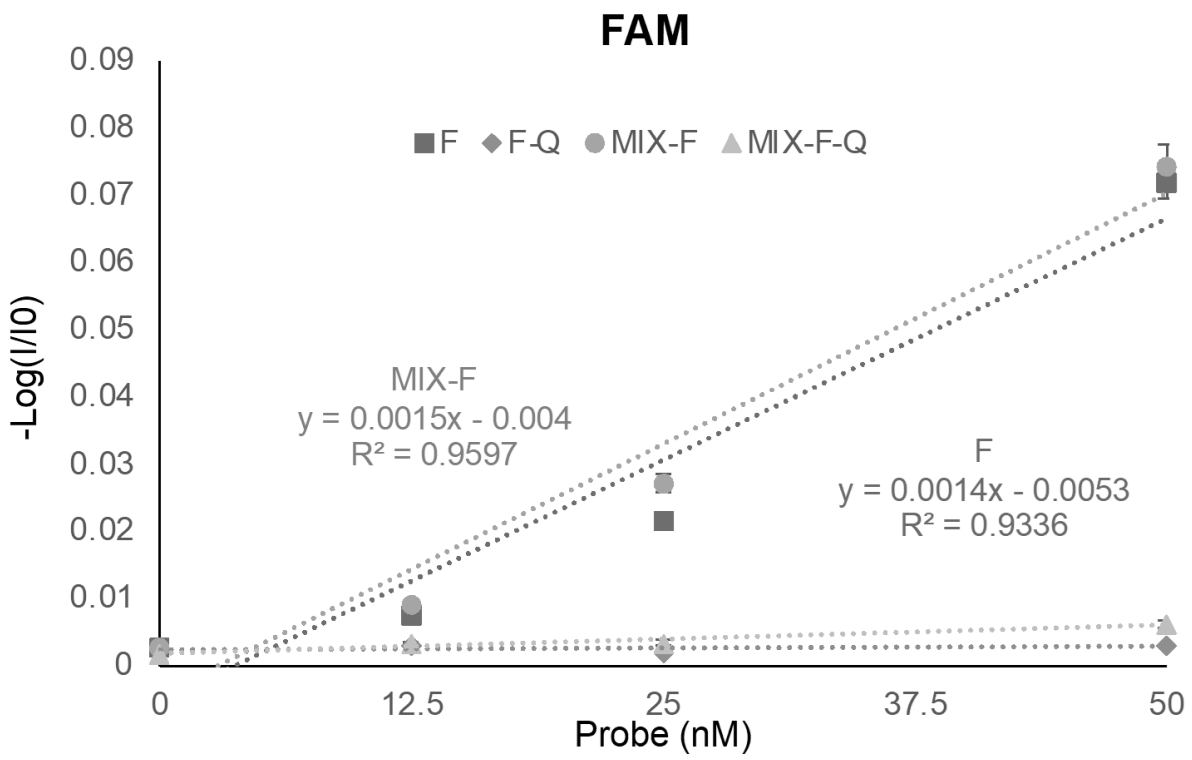


Figure 16 (continued)

I.



J.

