

**Antimicrobial Efficiency of Yanex-2M Mobile Pulsed xenon UV unit**

**Test Method:**

The study was performed according to the sponsor's protocol.

**Purpose**

Studying the antimicrobial efficiency of pulsed ultraviolet radiation generated by the Yanex-2M unit against several multi-drug resistance microorganisms.

**Test microorganisms:**

1. *Klebsiella pneumonia* (ATCC 10031)
2. *Staphylococcus aureus* MRSA (ATCC 700699)
3. CRE *carbapenem-resistant enterobacteriaceae* (hospital strain)
4. *Acinetobacter baumannii* (ATCC BAA-747)
5. VRE *Vancomycin resistant enterococcus* (hospital strain)
6. *Clostridium difficile* (hospital strain produces toxin B)

**Test media and solutions:**

Tryptic Soy Agar (TSA)

TSA + Sheep Blood (TSBA)

Buffered Sodium Chloride-Peptone solution pH 7.0

**Test procedure:**

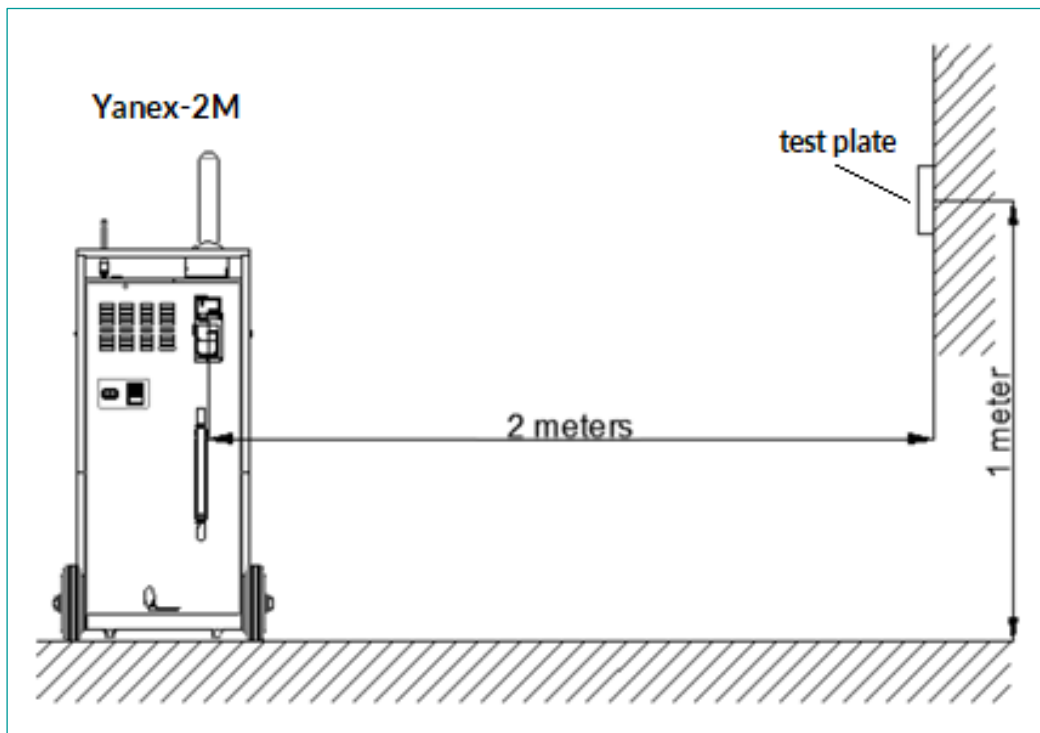
For bacteria 1-5: Six (6) Petri plates were inoculated with 0,01mL bacterial suspension containing about  $10^8$ - $10^9$  CFU/ml (each test microorganism was tested separately). The plates were put into the incubator at 37°C for 50 minutes to dry. After drying 3 plates were treated by the sponsor for 4 minutes with Yanex-2M Mobile Pulsed xenon UV unit. The rest 3 plates were served as Positive Control (PC). Microorganisms were removed from each plate by rinsing with 10 mL Buffered Sodium Chloride-Peptone solution pH 7.0 and enumerated using pour plate method on TSA.

