intertek
Total Quality. Assured.

LG ELECTRONICS CO., LTD.

TEST REPORT

SCOPE OF WORKS
EVALUATION OF STERILIZATION EFFICIENCY OF DISINFECTION ROBOT USING UV-C LIGHT DEVICES

REPORT NUMBER
RT21E-S0023

ISSUE DATE
29-APR-2021

PAGES
30

DOCUMENT CONTROL NUMBER
ISTC-QP-FM-17-03-E1 Rev.1

TEST REPORT FOR LG ELECTRONICS CO., LTD.

Report No.: RT21E-S0023
Date: APR 29, 2021

OBJECTIVE

The purpose of the testing is:

To define test conditions and evaluate the efficacy of microorganisms inactivation on the surface materials by a disinfection robot using UV-C light devices.

HYPOTHESIS

Staphylococcus aureus & Salmonella on stainless steel exposed to UVC will be decreased 99.999%.
Staphylococcus aureus & Salmonella on glass exposed to UVC will be decreased 99.999%.
Staphylococcus aureus & Klebsiella pneumoniae on fabric exposed to UVC will be decreased 99.999%.

CONCLUSION

Based on the data collected, the Hypothesis is accepted:

Staphylococcus aureus on stainless steel & glass exposed to UVC lamp at a distance of 23.5 cm can decreased 99.999 % at more than 70 seconds.

Salmonella on stainless steel & glass exposed to UVC lamp at a distance of 23.5 cm can decreased 99.999 % at more than 90seconds.

Staphylococcus aureus & Klebsiella pneumoniae on fabric exposed to UVC lamp at a distance of 23.5 cm can decreased 99.999 % at more than 30 seconds.

Rody Ju   Bo Park
_____   _____
ENGINEER   **REVIEWER**

CONDUCTED BY   LG ELECTRONICS INC.

PERFORMED BY   INTERTEK TESTING SERVICES KOREA LTD.

PERIOD OF TEST   05 APR 2021 ~ 14 APR 2021

DATE OF ISSUE   29 APR 2021

SECTION 1
INDEX

SECTION 2
OBJECTIVE

The purpose of the testing is:

To define test conditions and evaluate the efficacy of microorganisms inactivation on the surface materials by a disinfection robot using UV-C light devices.

SECTION 3
PARAMETERS

The following parameters are controlled

VALUE	DESCRIPTION	UNITS	METHOD
23 ± 5	Test room temperature	°C	Data logger
65 ± 20	Test room humidity	% R.H.	Data logger
35-37	Incubated Temperature	°C	Data logger

The following parameters are monitored

VALUE	DESCRIPTION	UNITS	METHOD
23 ± 5	Test room temperature	°C	Data logger
65 ± 20	Test room humidity	% R.H.	Data logger
35-37	Incubated Temperature	°C	Data logger

SECTION 4
PRODUCT/MODEL DESCRIPTION

PRODUCT INFORMATION : LG DISINFECTING ROBOT

MODEL :

Note :

SECTION 5
SAMPLE ACQUISITION

Sample(s) was supplied by the applicant:

SAMPLE #	DESCRIPTION	MODEL	PURCHASE LOCATION	DATE	CONDITION
1	Disinfection robot	-	Prepared by LG	2021.2	Packaged and undamaged
2	UV Lamp	Philips TUV 36W SLV/6	Prepared by LG	2021.2	Packaged and undamaged

SECTION 6
HYPOTHESIS

Staphylococcus aureus & Salmonella on stainless steel exposed to UVC will be decreased 99.999%.
Staphylococcus aureus & Salmonella on glass exposed to UVC will be decreased 99.999%.
Staphylococcus aureus & Klebsiella pneumoniae on fabric exposed to UVC will be decreased 99.999%.