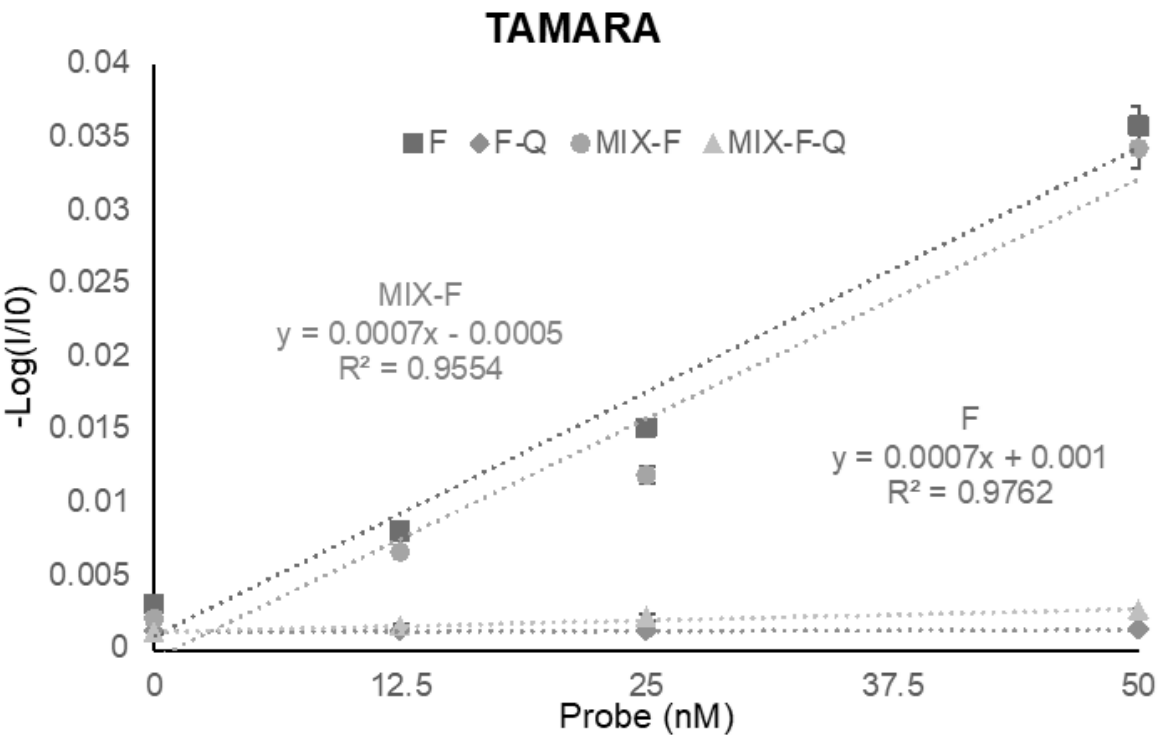
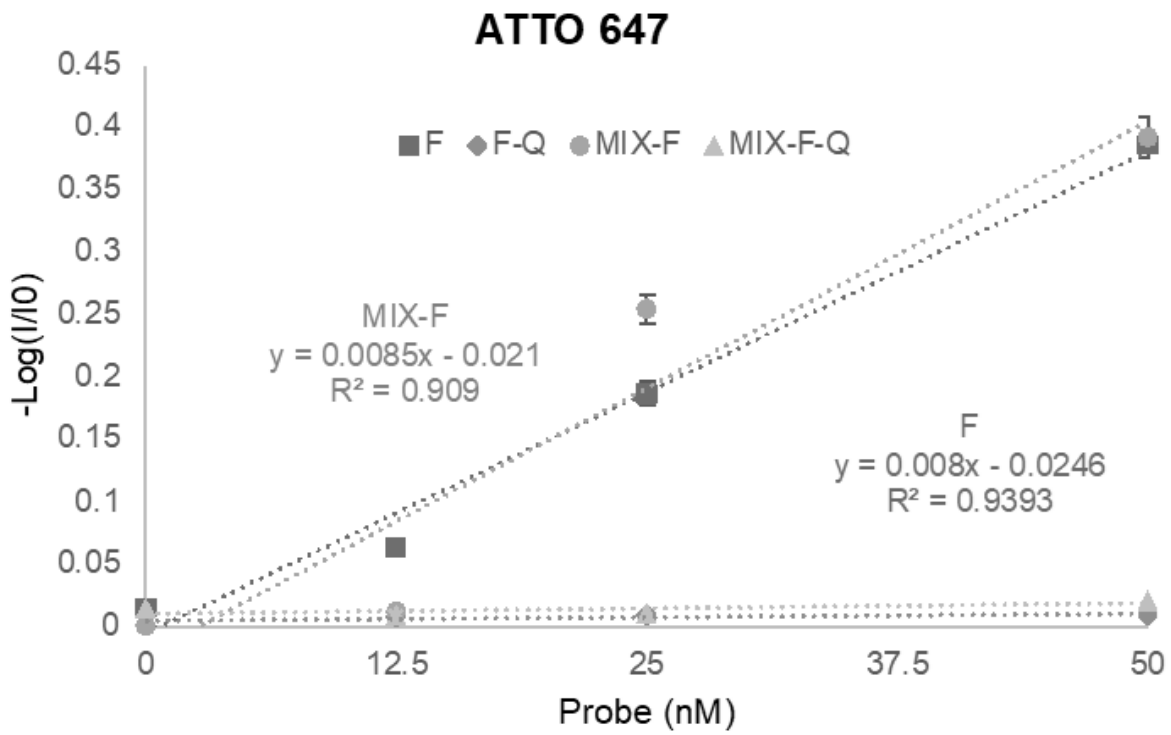