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For bacterium 6: Six (6) Petri plates were inoculated, dried and treated as above. Treatment time by UV: 4 and 7 minutes. Additional 3 plates were inoculated with suspension containing 500 CFU/0.01 ml, dried and treated by UV for 4 and 7 minutes. Microorganisms were removed from each plate by rinsing and enumerated using membrane filtration method. Membranes were placed onto TSBA plates and incubated in anaerobic conditions.

All plates were incubated at 35-37°C for 5 days.

The treatment of test plates is carried out from a distance of 2 meters according to the scheme below:



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**Results**

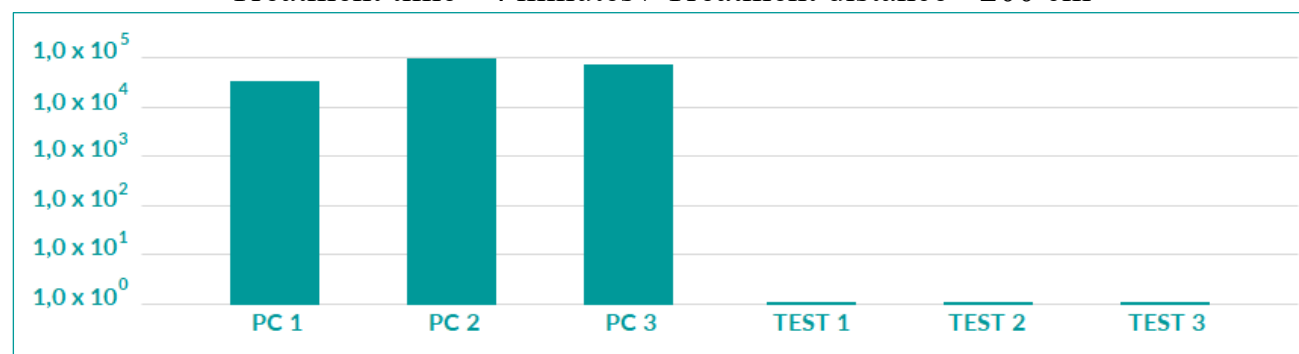
***Klebsiella pneumonia* (ATCC 10031)**

Treatment time - 4 minutes / Treatment distance - 200 cm

| Plate ID      | CFU/sample                    | Average CFU/sample     | Log  | Log reduction |
|---------------|-------------------------------|------------------------|------|---------------|
| Test 1        | <1                            | <1                     | 0    | 4.82          |
| Test 2        | <1                            |                        |      |               |
| Test 3        | <1                            |                        |      |               |
| PC-1          | 3.40 x 10 <sup>4</sup>        | 6.63 x 10 <sup>4</sup> | 4.82 |               |
| PC-2          | 9.30 x 10 <sup>4</sup>        |                        |      |               |
| PC-3          | 7.20 x 10 <sup>4</sup>        |                        |      |               |
| Inoculum size | 8.50 x 10 <sup>8</sup> CFU/ml |                        |      |               |