SECTION 7
EQUIPMENT LIST

#	EQUIPMENT DESCRIPTION	MANUFACTURER'S NAME / MODEL # / SERIAL #	INTERTEK ASSET #	CALIBRATION DATE	CALIBRATION DUE	RANGE USED
1	Auto clave	JEIOTECH / ST-105G / 1A035183	ISTK-78-00	2020.04.24	2021.04.23	121 ℃
2	Incubator	JEIOTECH / 1L-11 / W070283	ISTK-21-06	2020.08.10	2021.08.10	0 ~ 60 ℃
3	Thermometer	NONE/ JB-913 / TEMPNO.11591	ISTC-64-05	2020.04.27	2021.04.27	10 ~ 30 ℃
4	hydrometer	NONE/ JB-913 / TEMPNO.11591	ISTC-64-05	2020.04.27	2021.04.27	40 ~ 80 %
5	Pipet (1000)	Biohit / 15582461 /AP-40	ISTC-APM-04	2020.08.20	2021.08.20	100 ~ 1000 uL
6	Pipet (10)	Biohit / 12527456 /AP-22	ISTC-APM-04	2020.11.10	2021.11.10	10 ~ 100 uL
7	Balance	AND/CB-2000/H16-02955	ISTK-01-07	2020.08.10	2021.08.10	(0 ~ 2000) g
8	Clean bench	SEOJIN / - / -	ISTK-23-01	-	-	-
9	Colony counter	Hwashin / 350CL / -	ISTK-48-01	-	-	-

Note: The equipment measurement uncertainty is stated in the Test Procedure.

SECTION 8
TECHNICAL STAFF

#	Staff Name	Area of Expertise
1	Ej Kim	Technician / Intertek Testing Korea Ltd.
2	Kenneth Lee	Sr.Engineer / Intertek Testing Korea Ltd.
3	Rody Ju	Technical Manager / Intertek Testing Korea Ltd.
4	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

1. Test Set up :

Items		Requirement	Condition
Electrical Supply	Voltage	(220 ± 10)	(220 ± 10)
	Frequency	(60 ± 10) Hz	(60 ± 10) Hz
Ambient Temperature		(25 ± 3) °C	(25 ± 3) °C
Ambient humidity		(40 ± 10) % R.H.	(40 ± 10) % R.H.

2. Test Condition :
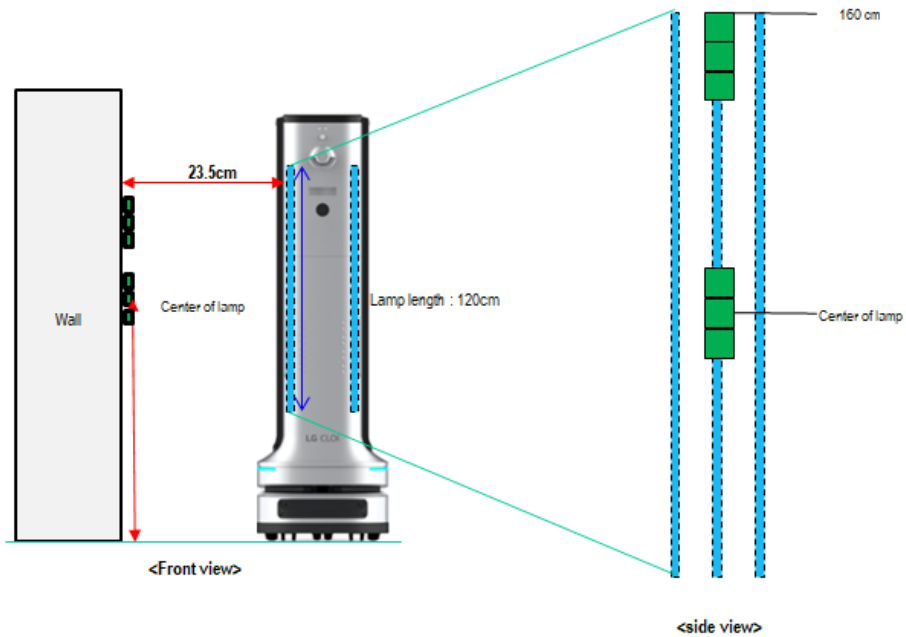
Date: APR. 29, 2021

3. Sample Description

	Photocatalytic specimens
Type	UV Lamp (Philips TUV 36W SLV/6)
Size	Length : 120mm
Shape	cylinder
Photo	