Figure 16 (continued)

K.



L.

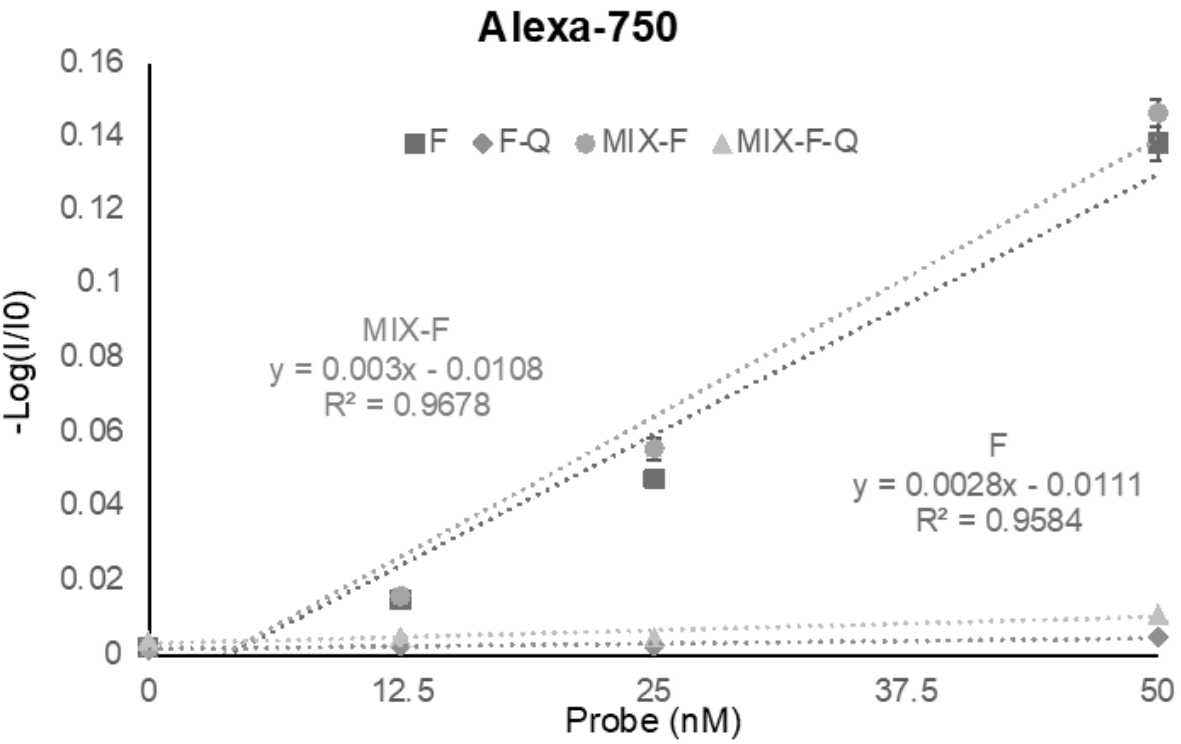


Figure 16 (continued)