***Klebsiella pneumonia* (ATCC 10031)**

Treatment time - 4 minutes / Treatment distance - 200 cm



**Antimicrobial Efficiency of Yanex-2M Mobile Pulsed xenon UV unit**

**Results**

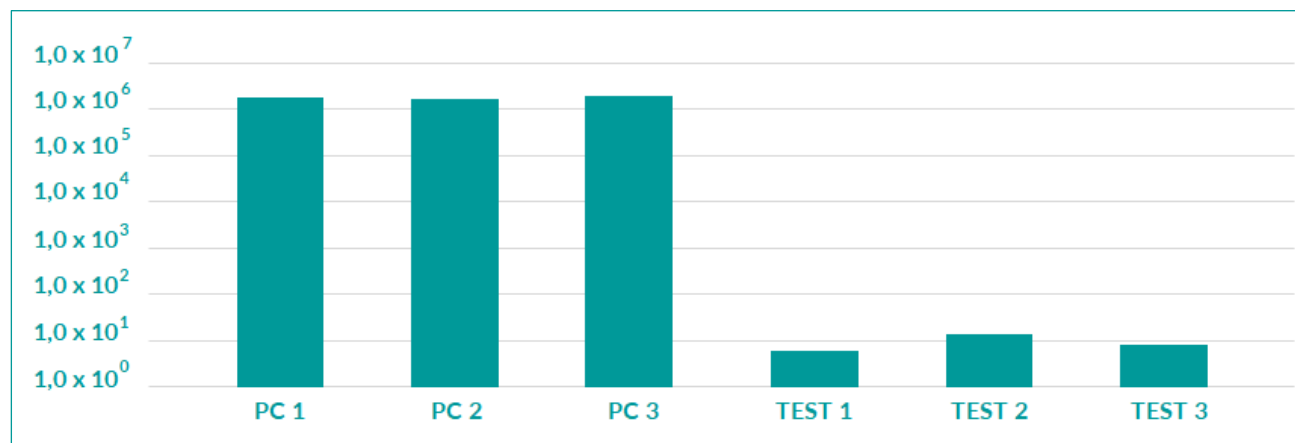
***Staphylococcus aureus* MRSA (ATCC 700699)**

Treatment time - 4 minutes / Treatment distance - 200 cm

| Plate ID      | CFU/sample                    | Average<br>CFU/sample  | Log  | Log<br>reduction |
|---------------|-------------------------------|------------------------|------|------------------|
| Test 1        | 6                             | 10                     | 1    | 5.26             |
| Test 2        | 14                            |                        |      |                  |
| Test 3        | 8                             |                        |      |                  |
| PC-1          | 1.86 x 10 <sup>6</sup>        | 1.80 x 10 <sup>6</sup> | 6.26 |                  |
| PC-2          | 1.64 x 10 <sup>6</sup>        |                        |      |                  |
| PC-3          | 1.90 x 10 <sup>6</sup>        |                        |      |                  |
| Inoculum size | 4.05 x 10 <sup>8</sup> CFU/ml |                        |      |                  |

***Staphylococcus aureus* MRSA (ATCC 700699)**

Treatment time - 4 minutes / Treatment distance - 200 cm



## Antimicrobial Efficiency of Yanex-2M Mobile Pulsed xenon UV unit

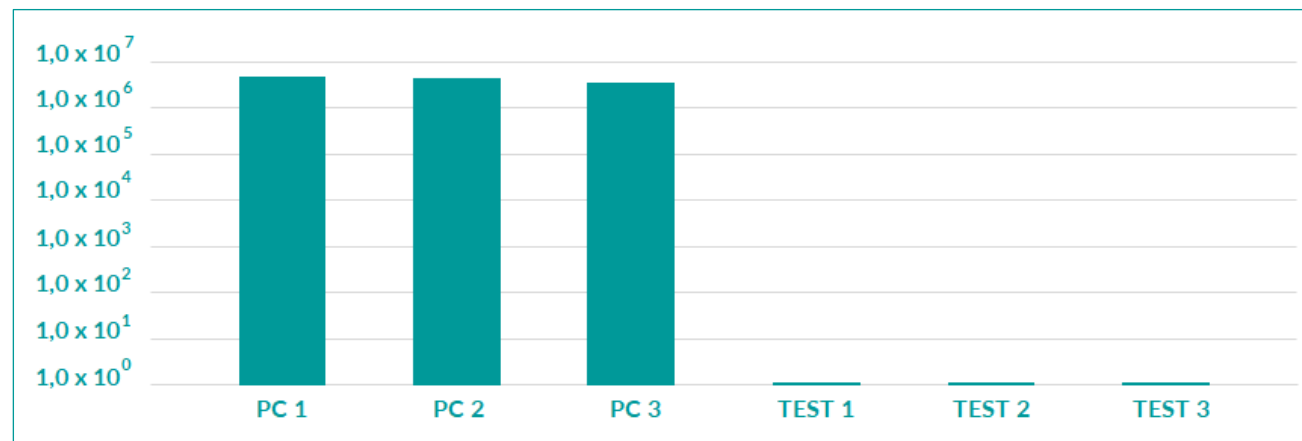
**Results*****CRE carbapenem-resistant enterobacteriaceae*** (hospital strain)