4. Microorganisms

Bacteria Species	Strain Number
Staphylococcus aureus	ATCC 6538
Klebsiella pneumoniae	ATCC 4352
Salmonella enteritidis	ATCC 12021

5. Reagents

Name	Manufacturer	Product No	LOT No	Expiry date	Contents
1 X PBS buffer	Gibco	70011-044	2193136	22.09.30	
Tryptic Soy Agar	Difco	236950	0244908	25.07.31	
Tryptic Soy Broth	Difco	211825	9065918	24.01.31	

6. Test method

6.1. Preparation of test

6.1.1 Disconnect 1 ul of the strains cultured on TSA using a loop and inoculate it in 100 ml of TSB.

6.1.2 Incubate in a 37 °C water bath so that the OD value is between 0.8 and 1.0 in the 600 nm wavelength.

6.1.3 Using Standard curve data dilute the number of bacteria to $1.0 \sim 10.0 \times 10^7$ CFU/mL

6.1.4 Put the specimen on an empty Petri dish and inoculate it with 10 ul of the **6.1.3** solution.

On 6 stainless steel & glass samples, inoculate *Staphylococcus aureus, Salmonella enteritidis.*

On 6 fabric samples, inoculate *Staphylococcus aureus, Klebsiella pneumoniae.*

In this case, Positive control and Negative control (D.W), respectively, are prepared and placed for the same time as the subsequent procedure.

6.1.5 Cover the petri dish lid diagonally and dry it naturally in the clean bench for 30 minutes. At this time, air is allowed to flow for drying.

6.2 Operating of Disinfection robot

The UV is radiated at the distance-time according to the test conditions.

6.2.1 Attach the specimen on the wall so that UV can be easily emitted.

6.2.2 Turn on the Lamp. (Cover the Lamp)

6.2.3 After the light source stabilizes, Remove the cover and Radiate with a UVC lamp for 30 seconds at a distance of 23.5 cm away.

6.2.4 In the same way, repeat the test again for 50s, 70s and 90s.

6.2.5 Change every lamp to another batch.

6.2.6 Triplicate test complete

6.3 Extraction of bacteria from sample specimen

6.3.1 Swab three times per specimen recovered and put it in a 50 mL tube containing 10mL of
1 X PBS buffer.

In the case of fabric, it is placed directly into a 50 mL conical tube containing 10mL of 1 X
PBS buffer without Swab.

6.3.2 Voltex more than 5 minutes.

6.4 The method of examination

6.4.1 Get 1 mL of Solution and put in an empty Petri dish, and then add 20 mL of TSA medium stored at
45-50 °C.

6.4.2 All plates incubate for (48 ± 4) hours at 37 ℃.

2.6.3 After incubation, the plates enumerated.

6.5 Calculation of result

6.5.1 Percent reduction = [(a-b)/a] × 100

a : the microorganism number of Positive control
b : the microorganism number of after UV radiation.

