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LG ELECTRONICS CO., LTD.

TEST REPORT

SCOPE OF WORKS
STERILIZATION PERFORMANCE TEST OF HYGH TEMP.CYCLE

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TEST REPORT FOR LG ELECTRONICS CO., LTD.

Report No.: RT20E-S0009
Date: MAY. 21, 2020

OBJECTIVE

The purpose of the testing is:

Dryer High Temp. Evaluation of sterilization rate of cycle (40 minutes, 100 minutes)

HYPOTHESIS

Dryer High Temp. Cycle (40 minutes, 100 minutes) can remove more than 99.9% of bacteria from laundry.

CONCLUSION

Based on the data collected, the Hypothesis is accepted:

Dryer High Temp. Cycle (40 minutes, 100 minutes) can remove more than 99.9% of *Pseudomonas aeruginosa, Escherichia coli, Klebsiella pneumoniae* and *Salmonella enteritidis* from laundry, and more than 99% of *Staphylococcus aureus.*

Suyeon Park		Bo Park	
ENGINEER		**REVIEWER**	

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SECTION 2
OBJECTIVE

The purpose of the testing is:

Dryer High Temp. Evaluation of sterilization rate of cycle (40 minutes, 100 minutes)

SECTION 3
PARAMETERS

The following parameters are controlled

VALUE	DESCRIPTION	UNITS	METHOD	MU
23 ± 5	Test room temperature	°C	Data logger	± 0.2 °C (Approx. 95 %, k=2)
65 ± 20	Test room humidity	% R.H.	Data logger	± 20 % (Approx. 95 %, k=2)
35-37	Incubated Temperature	°C	Data logger	± 2.0 °C (Approx. 95 %, k=2)

The following parameters are monitored

VALUE	DESCRIPTION	UNITS	METHOD	MU
23 ± 5	Test room temperature	°C	Data logger	± 0.2 °C (Approx. 95 %, k=2)
65 ± 20	Test room humidity	% R.H.	Data logger	± 20 % (Approx. 95 %, k=2)
35-37	Incubated Temperature	°C	Data logger	± 2.0 °C (Approx. 95 %, k=2)

SECTION 4
PRODUCT/MODEL DESCRIPTION

PRODUCT INFORMATION : Giant-C Electric Dryer

MODEL : RV1029A4S

Note :
1. The model RV1029A4S was selected as a representative tested model. Refer to the model similarity below.
2. In the model name RV1*29****, the suffix (*) is variable as below.

- The 1st suffix "*" : Country (0-Korea, 3-Global)
- The 2nd suffix "*" : Product Color (A to Z)
- The 3rd suffix "*" : Payment type (blank or A to Z)
- The 4th suffix "*" : Layout (1 to 9)
- The 5th suffix "*" : Model Type (A to Z)

SECTION 5
SAMPLE ACQUISITION

Sample(s) was supplied by the applicant:

SAMPLE #	DESCRIPTION	MODEL	PURCHASE LOCATION	DATE	CONDITION
1	Giant-C Electric Dryer	RV1029A4S	Prepared by LG	-	Packaged and undamaged

SECTION 6
HYPOTHESIS

Dryer High Temp. Cycle (40 minutes, 100 minutes) can remove more than 99.9% of bacteria from laundry.

SECTION 7
EQUIPMENT LIST

EQUIPMENT	MANUFACTURER	MODEL NO.	CALIBRATION DATE	CALIBRATION DUE
Auto clave	JEIOTECH	ST-105G	2020.04.24	2021.04.24
Incubator	JEIOTECH	1L-11	2019.08.29	2020.08.28
Thermometer	ELITECH	RC-4HC	2019.12.12	2020.12.12
hydrometer	ELITECH	RC-4HC	2019.12.12	2020.12.12
Pipet (1000)	Eppendorf	-	2020.03.02	2021.03.02
Balance	AND	CB-2000	2019.08.05	2020.08.04
Balance	AND	FX-5000i	2019.08.05	2020.08.05
Clean bench	SEOJIN	-	-	-
Colony counter	Hwashin	350CL	-	-

SECTION 8
TECHNICAL STAFF

#	Staff Name	Area of Expertise
1	Suyeon Park	Technical Manager / Intertek Testing Korea Ltd.
2	Bo Park	Laboratory Director / Intertek Testing Korea Ltd.
Note: Complete training records for staff are available upon request		

Testing was conducted at:

Intertek Testing Services Korea Ltd. 4/F, A-JU Digital Tower, 7, Achasan-ro 5 –gil, Seongdong-gu, Seoul, Korea

SECTION 9
TEST PROCEDURE

9.1 Test Set up :

Items		Requirement	Condition
Electrical Supply	Voltage	(220 ± 0.04) V	(220 ± 0.04) V
	Frequency	(60 ± 0.08) Hz	(60 ± 0.08) Hz
Ambient Temperature		(23 ± 2) °C	(23 ± 2) °C
Ambient humidity		(50 ± 5) % R.H.	(50 ± 5) % R.H.
Case 1		High Temp. Cycle 40minute	
Case 2		High Temp. Cycle 100minute	

9.2 Test method

9.2.1 Microorganisms

9.2.1.1 *Staphylococcus aureus* ATCC 6538

9.2.1.2 *Pseudomonas aeruginosa ATCC 9027*

9.2.1.3 *Escherichia coli ATCC 8739*

9.2.1.4 *Klebsiella pneumoniae ATCC 4352*

9.2.1.5 *Salmonella enteritidis KCCM 12021*

9.2.2 Preparation of test

9.2.2.1 Test Load : IEC load, 3.75kg (Sheet 2ea, Pillowcases 6ea, Towels 19ea) Towel is used for weight correction.

9.2.2.2 Preparation of test piece : IEC load, Positive control 2ea, Negative control 2ea, Test 3ea
Five types of bacteria were incubated in TSB at 35 to 37 ° C for 24 hours, and the inoculation concentrations of 10^9 ~ 10^{10} CFU / mL were prepared by inoculating 2 mL of positive control and test.

9.2.3 Test progress

9.2.3.1 Bone dry test load and all specimens are sterilized under conditions of 121 ℃ and 15 psi for 15 minutes.

9.2.3.2 Positive control Specimen bacteria 2mL Immediately after inoculation, measure the number of microorganism.

9.2.3.3 After inoculation of 2mL of test specimens, the test load and the IEC standard detergent are put into the washing machine together to carry out the test course.

9.2.3.4 Measure the number of microorganism in the test specimen.

9.2.3.5 After the test course is conducted, the test load and the negative specimen are introduced to proceed with the blowing course for 20 minutes.

9.2.3.6 Measure the number of microorganism a negative specimen.

9.2.4 Evaluated the data as below Calculation.

9.2.4.1 Percent reduction = [(a-b)/a] × 100
a : the microorganism number of before Hygiene course
b : the microorganism number of after Hygiene course

SECTION 10

TEST RESULT

<Case 1>

1.Test

1.1 *Staphylococcus aureus* **(Unit : CFU/ml)**

	Repeat #1		Repeat #2		Repeat #3	
	Result	Average	Result	Average	Result	Average
Positive control	5.1×10^6	5.0×10^6	2.4×10^8	2.5×10^8	1.8×10^8	2.0×10^8
	4.9×10^6		2.5×10^8		2.1×10^8	
Test 1	3.4×10^4	4.8×10^4	1.1×10^6	1.1×10^6	1.7×10^6	1.8×10^6
Test 2	7.6×10^4		1.2×10^6		1.7×10^6	
Test 3	3.4×10^4		1.1×10^6		2.0×10^6	
Reduction rate (%)	99.0		99.5		99.1	

1.2 *Pseudomonas aeruginosa* **(Unit : CFU/ml)**

	Repeat #1		Repeat #2		Repeat #3	
	Result	Average	Result	Average	Result	Average
Positive control	2.6×10^7	6.8×10^8	2.3×10^9	2.0×10^9	1.4×10^8	1.9×10^8
	1.1×10^8		1.6×10^9		2.3×10^8	
Test 1	1.8×10^2	9.3×10^1	5.7×10^2	1.4×10^3	4.8×10^2	8.5×10^2
Test 2	4.5×10^1		2.8×10^3		1.7×10^3	
Test 3	5.5×10^1		9.5×10^2		3.8×10^2	
Reduction rate (%)	> 99.9		> 99.9		> 99.9	