Treatment time - 4 minutes / Treatment distance - 200 cm

| Plate ID      | CFU/sample                    | Average<br>CFU/sample  | Log  | Log<br>reduction |
|---------------|-------------------------------|------------------------|------|------------------|
| Test 1        | <1                            | <1                     | 0    | 6.64             |
| Test 2        | <1                            |                        |      |                  |
| Test 3        | <1                            |                        |      |                  |
| PC-1          | 4.80 x 10 <sup>6</sup>        | 4.33 x 10 <sup>6</sup> | 6.64 |                  |
| PC-2          | 4.60 x 10 <sup>6</sup>        |                        |      |                  |
| PC-3          | 3.60 x 10 <sup>6</sup>        |                        |      |                  |
| Inoculum size | 1.26 x 10 <sup>9</sup> CFU/ml |                        |      |                  |

***CRE carbapenem-resistant enterobacteriaceae*** (hospital strain)

Treatment time - 4 minutes / Treatment distance - 200 cm



**Antimicrobial Efficiency of Yanex-2M Mobile Pulsed xenon UV unit**

**Results**

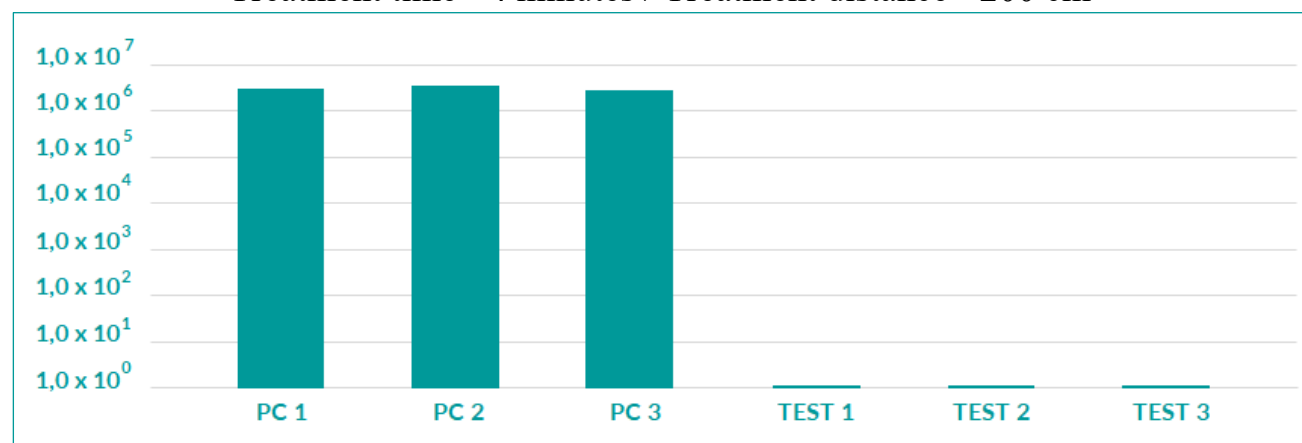
***Acinetobacter baumannii* (ATCC BAA-747)**