SECTION 10
TEST RESULT

Stainless steel - *Staphylococcus aureus*

Repeat #1	Sample	160 cm			100 cm		
		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive control	Control 1	3.3×10^6	2.8×10^6	-	3.3×10^6	2.8×10^6	-
	Control 2	2.3×10^6			2.3×10^6		
30s	Sample 1	1.6×10^2	6.2×10^1	99.997	0	2.0×10^0	99.999
	Sample 2	1.5×10^1			5.0×10^0		
	Sample 3	1.0×10^1			0		
50s	Sample 1	1.1×10^2	4.2×10^1	99.998	0	8.0×10^0	99.999
	Sample 2	0			2.5×10^1		
	Sample 3	1.5×10^1			0		
70s	Sample 1	0	2.0×10^0	99.999	0	2.0×10^0	99.999
	Sample 2	0			0		
	Sample 3	5.0×10^0			5.0×10^0		
90s	Sample 1	1.0×10^1	3.0×10^0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		

Stainless steel - *Staphylococcus aureus*

Repeat #2	Sample	160 cm			100 cm		
		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive control	Control 1	1.0×10^7	9.0×10^6	-	1.0×10^7	9.0×10^6	-
	Control 2	7.8×10^6			7.8×10^6		
30s	Sample 1	1.0×10^1	8.3×10^1	99.999	1.5×10^1	1.8×10^1	99.999
	Sample 2	1.1×10^2			3.5×10^1		
	Sample 3	1.3×10^2			5.0×10^0		
50s	Sample 1	0	0	99.999	0	3.0×10^0	99.999
	Sample 2	0			5.0×10^0		
	Sample 3	0			5.0×10^0		
70s	Sample 1	1.0×10^1	3.0×10^0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
90s	Sample 1	5.0×10^0	2.0×10^0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		

Date: APR. 29, 2021

Stainless steel - *Staphylococcus aureus*

Repeat #3	Sample	160 cm			100 cm		
		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive control	Control 1	1.2×10^7	1.1×10^7	-	1.2×10^7	1.1×10^7	-
	Control 2	1.1×10^7			1.1×10^7		
30s	Sample 1	1.8×10^3	6.3×10^2	99.994	0	1.0×10^1	99.999
	Sample 2	9.0×10^1			1.0×10^1		
	Sample 3	5.0×10^0			2.0×10^1		
50s	Sample 1	9.7×10^2	3.7×10^2	99.996	5.0×10^0	2.0×10^0	99.999
	Sample 2	1.5×10^1			0		
	Sample 3	0			0		
70s	Sample 1	8.0×10^1	2.8×10^1	99.999	0	0	99.999
	Sample 2	5.0×10^0			0		
	Sample 3	0			0		
90s	Sample 1	1.5×10^1	5.0×10^0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		

Stainless steel - *Salmonella enteritidis*

Repeat #1	Sample	160 cm			100 cm		
		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive control	Control 1	6.3×10^5	6.4×10^5	-	6.3×10^5	6.4×10^5	-
	Control 2	6.5×10^5			6.5×10^5		
30s	Sample 1	2.4×10^2	1.8×10^2	99.971	1.2×10^2	8.7×10^1	99.986
	Sample 2	2.1×10^2			2.0×10^1		
	Sample 3	9.0×10^1			1.2×10^2		
50s	Sample 1	3.0×10^1	3.3×10^1	99.994	0	0	99.999
	Sample 2	1.0×10^1			0		
	Sample 3	6.0×10^1			0		
70s	Sample 1	0	1.0×10^1	99.998	0	0	99.999
	Sample 2	1.0×10^1			0		
	Sample 3	2.0×10^1			0		
90s	Sample 1	1.0×10^1	3.0×10^0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		

Stainless steel - *Salmonella enteritidis*

Repeat #2	Sample	160 cm			100 cm		
		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive control	Control 1	3.1×10^5	3.4×10^5	-	3.1×10^5	3.4×10^5	-
	Control 2	3.6×10^5			3.6×10^5		
30s	Sample 1	4.9×10^2	3.1×10^2	99.908	0	2.0×10^0	99.999
	Sample 2	3.2×10^2			5.0×10^0		
	Sample 3	1.1×10^2			0		
50s	Sample 1	9.0×10^1	7.3×10^1	99.978	0	0	99.999
	Sample 2	2.0×10^1			0		
	Sample 3	1.1×10^2			0		
70s	Sample 1	0	3.0×10^0	99.999	0	0	99.999
	Sample 2	5.0×10^0			0		
	Sample 3	5.0×10^0			0		
90s	Sample 1	5.0×10^0	2.0×10^0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		