1.3 *Escherichia coli* **(Unit : CFU/ml)**

	Repeat #1		Repeat #2		Repeat #3	
	Result	Average	Result	Average	Result	Average
Positive control	1.6×10^8	1.6×10^8	8.2×10^8	8.5×10^8	1.0×10^9	9.7×10^8
	1.5×10^8		8.7×10^8		9.3×10^8	
Test 1	9.4×10^3	7.9×10^3	1.9×10^4	1.6×10^4	1.4×10^3	1.5×10^3
Test 2	1.0×10^4		1.0×10^4		1.9×10^3	
Test 3	4.3×10^3		1.8×10^4		1.1×10^3	
Reduction rate (%)	> 99.9		> 99.9		> 99.9	

1.4 *Klebsiella pneumoniae* **(Unit : CFU/ml)**

	Repeat #1		Repeat #2		Repeat #3	
	Result	Average	Result	Average	Result	Average
Positive control	1.2×10^7	1.2×10^7	2.5×10^8	3.3×10^8	3.6×10^8	3.6×10^8
	1.2×10^7		4.1×10^8		3.6×10^8	
Test 1	1.2×10^2	1.6×10^2	1.6×10^4	8.0×10^3	5.2×10^2	5.3×10^2
Test 2	2.7×10^2		5.6×10^3		4.1×10^2	
Test 3	9.5×10^1		2.5×10^3		6.7×10^2	
Reduction rate (%)	> 99.9		> 99.9		> 99.9	

1.5 *Salmonella enteritidis* **(Unit : CFU/ml)**

	Repeat #1		Repeat #2		Repeat #3	
	Result	Average	Result	Average	Result	Average
Positive control	5.1×10^7	4.8×10^7	2.2×10^8	2.8×10^8	6.9×10^8	6.6×10^8
	4.5×10^7		3.3×10^8		6.2×10^8	
Test 1	3.0×10^4	2.5×10^4	1.5×10^5	1.6×10^5	3.8×10^4	5.4×10^4
Test 2	2.6×10^4		1.7×10^5		3.8×10^4	
Test 3	1.9×10^4		1.6×10^5		8.7×10^4	
Reduction rate (%)	> 99.9		> 99.9		> 99.9	

2. Negative control

2.1 *Staphylococcus aureus* **(Unit : CFU/ml)**

	Repeat #1		Repeat #2		Repeat #3	
	Result	Average	Result	Average	Result	Average
Negative control	5.0×10^0	8.0×10^0	2.5×10^1	2.0×10^1	1.5×10^1	1.5×10^1
	1.0×10^1		1.5×10^1		1.5×10^1	

2.2 *Pseudomonas aeruginosa* **(Unit : CFU/ml)**

	Repeat #1		Repeat #2		Repeat #3	
	Result	Average	Result	Average	Result	Average
Negative control	5.0×10^0	8.0×10^0	0	0	5.0×10^0	8.0×10^0
	1.0×10^1		0		1.0×10^1	

2.3 *Escherichia coli* **(Unit : CFU/ml)**

	Repeat #1		Repeat #2		Repeat #3	
	Result	Average	Result	Average	Result	Average
Negative control	2.0×10^1	1.0×10^1	4.5×10^1	7.8×10^1	5.0×10^0	5.0×10^0
	0		1.1×10^2		5.0×10^0	

2.4 *Klebsiella pneumoniae* **(Unit : CFU/ml)**

	Repeat #1		Repeat #2		Repeat #3	
	Result	Average	Result	Average	Result	Average
Negative control	2.5×10^1	1.8×10^1	3.0×10^1	3.0×10^1	0	3.0×10^0
	1.0×10^1		3.0×10^1		5.0×10^0	

2.5 *Salmonella enteritidis* **(Unit : CFU/mL)**

	Repeat #1		Repeat #2		Repeat #3	
	Result	Average	Result	Average	Result	Average
Negative control	2.5×10^1	2.8×10^1	1.0×10^1	2.0×10^1	2.0×10^1	1.0×10^1
	3.0×10^1		3.0×10^1		0	

<case 2>

1.Test

1.1 *Staphylococcus aureus* **(Unit : CFU/mL)**

	Repeat #4		Repeat #5		Repeat #6	
	Result	Average	Result	Average	Result	Average
Positive control	2.3×10^8	2.4×10^8	6.7×10^7	7.2×10^7	8.7×10^7	1.6×10^8
	2.5×10^8		8.1×10^7		2.3×10^8	
Test 1	1.1×10^6	1.0×10^6	3.4×10^5	5.1×10^5	6.9×10^5	5.8×10^5
Test 2	1.2×10^6		6.4×10^5		6.6×10^5	
Test 3	9.0×10^5		5.4×10^5		3.9×10^5	
Reduction rate (%)	99.6		99.3		99.6	

1.2 *Pseudomonas aeruginosa* **(Unit : CFU/mL)**

	Repeat #4		Repeat #5		Repeat #6	
	Result	Average	Result	Average	Result	Average
Positive control	1.4×10^8	1.4×10^8	1.1×10^8	8.5×10^7	5.1×10^8	5.2×10^8
	1.4×10^8		6.0×10^7		5.2×10^8	
Test 1	7.0×10^1	7.0×10^1	8.5×10^1	7.3×10^1	1.8×10^3	1.0×10^3
Test 2	6.5×10^1		5.5×10^1		9.3×10^2	
Test 3	7.5×10^1		8.0×10^1		3.8×10^2	
Reduction rate (%)	> 99.9		> 99.9		> 99.9	

1.3 *Escherichia coli* **(Unit : CFU/mL)**

	Repeat #4		Repeat #5		Repeat #6	
	Result	**Average**	**Result**	**Average**	**Result**	**Average**
Positive control	5.8×10^8	6.1×10^8	1.6×10^8	1.9×10^8	4.5×10^8	5.2×10^8
	6.3×10^8		2.1×10^8		5.9×10^8	
Test 1	7.0×10^2	9.6×10^2	6.0×10^3	3.7×10^3	6.8×10^3	5.4×10^3
Test 2	7.9×10^2		2.5×10^3		6.8×10^3	
Test 3	1.4×10^3		2.7×10^3		2.5×10^3	
Reduction rate (%)	> 99.9		> 99.9		> 99.9	

1.4 *Klebsiella pneumoniae* **(Unit : CFU/mL)**

	Repeat #4		Repeat #5		Repeat #6	
	Result	**Average**	**Result**	**Average**	**Result**	**Average**
Positive control	7.6×10^8	6.6×10^8	1.8×10^8	1.9×10^8	5.4×10^8	7.1×10^8
	5.5×10^8		1.9×10^8		8.7×10^8	
Test 1	1.8×10^3	1.1×10^3	4.1×10^2	3.5×10^2	5.4×10^2	5.6×10^2
Test 2	6.6×10^2		3.8×10^2		6.0×10^2	
Test 3	8.8×10^2		2.6×10^2		5.3×10^2	
Reduction rate (%)	**> 99.9**		**> 99.9**		**> 99.9**	

1.5 *Salmonella enteritidis* **(Unit : CFU/mL)**

	Repeat #4		Repeat #5		Repeat #6	
	Result	**Average**	**Result**	**Average**	**Result**	**Average**
Positive control	9.3×10^8	9.7×10^8	5.8×10^8	5.6×10^8	4.8×10^8	6.8×10^8
	1.0×10^9		5.3×10^8		8.7×10^8	
Test 1	1.3×10^4	2.1×10^4	3.2×10^3	4.2×10^3	3.5×10^3	1.2×10^4
Test 2	2.1×10^4		3.9×10^3		2.3×10^4	
Test 3	2.9×10^4		5.6×10^3		9.7×10^3	
Reduction rate (%)	> 99.9		> 99.9		> 99.9	