Treatment time - 4 minutes / Treatment distance - 200 cm

| Plate ID      | CFU/sample                    | Average<br>CFU/sample  | Log  | Log<br>reduction |
|---------------|-------------------------------|------------------------|------|------------------|
| Test 1        | <1                            | <1                     | 0    | 6.51             |
| Test 2        | <1                            |                        |      |                  |
| Test 3        | <1                            |                        |      |                  |
| PC-1          | 3.18 x 10 <sup>6</sup>        | 3.23 x 10 <sup>6</sup> | 6.51 |                  |
| PC-2          | 3.63 x 10 <sup>6</sup>        |                        |      |                  |
| PC-3          | 2.89 x 10 <sup>6</sup>        |                        |      |                  |
| Inoculum size | 1.06 x 10 <sup>9</sup> CFU/ml |                        |      |                  |

***Acinetobacter baumannii* (ATCC BAA-747)**

Treatment time - 4 minutes / Treatment distance - 200 cm



**Antimicrobial Efficiency of Yanex-2M Mobile Pulsed xenon UV unit**

**Results**

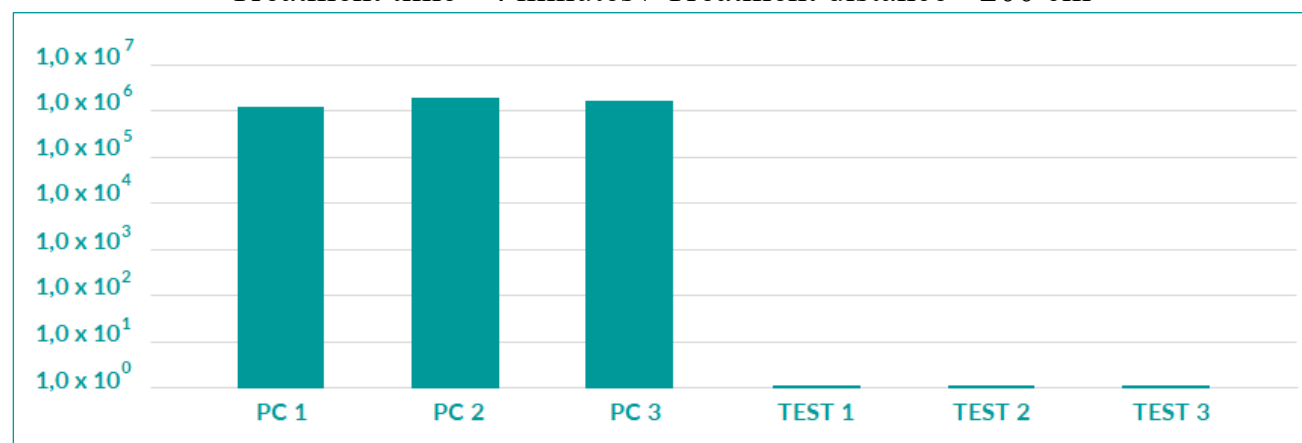
**VRE *Vancomycin resistant enterococcus* (hospital strain)**

Treatment time - 4 minutes / Treatment distance - 200 cm

| Plate ID      | CFU/sample                    | Average CFU/sample     | Log  | Log reduction |
|---------------|-------------------------------|------------------------|------|---------------|
| Test 1        | <1                            | <1                     | 0    | 6.21          |
| Test 2        | <1                            |                        |      |               |
| Test 3        | <1                            |                        |      |               |
| PC-1          | 1.24 x 10 <sup>6</sup>        | 1.63 x 10 <sup>6</sup> | 6.21 |               |
| PC-2          | 1.93 x 10 <sup>6</sup>        |                        |      |               |
| PC-3          | 1.71 x 10 <sup>6</sup>        |                        |      |               |
| Inoculum size | 9.30 x 10 <sup>8</sup> CFU/ml |                        |      |               |