Stainless steel - *Salmonella enteritidis*

Repeat #3	Sample	160 cm			100 cm		
		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive control	Control 1	3.1×10^5	2.6×10^5	-	3.1×10^5	2.6×10^5	-
	Control 2	2.1×10^5			2.1×10^5		
30s	Sample 1	7.5×10^2	5.1×10^2	99.803	1.0×10^1	7.2×10^1	99.972
	Sample 2	8.0×10^1			5.5×10^1		
	Sample 3	7.1×10^2			1.5×10^2		
50s	Sample 1	2.2×10^2	8.0×10^1	99.969	0	0	99.999
	Sample 2	1.0×10^1			0		
	Sample 3	1.0×10^1			0		
70s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
90s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		

Glass - *Staphylococcus aureus*

Repeat #1	Sample	160 cm			100 cm		
		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive control	Control 1	4.5×10^6	4.1×10^6	-	4.5×10^6	4.1×10^6	-
	Control 2	3.6×10^6			3.6×10^6		
30s	Sample 1	5.5×10^1	2.7×10^1	99.999	0	0	99.999
	Sample 2	1.5×10^1			0		
	Sample 3	1.0×10^1			0		
50s	Sample 1	1.0×10^1	1.7×10^1	99.999	0	0	99.999
	Sample 2	1.5×10^1			0		
	Sample 3	2.5×10^1			0		
70s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
90s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		

Glass - *Staphylococcus aureus*

Repeat #2	Sample	160 cm			100 cm		
		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive control	Control 1	9.1×10^6	8.7×10^6	-	9.1×10^6	8.7×10^6	-
	Control 2	8.3×10^6			8.3×10^6		
30s	Sample 1	0	7.0×10^0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	2.0×10^1			0		
50s	Sample 1	0	0	99.999	0	2.0×10^0	99.999
	Sample 2	0			5.0×10^0		
	Sample 3	0			0		
70s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
90s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		

Glass - *Staphylococcus aureus*

Repeat #3	Sample	160 cm			100 cm		
		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive control	Control 1	8.9×10^6	8.9×10^6	-	8.9×10^6	8.9×10^6	-
	Control 2	8.8×10^6			8.8×10^6		
30s	Sample 1	3.7×10^2	2.1×10^2	99.997	5.0×10^0	2.0×10^1	99.999
	Sample 2	2.7×10^2			2.0×10^1		
	Sample 3	0			3.5×10^1		
50s	Sample 1	4.7×10^2	1.6×10^2	99.998	3.0×10^1	1.0×10^1	99.999
	Sample 2	0			0		
	Sample 3	5.0×10^0			1.0×10^1		
70s	Sample 1	2.0×10^1	7.0×10^0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
90s	Sample 1	1.5×10^1	5.0×10^0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		

Glass - *Salmonella enteritidis*

Repeat #1	Sample	160 cm			100 cm		
		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive control	Control 1	6.0×10^5	6.7×10^5	-	6.0×10^5	6.7×10^5	-
	Control 2	7.4×10^5			7.4×10^5		
30s	Sample 1	5.0×10^1	6.0×10^1	99.991	0	3.0×10^0	99.999
	Sample 2	7.5×10^1			1.0×10^1		
	Sample 3	6.0×10^1			0		
50s	Sample 1	8.5×10^1	4.8×10^1	99.992	0	0	99.999
	Sample 2	0			0		
	Sample 3	6.0×10^1			0		
70s	Sample 1	1.5×10^1	5.0×10^0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
90s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		