2. Negative control

2.1 *Staphylococcus aureus* **(Unit : CFU/mL)**

	Repeat #4		Repeat #5		Repeat #6	
	Result	**Average**	**Result**	**Average**	**Result**	**Average**
Negative control	0	0	0	3.0×10^0	0	3.0×10^0
	0		5.0×10^0		5.0×10^0	

2.2 *Pseudomonas aeruginosa* **(Unit : CFU/mL)**

	Repeat #4		Repeat #5		Repeat #6	
	Result	Average	Result	Average	Result	Average
Negative control	0	3.0×10^0	0	0	0	8.0×10^0
	5.0×10^0		0		1.5×10^1	

2.3 *Escherichia coli* **(Unit : CFU/mL)**

	Repeat #4		Repeat #5		Repeat #6	
	Result	Average	Result	Average	Result	Average
Negative control	0	1.3×10^1	0	3.0×10^0	5.0×10^0	3.0×10^0
	2.5×10^1		5.0×10^0		0	

2.4 *Klebsiella pneumoniae* **(Unit : CFU/mL)**

	Repeat #4		Repeat #5		Repeat #6	
	Result	Average	Result	Average	Result	Average
Negative control	2.0×10^1	1.3×10^1	1.5×10^1	1.0×10^1	2.5×10^1	1.3×10^1
	5.0×10^0		5.0×10^0		0	

2.5 *Salmonella enteritidis* **(Unit : CFU/mL)**

	Repeat #4		Repeat #5		Repeat #6	
	Result	Average	Result	Average	Result	Average
Negative control	0	5.0×10^0	0	0	0	0
	1.0×10^1		0		0	

SECTION 11
Conclusion

Based on the data collected the Hypothesis is accepted:

Dryer High Temp. Cycle (40 minutes, 100 minutes) can remove more than 99.9% of *Pseudomonas aeruginosa, Escherichia coli, Klebsiella pneumoniae* and *Salmonella enteritidis* from laundry, and more than 99% of *Staphylococcus aureus.*

- End –

APPEXDIX I. PHOTOS OF SAMPLE



<Front view>

APPEXDIX II. Label

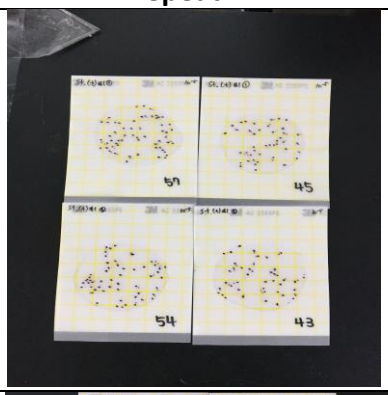
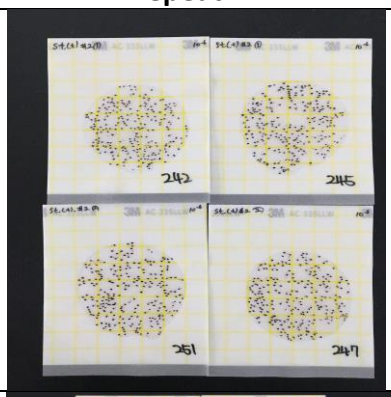
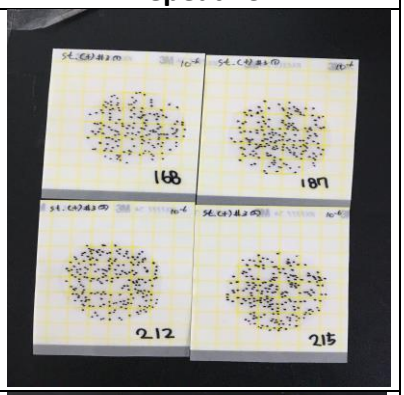
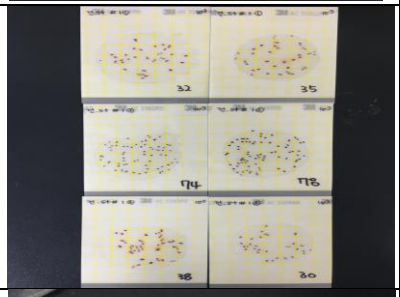
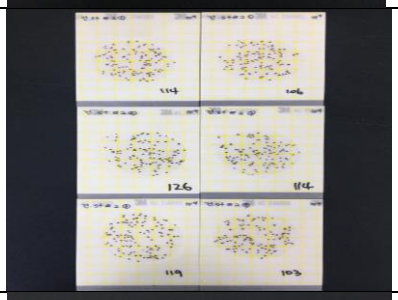
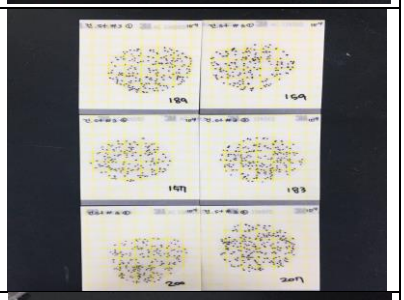
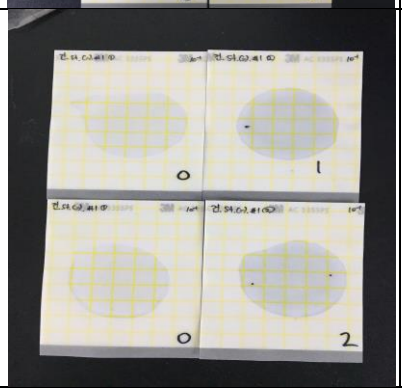
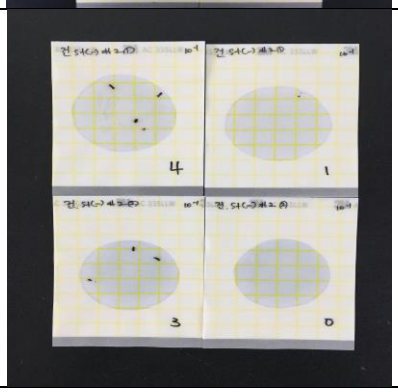
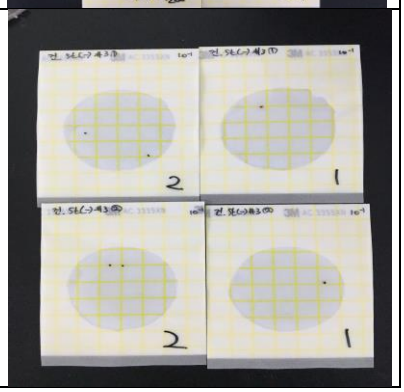