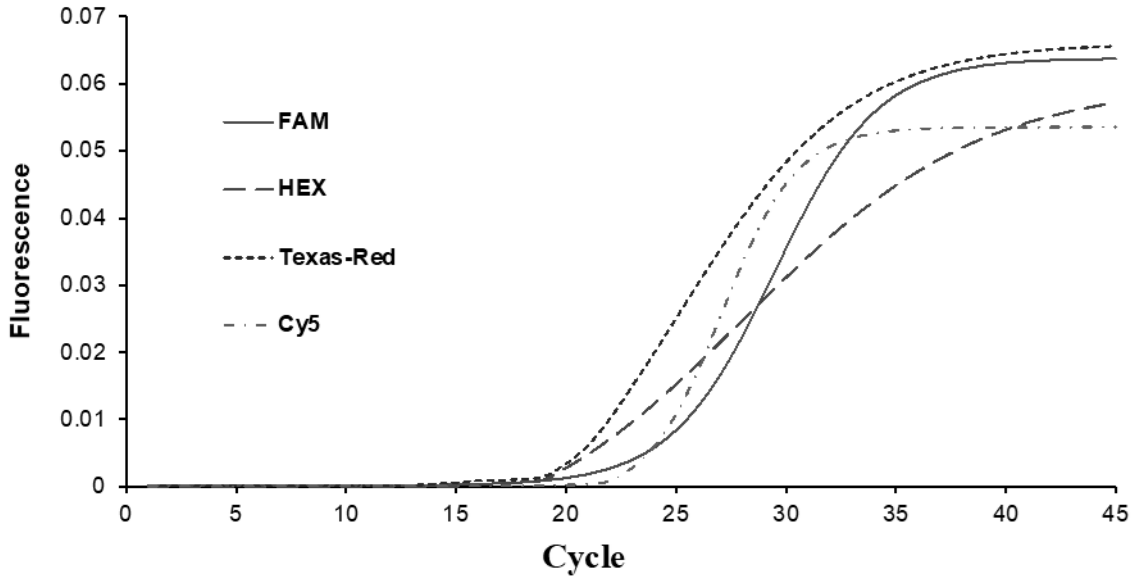

0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Fluorescence
FAM
HEX
Texas-Red
Cy5
0
5
10
15
20
25
30
35
40
45
Cycle