**VRE *Vancomycin resistant enterococcus* (hospital strain)**

Treatment time - 4 minutes / Treatment distance - 200 cm



**Antimicrobial Efficiency of Yanex-2M Mobile Pulsed xenon UV unit**

**Results**

***Clostridium difficile* (hospital strain produces toxin B)**

Treatment time - 4 minutes / Treatment distance - 200 cm

| Plate ID      | CFU/sample                    | Average<br>CFU/sample  | Log  | Log<br>reduction |
|---------------|-------------------------------|------------------------|------|------------------|
| Test 1        | 15                            | 8                      | 0.90 | 3.16             |
| Test 2        | 3                             |                        |      |                  |
| Test 3        | 5                             |                        |      |                  |
| PC-1          | 8.80 x 10 <sup>3</sup>        | 1.14 x 10 <sup>4</sup> | 4.06 |                  |
| PC-2          | 1.05 x 10 <sup>4</sup>        |                        |      |                  |
| PC-3          | 1.48 x 10 <sup>4</sup>        |                        |      |                  |
| Inoculum size | 3.10 x 10 <sup>8</sup> CFU/ml |                        |      |                  |

***Clostridium difficile* (hospital strain produces toxin B)**

Treatment time - 7 minutes / Treatment distance - 200 cm

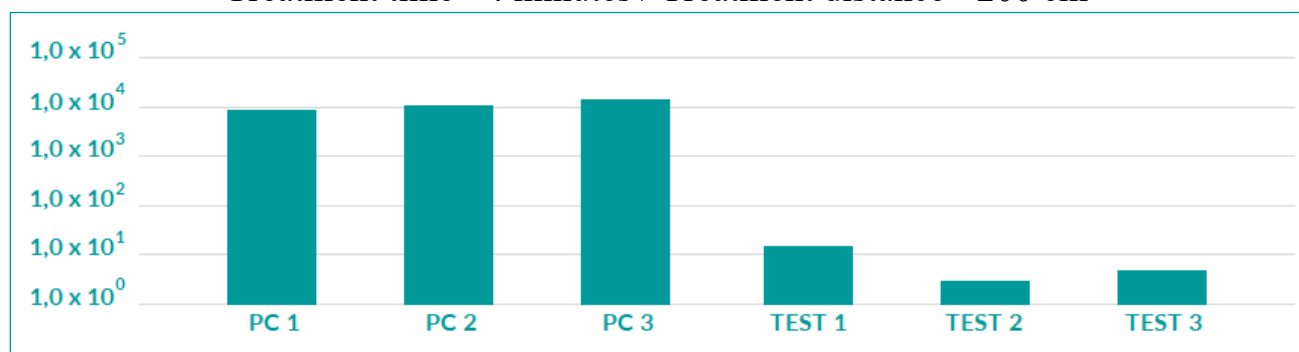
| Plate ID      | CFU/sample                    | Average CFU/sample     | Log  | Log reduction |
|---------------|-------------------------------|------------------------|------|---------------|
| Test 1        | 0                             | <1                     | 0    | 4.06          |
| Test 2        | 1                             |                        |      |               |
| Test 3        | 1                             |                        |      |               |
| PC-1          | 8.80 x 10 <sup>3</sup>        | 1.14 x 10 <sup>4</sup> | 4.06 |               |
| PC-2          | 1.05 x 10 <sup>4</sup>        |                        |      |               |
| PC-3          | 1.48 x 10 <sup>4</sup>        |                        |      |               |
| Inoculum size | 3.10 x 10 <sup>8</sup> CFU/ml |                        |      |               |