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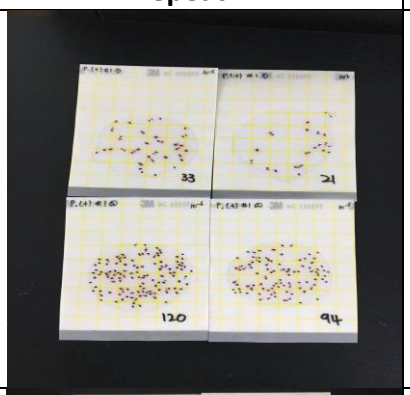
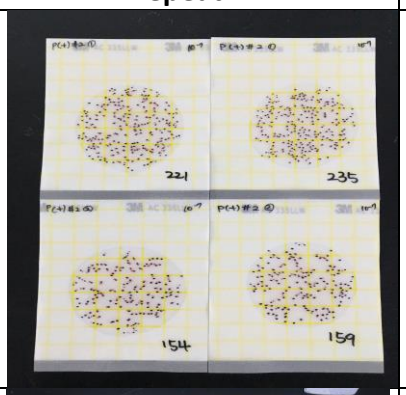
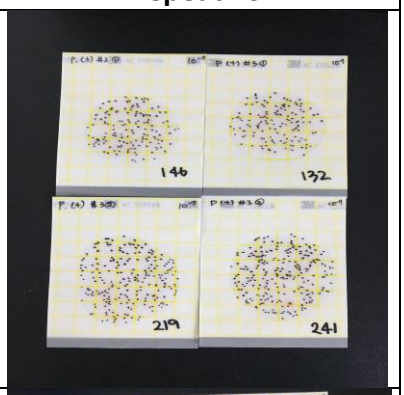
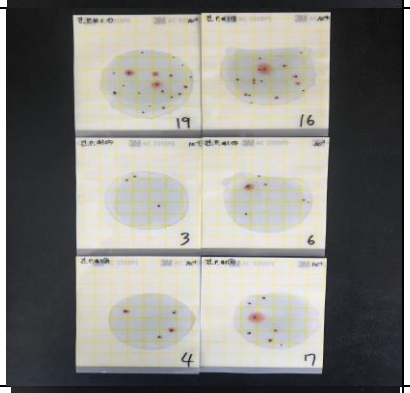
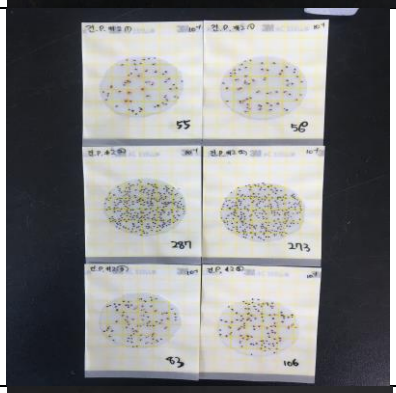
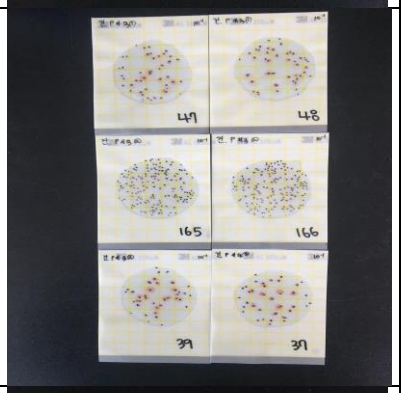
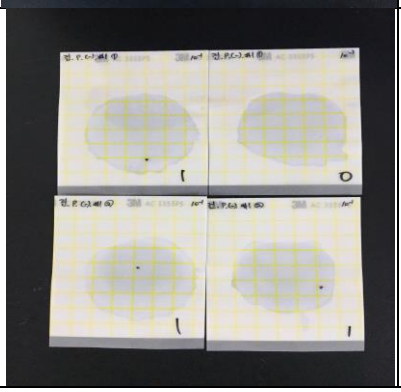
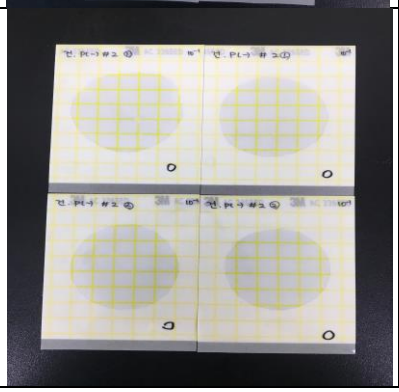
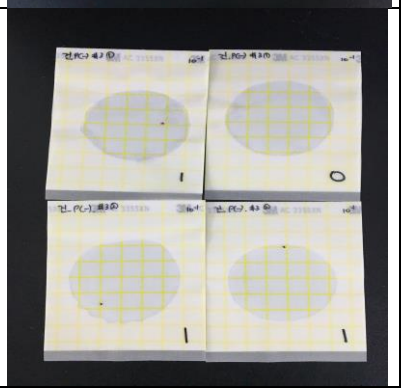
Appendix III. Photos of result

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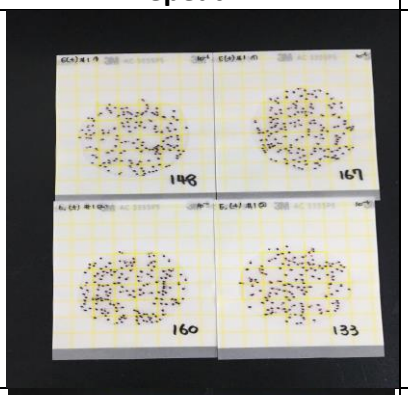
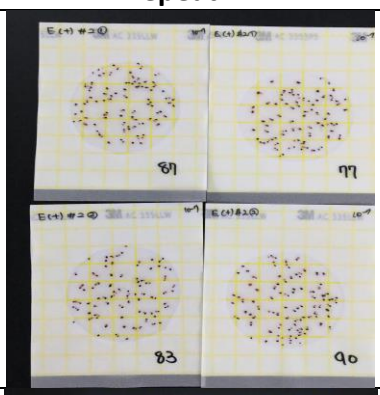
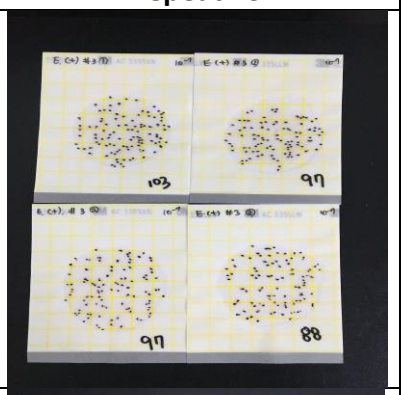
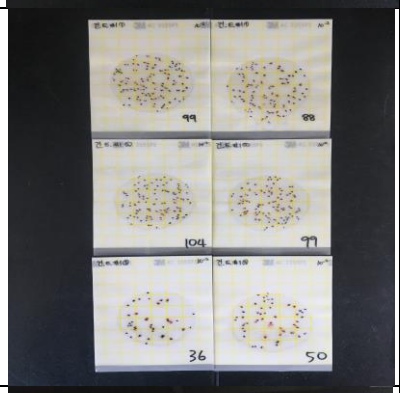
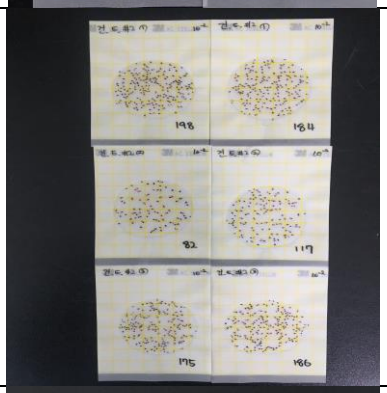
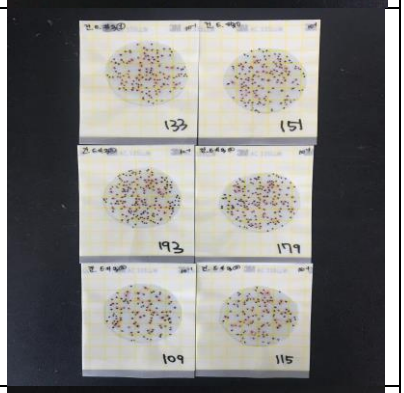
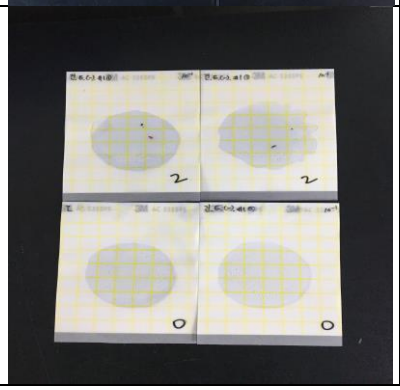
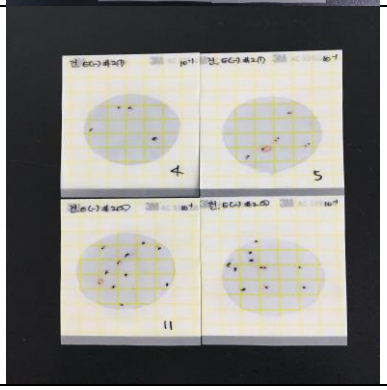
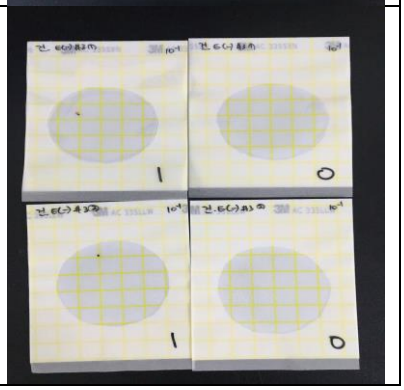
1. *Staphylococcus aureus*