Glass - *Salmonella enteritidis*

Repeat #2	Sample	160 cm			100 cm		
		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive control	Control 1	1.6×10^5	1.4×10^5	-	1.6×10^5	1.4×10^5	-
	Control 2	1.1×10^5			1.1×10^5		
30s	Sample 1	2.0×10^1	3.2×10^1	99.977	1.0×10^1	5.0×10^0	99.996
	Sample 2	7.5×10^1			0		
	Sample 3	0			5.0×10^0		
50s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
70s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
90s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		

Glass - *Salmonella enteritidis*

Repeat #3	Sample	160 cm			100 cm		
		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive control	Control 1	3.4×10^5	3.4×10^5	-	3.4×10^5	3.4×10^5	-
	Control 2	3.3×10^5			3.3×10^5		
30s	Sample 1	2.1×10^2	1.1×10^2	99.967	1.0×10^1	5.0×10^0	99.998
	Sample 2	2.0×10^1			5.0×10^0		
	Sample 3	1.1×10^2			0		
50s	Sample 1	2.5×10^1	1.3×10^1	99.996	0	0	99.999
	Sample 2	1.0×10^1			0		
	Sample 3	5.0×10^0			0		
70s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
90s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		

Fabric - *Staphylococcus aureus*

Repeat #1	Sample	160 cm			100 cm		
		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive control	Control 1	9.5×10^5	8.1×10^5	-	9.5×10^5	8.1×10^5	-
	Control 2	6.6×10^5			6.6×10^5		
30s	Sample 1	1.5×10^1	7.0×10^0	99.999	0	0	99.999
	Sample 2	5.0×10^0			0		
	Sample 3	0			0		
50s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
70s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
90s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		

Date: APR. 29, 2021

Fabric - *Staphylococcus aureus*

Repeat #2	Sample	160 cm			100 cm		
		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive control	Control 1	5.4×10^5	5.4×10^5	-	5.4×10^5	5.4×10^5	-
	Control 2	5.3×10^5			5.3×10^5		
30s	Sample 1	5.0×10^0	2.0×10^0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
50s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
70s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
90s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		

Fabric - *Staphylococcus aureus*

Repeat #3	Sample	160 cm			100 cm		
		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive control	Control 1	5.1×10^5	6.6×10^5	-	5.1×10^5	6.6×10^5	-
	Control 2	8.1×10^5			8.1×10^5		
30s	Sample 1	0	2.0×10^0	99.999	5.0×10^0	2.0×10^0	99.999
	Sample 2	5.0×10^0			0		
	Sample 3	0			0		
50s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
70s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
90s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		

Fabric - *Klebsiella pneumoniae*

Repeat #1	Sample	160 cm			100 cm		
		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive control	Control 1	6.3×10^6	6.5×10^6	-	6.3×10^6	6.5×10^6	-
	Control 2	6.6×10^6			6.6×10^6		
30s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
50s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
70s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
90s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		

Fabric - *Klebsiella pneumoniae*

Repeat #2	Sample	160 cm			100 cm		
		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive control	Control 1	7.2×10^6	7.3×10^6	-	7.2×10^6	7.3×10^6	-
	Control 2	7.3×10^6			7.3×10^6		
30s	Sample 1	3.0×10^1	1.2×10^1	99.999	5.0×10^0	2.0×10^0	99.999
	Sample 2	5.0×10^0			0		
	Sample 3	0			0		
50s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
70s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
90s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		

Date: APR. 29, 2021

Fabric - *Klebsiella pneumoniae*

Repeat #3	Sample	160 cm			100 cm		
		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive control	Control 1	5.9×10^6	5.9×10^6	-	5.9×10^6	5.9×10^6	-
	Control 2	5.9×10^6			5.9×10^6		
30s	Sample 1	5.0×10^0	3.0×10^0	99.999	0	0	99.999
	Sample 2	5.0×10^0			0		
	Sample 3	0			0		
50s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
70s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
90s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		