Figure 17

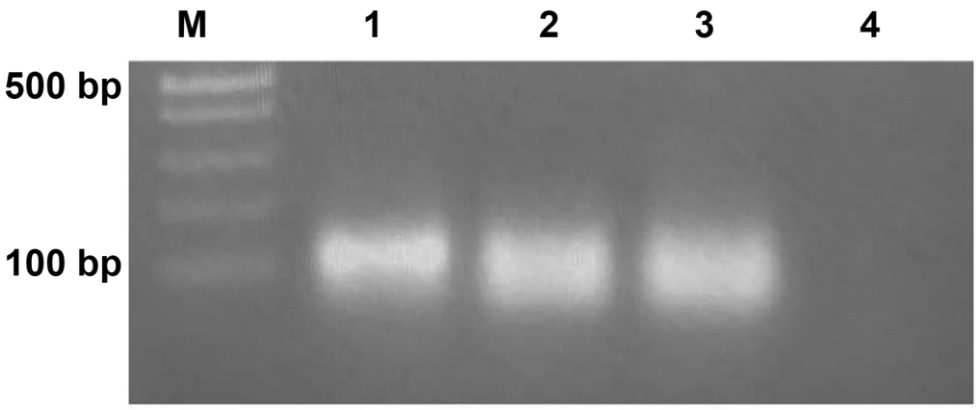


Figure 18

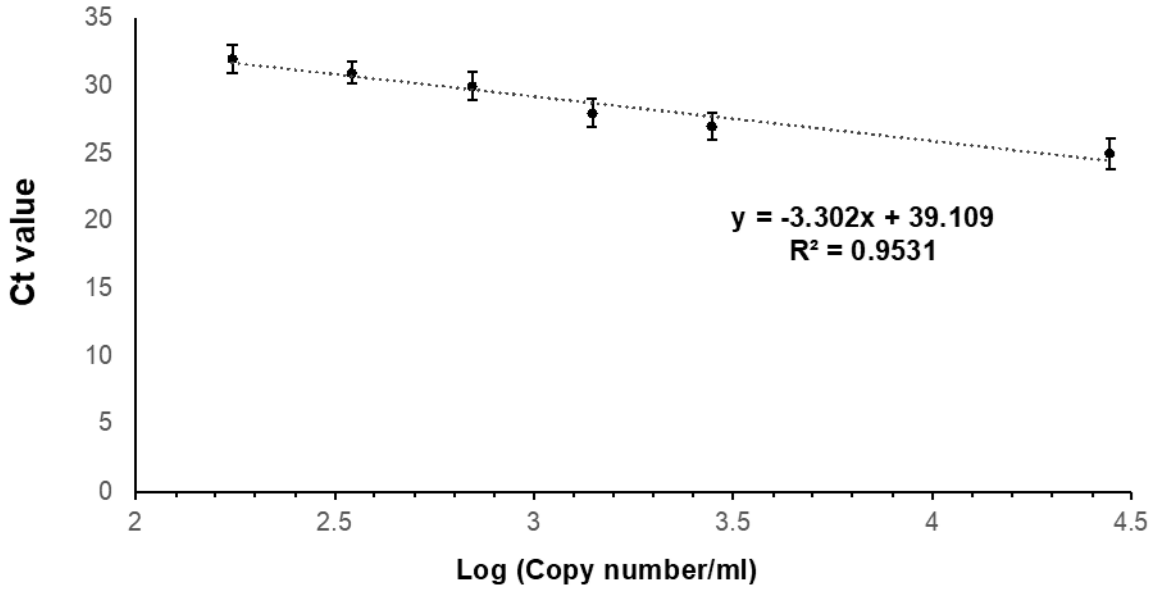

35
30
25
20
15
10
5
0
Ct value
2
2.5
3
3.5
4
4.5
Log (Copy number/ml)
y = -3.302x + 39.109
R² = 0.9531