	Repeat #1	Repeat #2	Repeat #3
Positive control			
test			
Negative control			

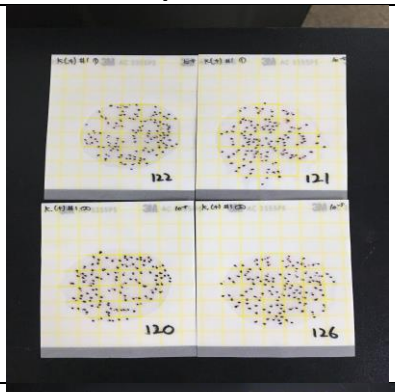
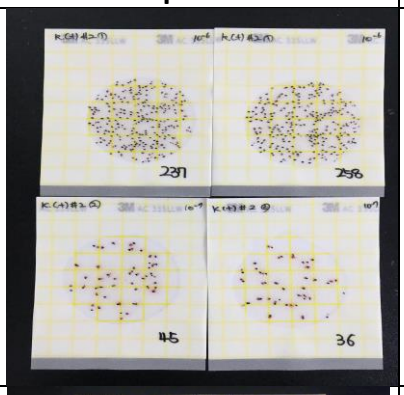
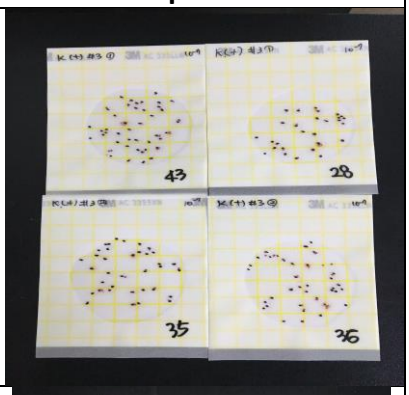
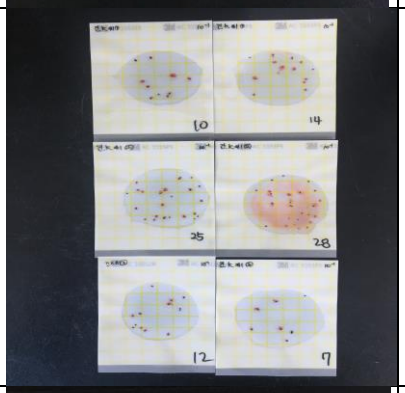
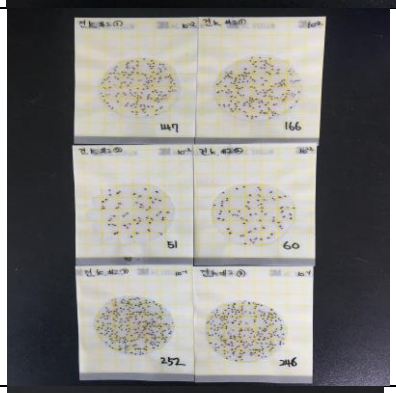
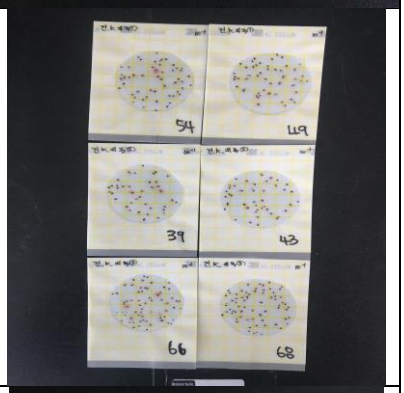
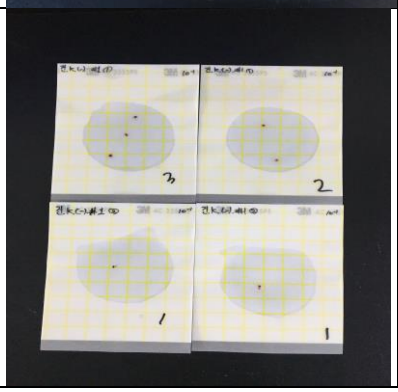
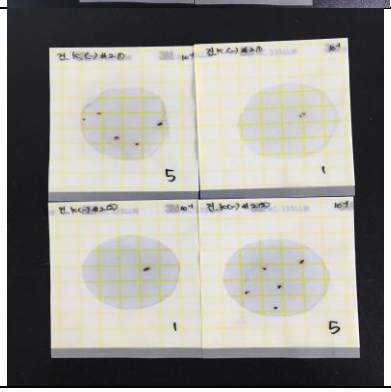
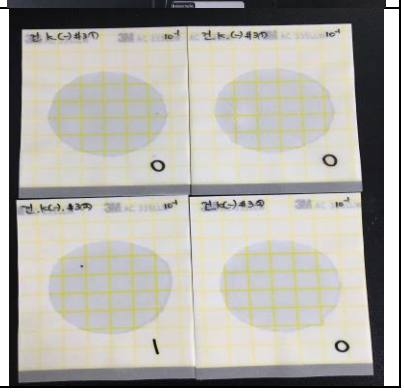
2. *Pseudomonas aeruginosa*

	Repeat #1	Repeat #2	Repeat #3
Positive control			
test			
Negative control			

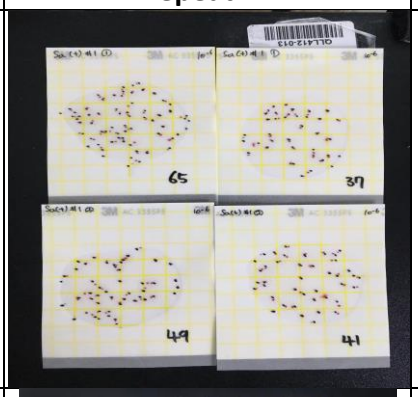
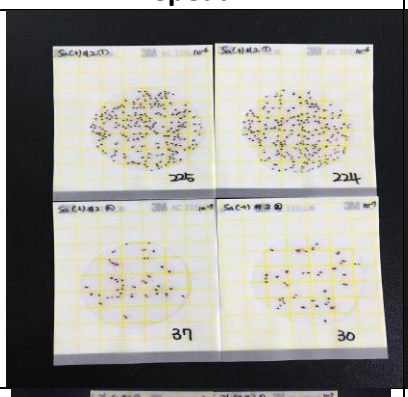
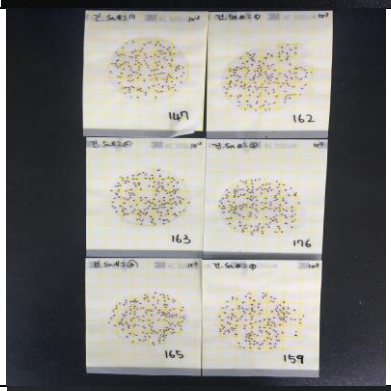
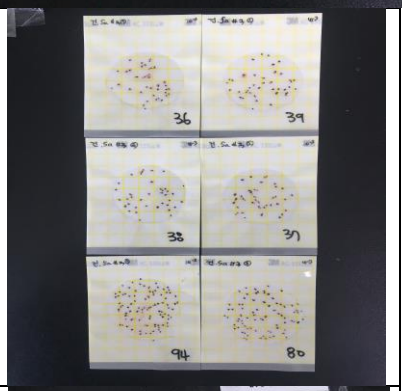
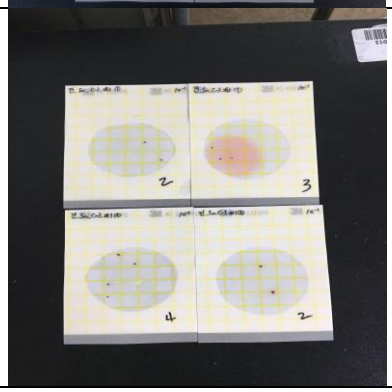
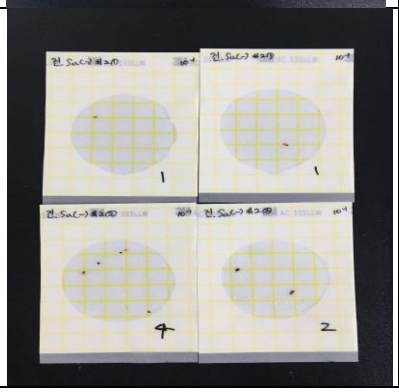
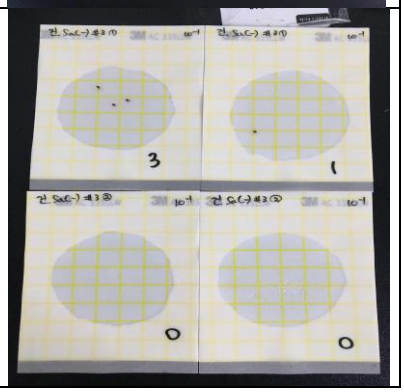
3. *Escherichia coli*