SECTION 11
Conclusion
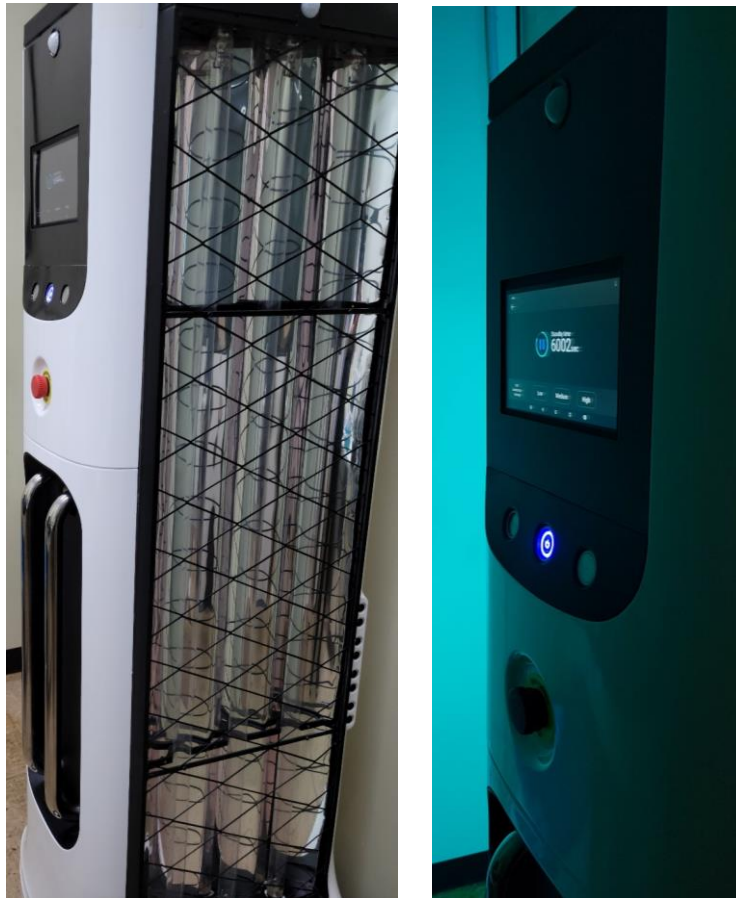
Based on the data collected the Hypothesis is accepted:

Staphylococcus aureus **on stainless steel & glass exposed to UVC lamp at a distance of 23.5 cm can decreased 99.999 % at more than 70 seconds.**

Salmonella **on stainless steel & glass exposed to UVC lamp at a distance of 23.5 cm can decreased 99.999 % at more than 90seconds.**
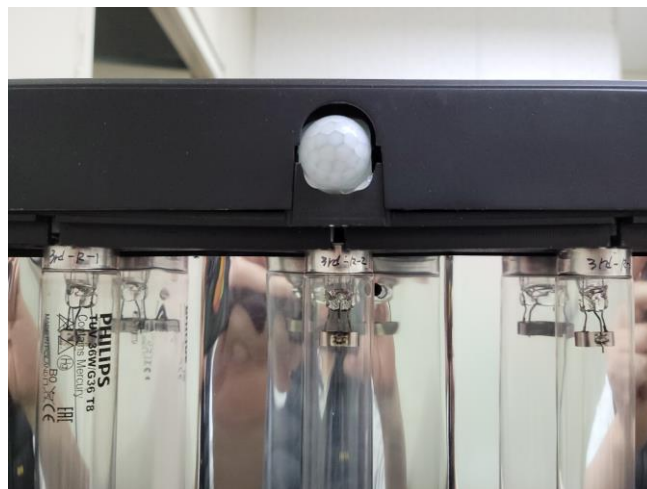
Staphylococcus aureus & Klebsiella pneumoniae **on fabric exposed to UVC lamp at a distance of 23.5 cm can decreased 99.999 % at more than 30 seconds.**

APPEXDIX I. Photos of sample

<Front view>

<Lamp position view>