



valid until: November 18, 2027

**Fraunhofer**  
TESTED<sup>®</sup>  
DEVICE  
LAPPKOREA LLC  
CR 8211 MC 3X0.14SQ  
Report No. LA 2208-1345

DUPPLICATE

Statement of  
Qualification

Single product  
Outgassing Behavior  
VOC/SVOC

# Statement of Qualification • Single product

## Customer

LAPPKOREA LLC  
42, JANGANGONGDAN 8-GIL  
18579 JANGAN-MYEON, HWASEONG-SI, GYEONGGI-DO  
Korea

## Test result / Classification

The outgassing behavior of the cable UNITRONIC CLEANROOM FD 8211 MC 3 X 0.14SQ at the stated temperatures was investigated according to ISO 14644-15. Based on the outgassing rates determined for the specific equipment, the following material classification was made for the corresponding Contaminant Category:

## Component tested

Category: Energy Supply  
Subcategory: Cable Systems  
Product name: UNITRONIC CLEANROOM FD 8211 MC 3 X 0.14SQ  
(manufacturing date: 6/24/2022; color: black; batch number: C/25; serial number: 85132401)

Contaminant Category (x)	SER <sup>1)</sup> 23 °C [g/unit · s]	ISO ACC <sub>e</sub> Class (x) based on 23 °C
VOC	3.7 x 10 <sup>-10</sup>	-9.4
SVOC	2.2 x 10 <sup>-10</sup>	-9.6
Amines	< 4.6 x 10 <sup>-13</sup>	--
Organophosphates	< 4.6 x 10 <sup>-13</sup>	--
Siloxanes	< 4.6 x 10 <sup>-13</sup>	--
Phthalates	< 4.6 x 10 <sup>-13</sup>	--

<sup>1)</sup>SER<sub>u</sub>: Unit-specific emission rate

## Emission measurements with purge-and-trap thermodesorption method and gas chromatography combined with mass spectrometry (TD-GC/MS)

Standards/Guidelines: ISO 14644-8, -15; ISO 16000-6, -9, -11, -25  
The norms stated generally refer to the version valid at the time of the tests.

Testing equipment: Measuring station: ..... PerkinElmer Clarus 600, Clarus SQ8, ATD 650

Test procedure parameters:

- Retention range (VOC): ..... C6 to C16
- Outgassing test temperatures: ..... 23 °C
- Duration of preconditioning: ..... > 10h
- Flow rate purge gas: ..... 10 l/h
- Flow rate sampling gas: ..... 10 l/h
- Duration of sampling: ..... 60 min
- Volume of the emission cell: ..... 10 l
- Emission cell material: ..... stainless steel

The measuring devices used for the qualification tests are calibrated at regular intervals; their results can be traced back to national and international standards. In cases where no national standards exist, the test procedure implemented complies with the technical regulations and norms applicable at the time of the test. The relevant documentation can be viewed on request at any time.

Detailed information and parameters of the test environment can be found in the Fraunhofer IPA test report.

Fraunhofer Institute for Manufacturing  
Engineering and Automation IPA

Department of Ultraclean Technology  
and Micromanufacturing

Nobelstrasse 12  
70569 Stuttgart  
Germany

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on behalf of   
Dr.-Ing. Frank Bürger, Project Manager Fraunhofer IPA

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