	Repeat #1	Repeat #2	Repeat #3
Positive control			
test			
Negative control			

4. *Klebsiella pneumoniae*

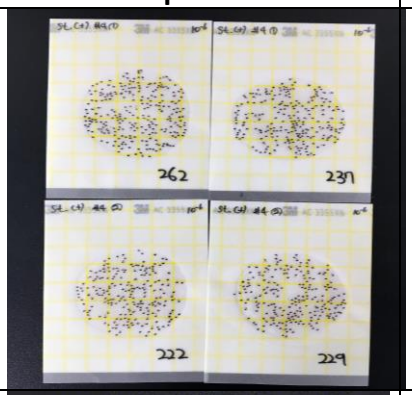
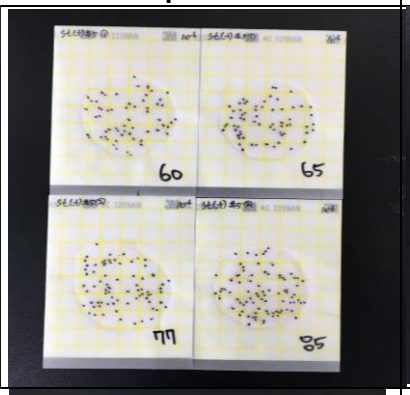
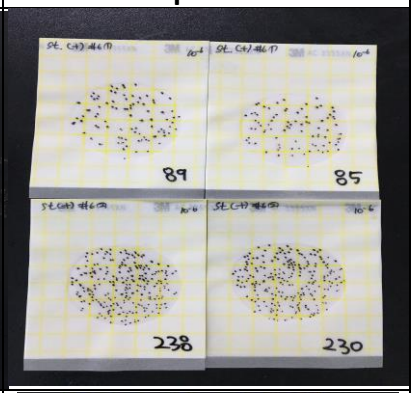
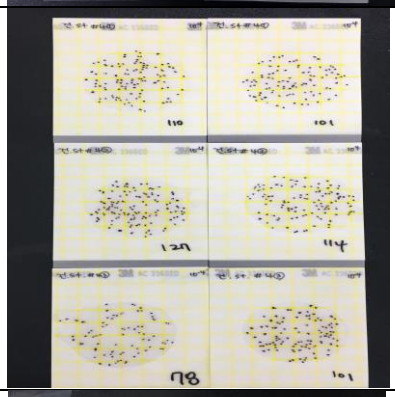
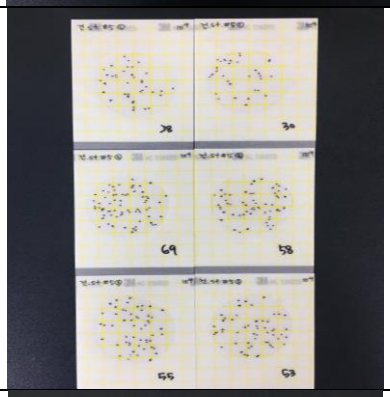
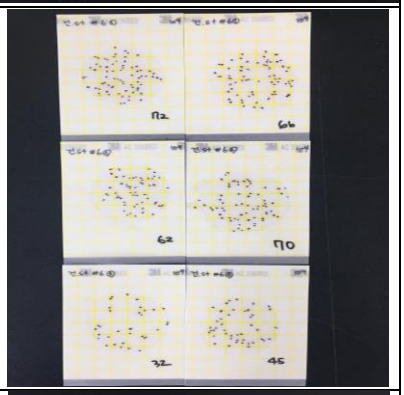
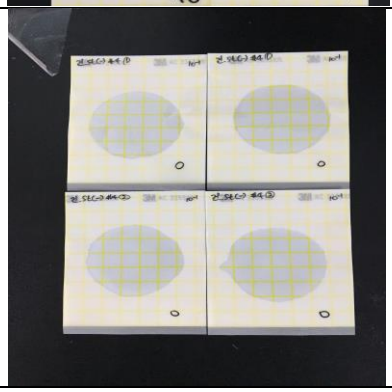
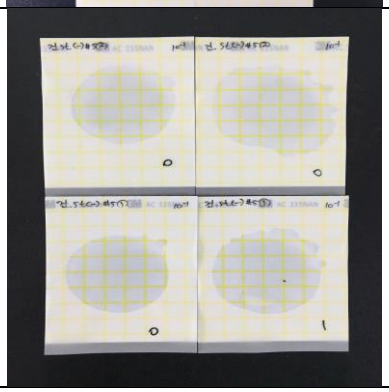
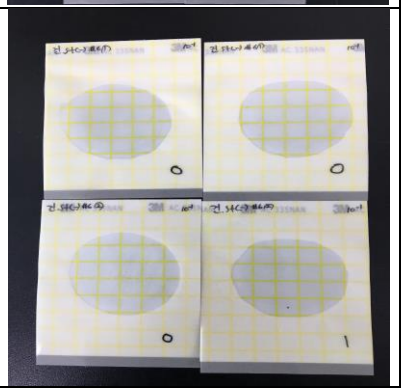
	Repeat #1	Repeat #2	Repeat #3
Positive control			
test			
Negative control			