Figure 19

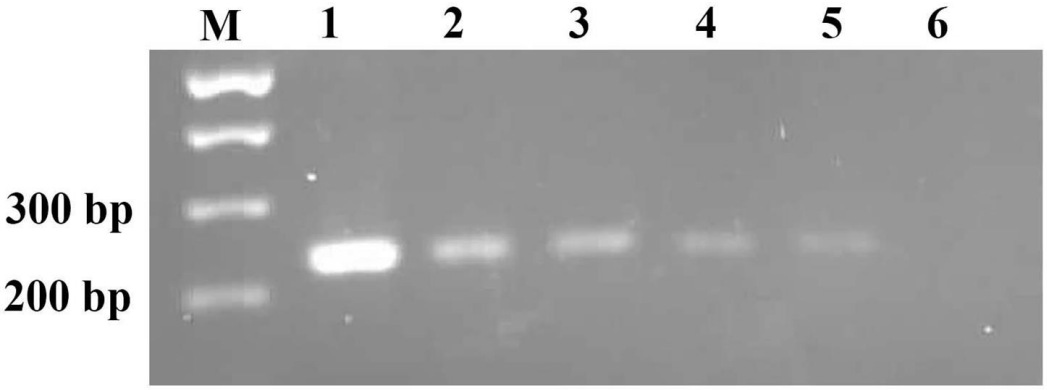


Figure 20

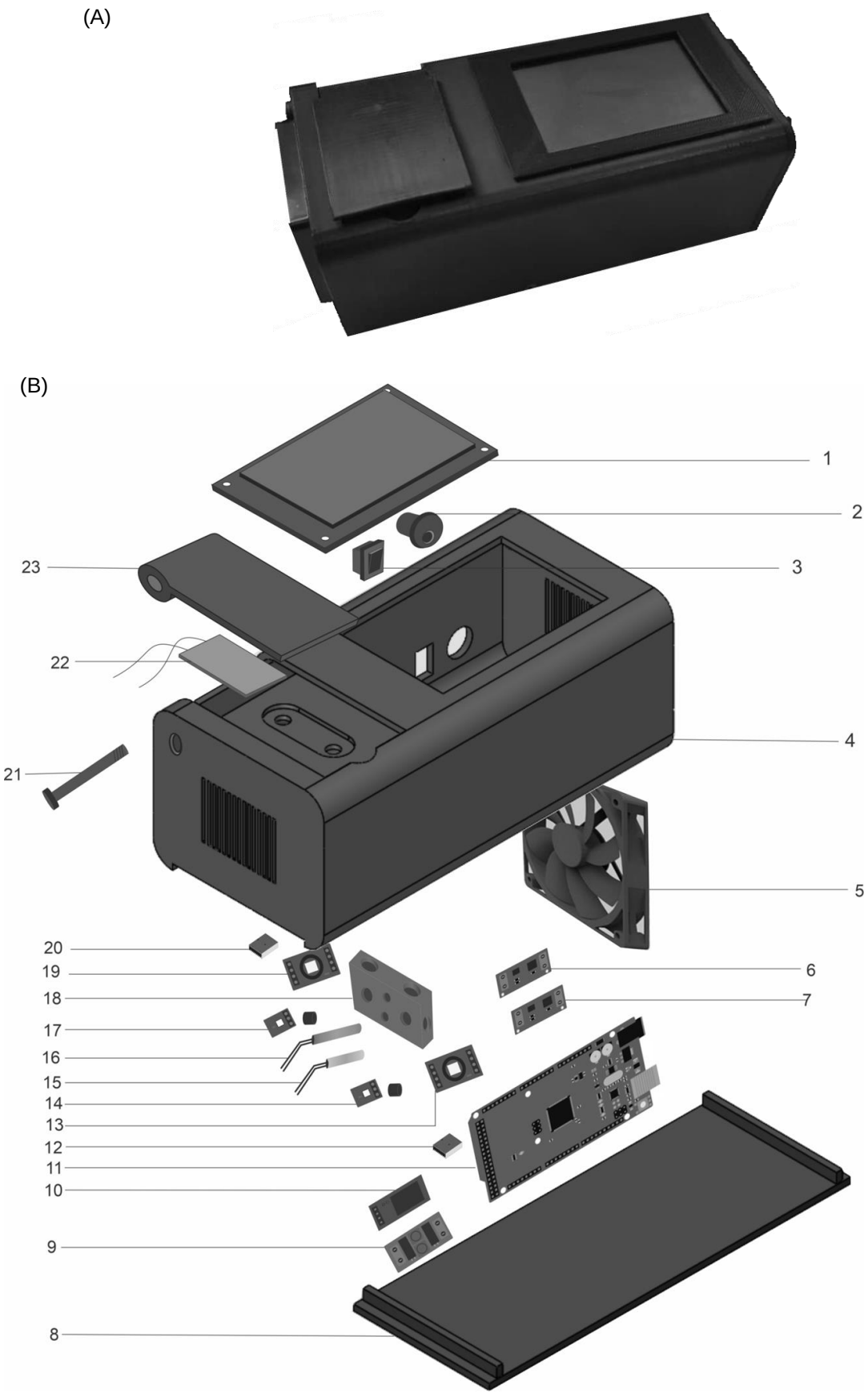


Figure 21

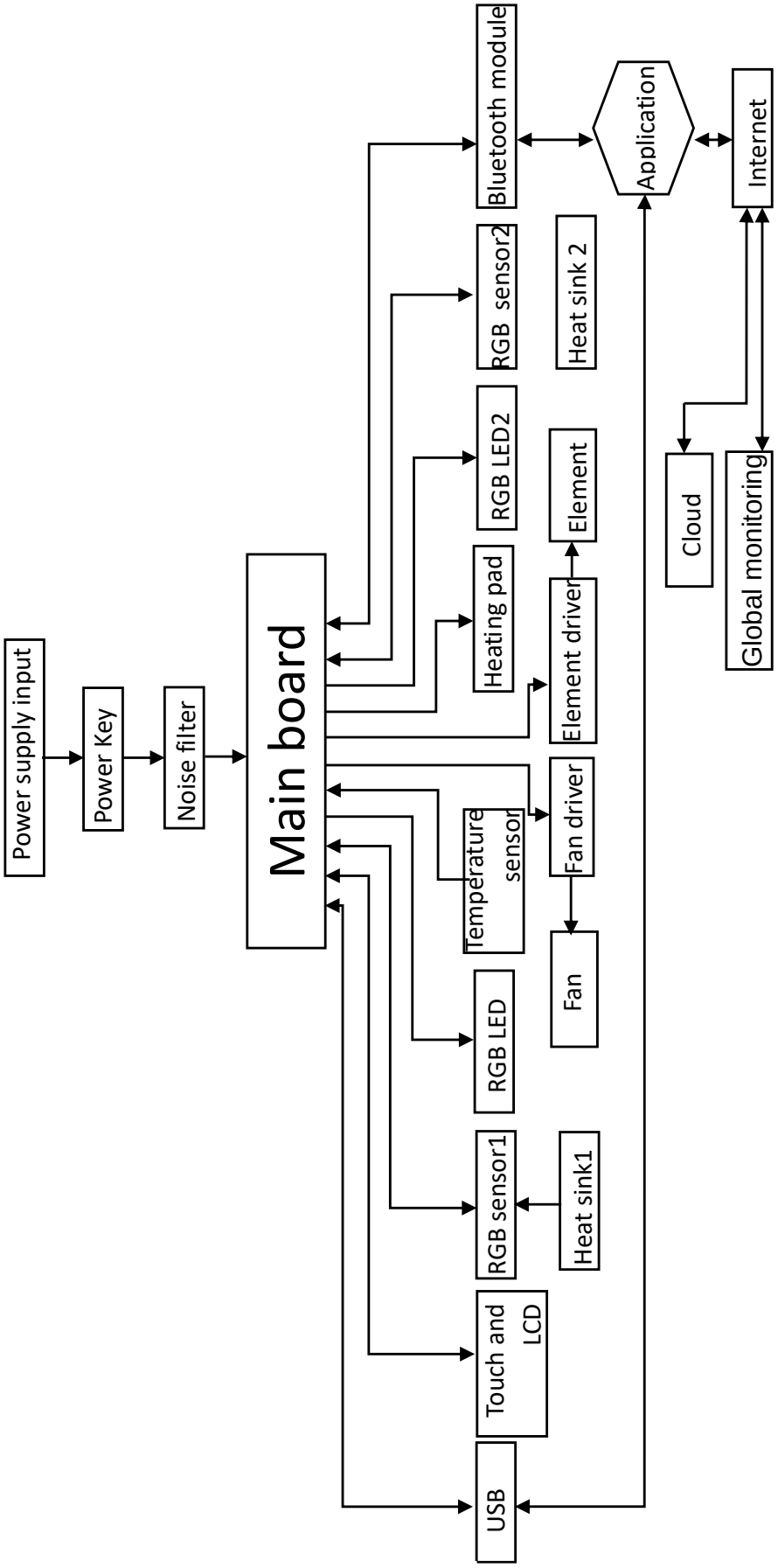

Power supply input
Power Key
Noise filter
Main board
Bluetooth module
Application
Internet
RGB sensor2
Heat sink 2
RGB LED2
Element
Heating pad
Element driver
Cloud
Global monitoring
Temperature sensor
Fan driver
Fan
RGB LED
RGB sensor1
Heat sink1
Touch and LCD
USB