**Antimicrobial Efficiency of Yanex-2M Mobile Pulsed xenon UV unit**

**Results**

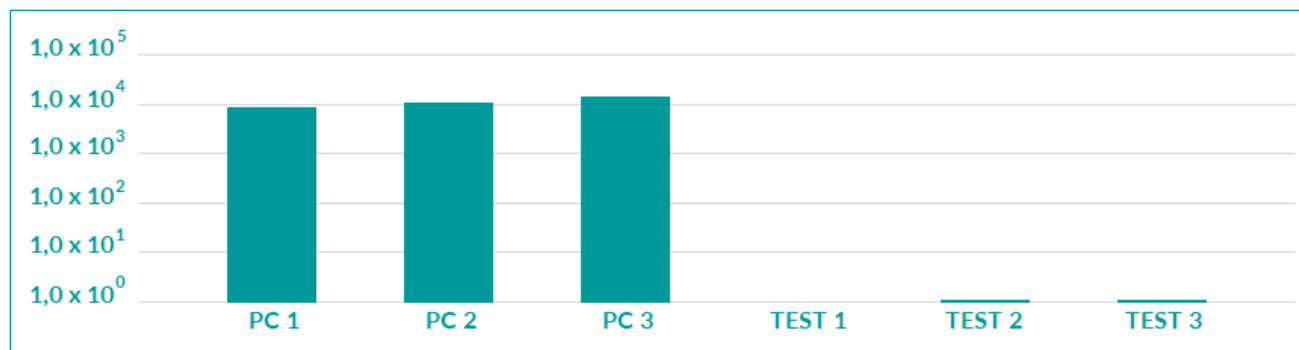
***Clostridium difficile* (hospital strain produces toxin B)**

Treatment time - 4 minutes / Treatment distance - 200 cm



***Clostridium difficile* (hospital strain produces toxin B)**

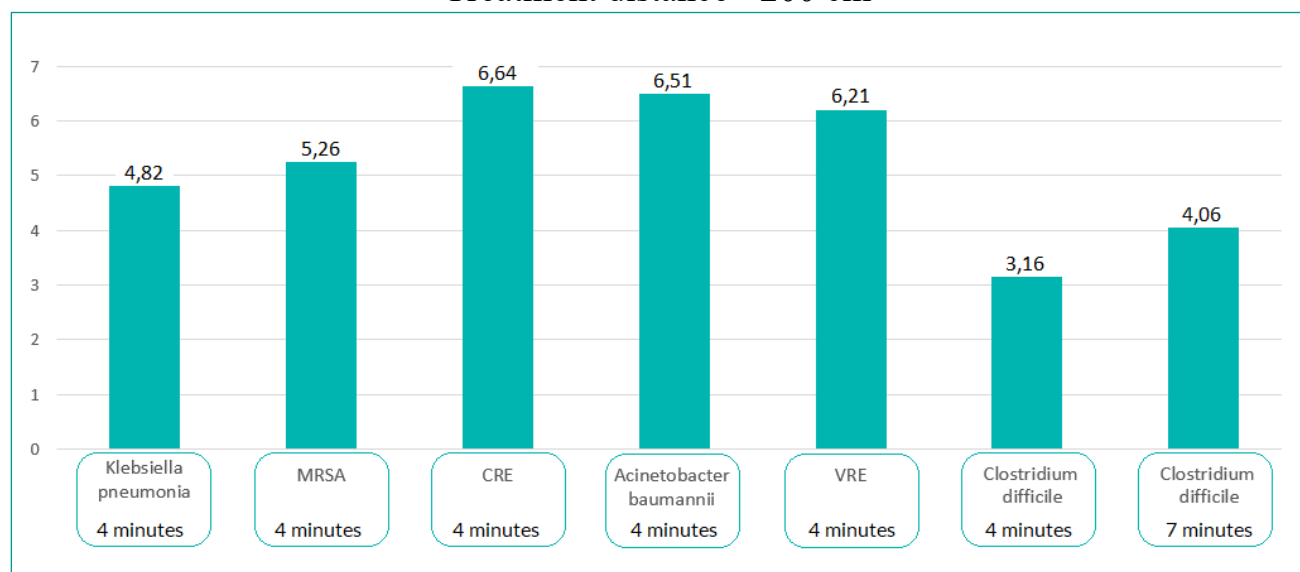
Treatment time - 7 minutes / Treatment distance - 200 cm



**Antimicrobial Efficiency of Yanex-2M Mobile Pulsed xenon UV unit**

**Summary results**

**Total Log reduction for each microorganism**  
Treatment distance - 200 cm



**\*End of certificate of analysis \***