5. *Salmonella enteritidis*

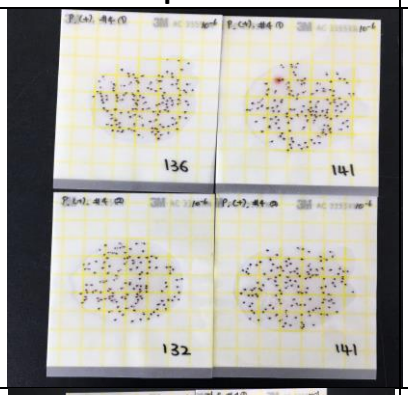
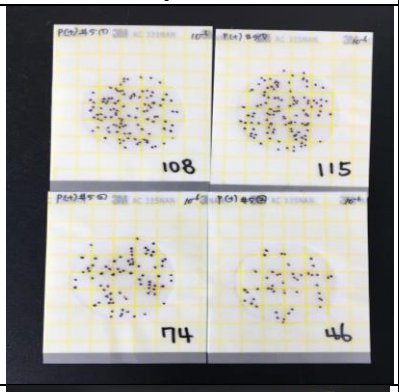
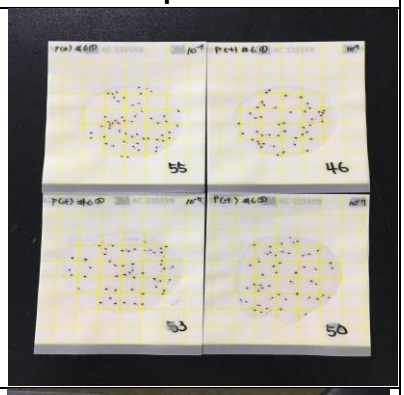
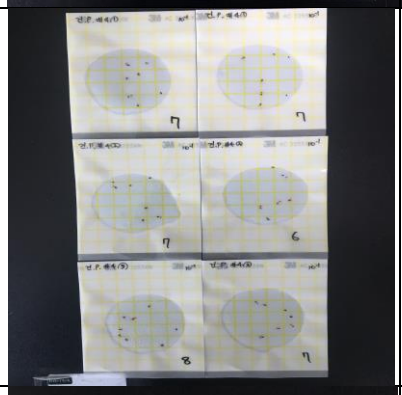
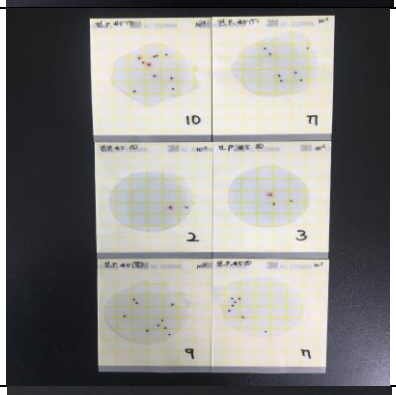
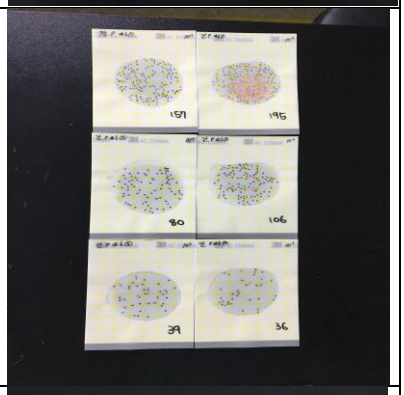
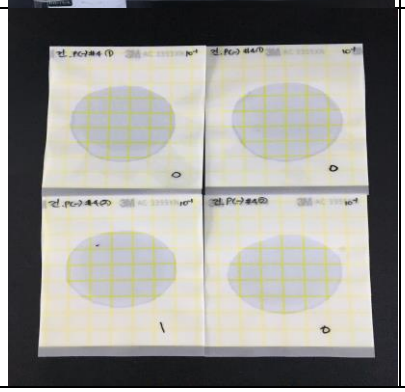
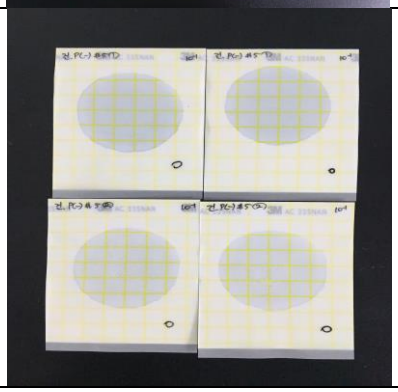
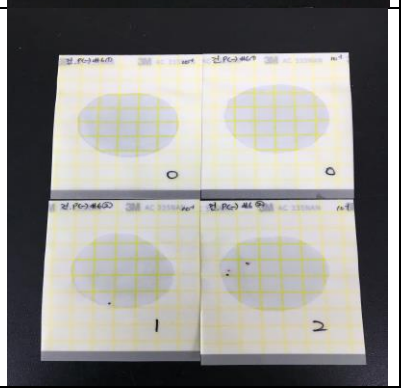
	Repeat #1	Repeat #2	Repeat #3
Positive control			
test			
Negative control			

<Case 2>

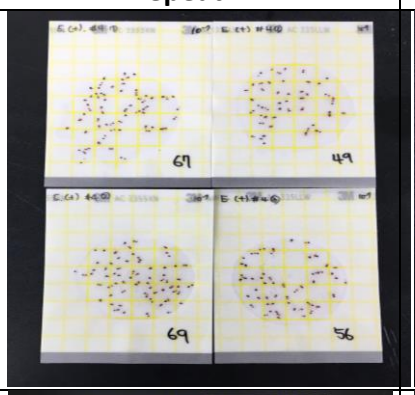
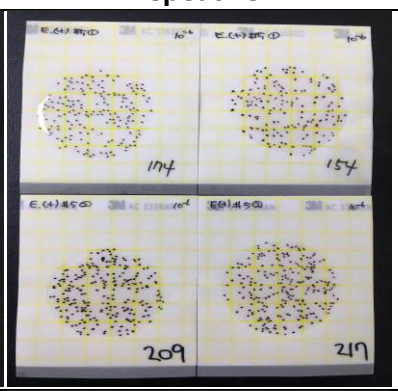
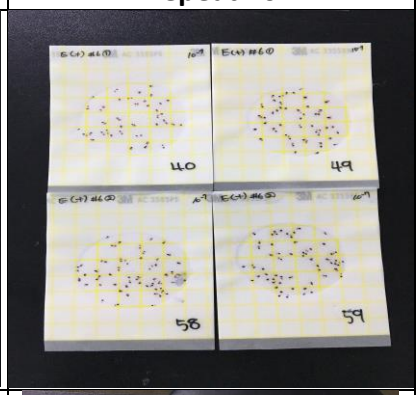
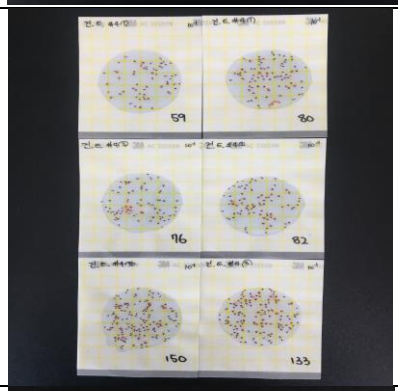
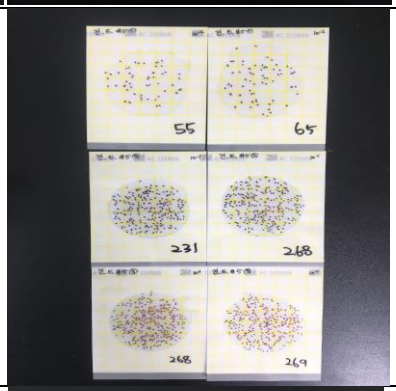
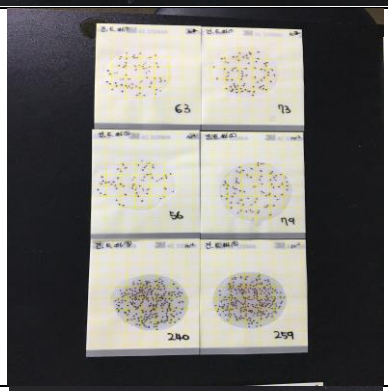
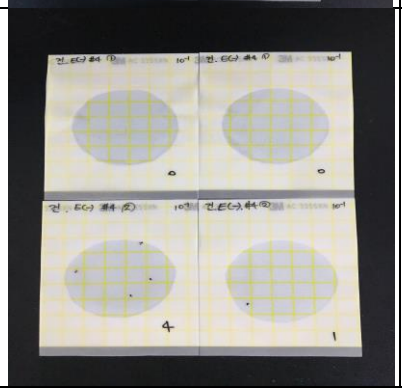
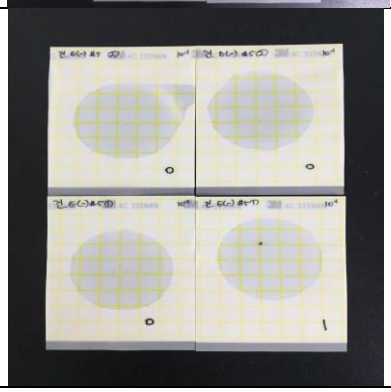
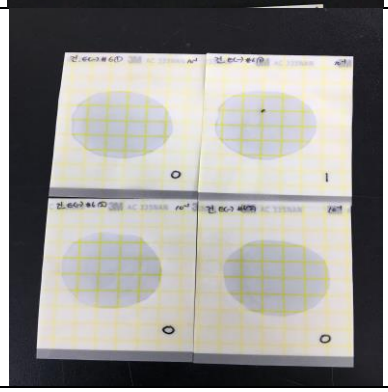
1. *Staphylococcus aureus*