Figure 22

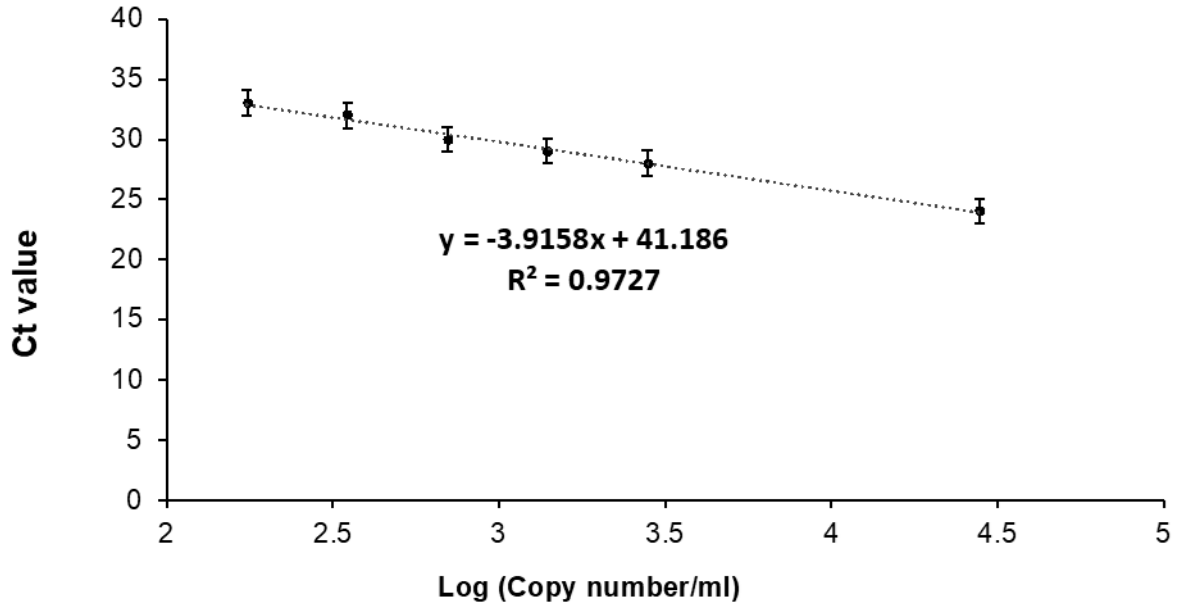

40
35
30
25
20
15
10
5
0
Ct value
y = -3.9158x + 41.186
R² = 0.9727
2
2.5
3
3.5
4
4.5
5
Log (Copy number/ml)

Figure 23

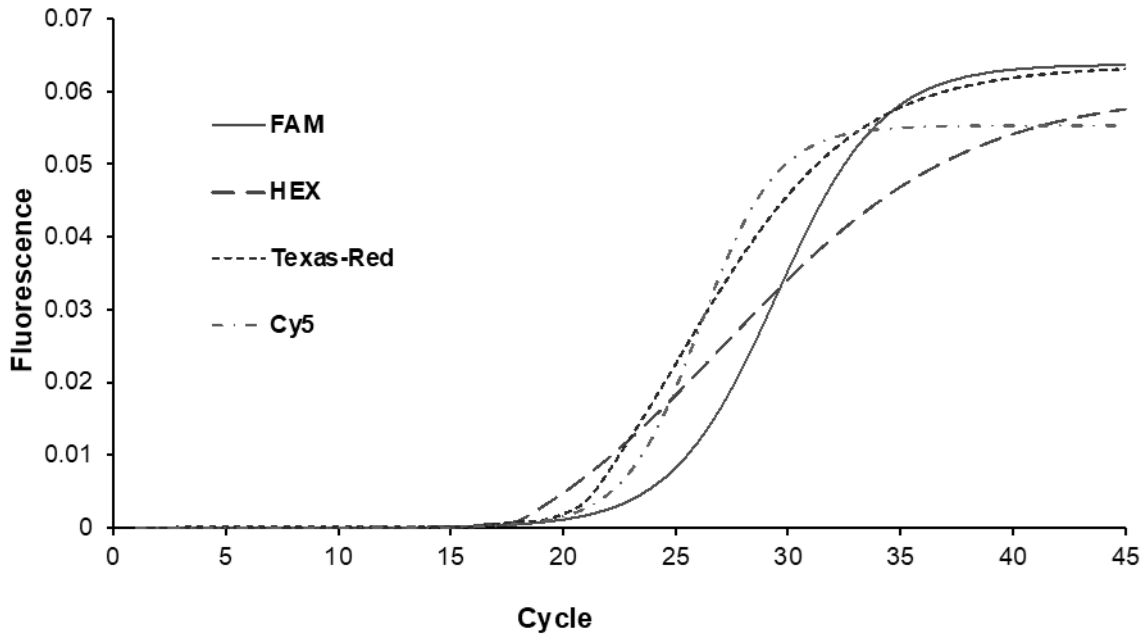

0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Fluorescence
FAM
HEX
Texas-Red
Cy5
0
5
10
15
20
25
30
35
40
45
Cycle

Figure 24