	Repeat #4	Repeat #5	Repeat #6
Positive control			
test			
Negative control			

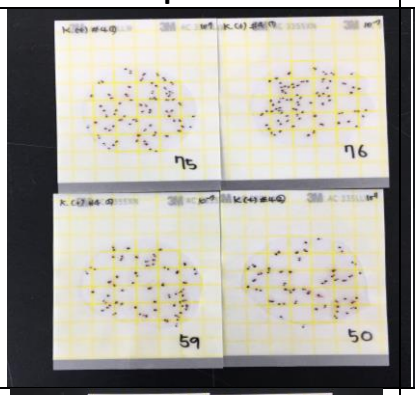
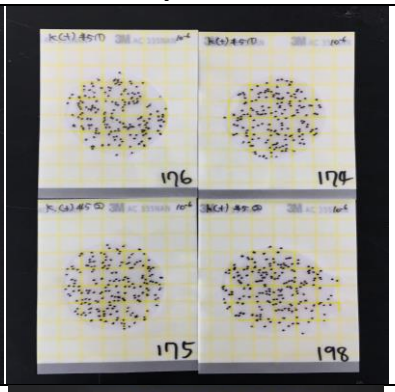
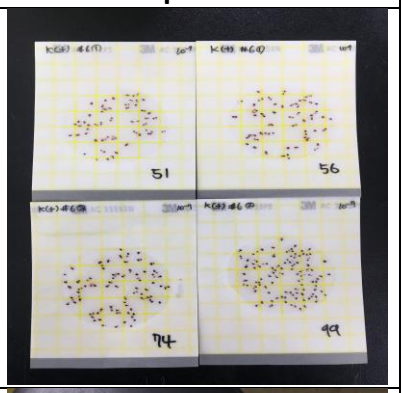
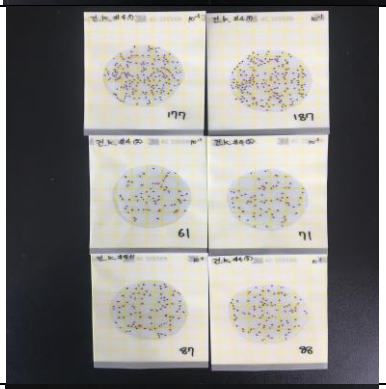
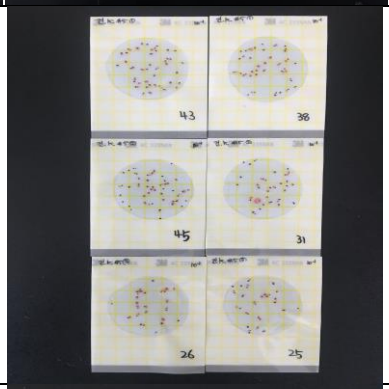
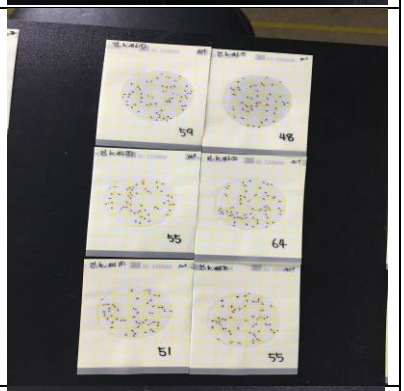
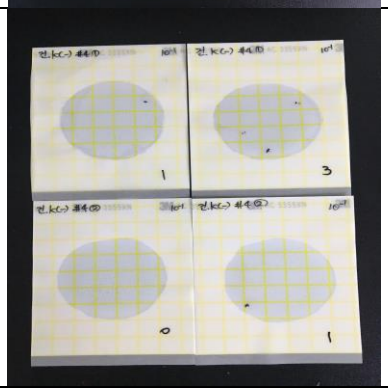
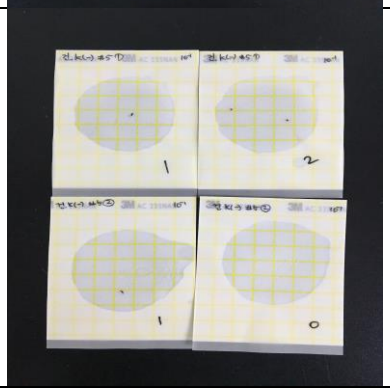
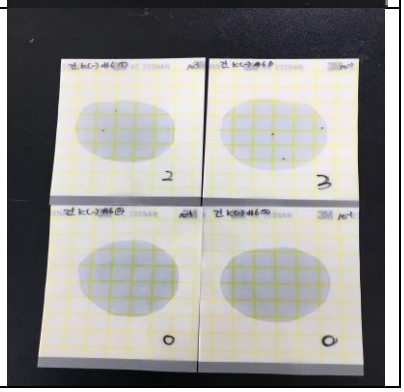
2. *Pseudomonas aeruginosa*

	Repeat #4	Repeat #5	Repeat #6
Positive control			
test			
Negative control			

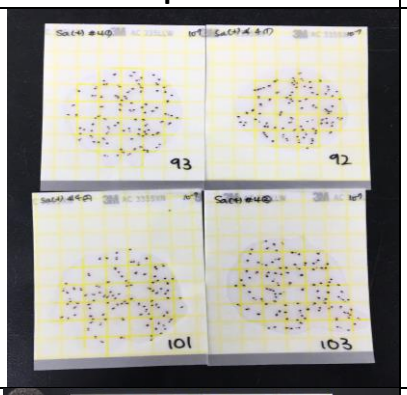
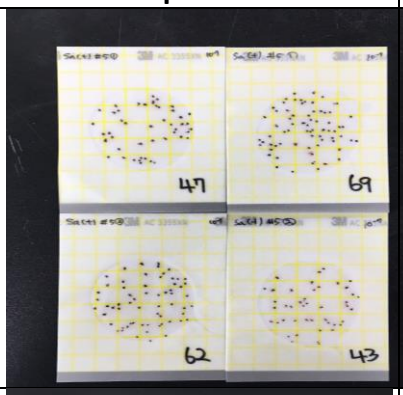
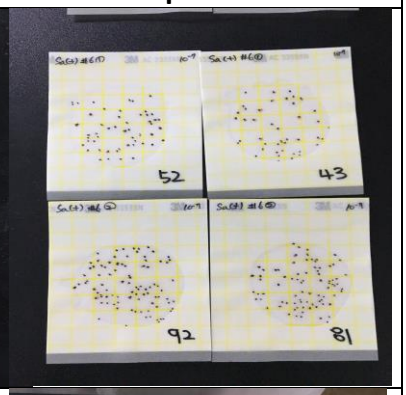
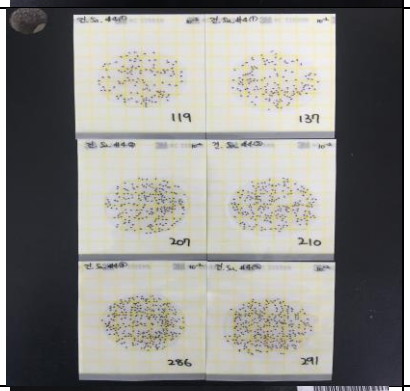
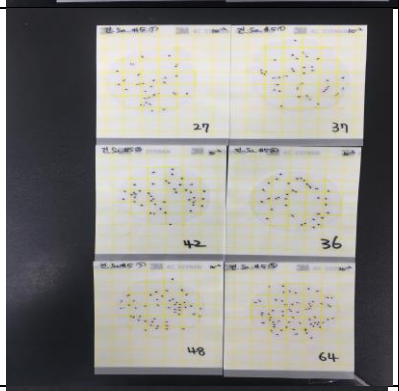
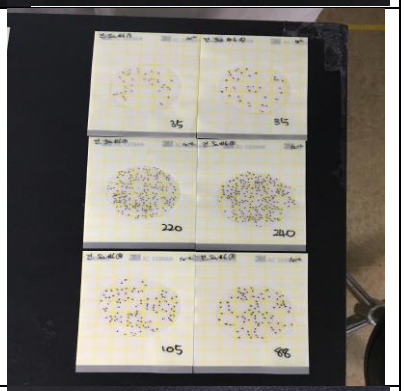
3. *Escherichia coli*

	Repeat #4	Repeat #5	Repeat #6
Positive control			
test			
Negative control			

4. Klebsiella pneumoniae

	Repeat #4	Repeat #5	Repeat #6
Positive control			
test			
Negative control			

5. *Salmonella enteritidis*

	Repeat #4	Repeat #5	Repeat #6
Positive control			
test			
Negative control	