

Date: 02-Nov-2023

Page: 1 of 13

NORDIC SEMICONDUCTOR ASA
OTTO NIELSENS VEG 12, 7052 TRONDHEIM, NORWAY

The following sample(s) was/were submitted and identified by the applicant as:

No.: ETR23A04839

Sample Submitted By : NORDIC SEMICONDUCTOR ASA

Sample Name : INTEGRATED CIRCUITS Style/Item No. : nRF52833-CJAA B00

Buyer/Order No. : PO-0022932

Other Info. : This report is also applicable to the following products: nRF52805-CAAA

A00/B00, nRF52820-CFAA D00, nRF52833-CJAA A00, nRF52840-CKAA D00/F00, nRF52810-CAAA D00/E00, nRF52811-CAAA A00/B00, nRF52832-

CLAA E00/G00.

Sample Receiving Date : 26-Oct-2023

Testing Period : 26-Oct-2023 to 02-Nov-2023

Test Requested : Testing item(s) is/are specified by client. Please refer to result table for testing

item(s).

**Test Results**: Please refer to following pages.

Troy Chang / Department Malager
Signed for and on behalf of Alwah
SGS TAIWAN LTD.
Chemical Laboratory - Taipei



PIN CODE: A3E4832



No.: ETR23A04839 Date: 02-Nov-2023 Page: 2 of 13

NORDIC SEMICONDUCTOR ASA
OTTO NIELSENS VEG 12, 7052 TRONDHEIM, NORWAY

**Test Part Description** 

No.1 : MIXED ALL PARTS

### Test Result(s)

Test Item(s)	Method	Unit	MDL	Result
				No.1
Cadmium (Cd)	With reference to IEC 62321-5: 2013,	mg/kg	2	n.d.
Lead (Pb)	analysis was performed by ICP-OES.	mg/kg	2	20.0
Mercury (Hg)	With reference to IEC 62321-4: 2013+ AMD1: 2017, analysis was performed	mg/kg	2	n.d.
	by ICP-OES.			
Hexavalent Chromium Cr(VI)	With reference to IEC 62321-7-2: 2017,	mg/kg	8	n.d.
	analysis was performed by UV-VIS.			
Monobromobiphenyl		mg/kg	5	n.d.
Dibromobiphenyl		mg/kg	5	n.d.
Tribromobiphenyl		mg/kg	5	n.d.
Tetrabromobiphenyl		mg/kg	5	n.d.
Pentabromobiphenyl		mg/kg	5	n.d.
Hexabromobiphenyl		mg/kg	5	n.d.
Heptabromobiphenyl		mg/kg	5	n.d.
Octabromobiphenyl		mg/kg	5	n.d.
Nonabromobiphenyl		mg/kg	5	n.d.
Decabromobiphenyl		mg/kg	5	n.d.
Sum of PBBs	With reference to IEC 62321-6: 2015,	mg/kg	1	n.d.
Monobromodiphenyl ether	analysis was performed by GC/MS.	mg/kg	5	n.d.
Dibromodiphenyl ether		mg/kg	5	n.d.
Tribromodiphenyl ether		mg/kg	5	n.d.
Tetrabromodiphenyl ether		mg/kg	5	n.d.
Pentabromodiphenyl ether		mg/kg	5	n.d.
Hexabromodiphenyl ether		mg/kg	5	n.d.
Heptabromodiphenyl ether		mg/kg	5	n.d.
Octabromodiphenyl ether		mg/kg	5	n.d.
Nonabromodiphenyl ether		mg/kg	5	n.d.
Decabromodiphenyl ether		mg/kg	5	n.d.
Sum of PBDEs		mg/kg	-	n.d.



No.: ETR23A04839 Date: 02-Nov-2023 Page: 3 of 13

NORDIC SEMICONDUCTOR ASA
OTTO NIELSENS VEG 12, 7052 TRONDHEIM, NORWAY

Test Item(s)	Method	Unit	MDL	Result
Dibutyl phthalate (DBP)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	No.1 n.d.
Butyl benzyl phthalate (BBP)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.
Di-(2-ethylhexyl) phthalate (DEHP)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.
Diisodecyl phthalate (DIDP) (CAS No.: 26761-40-0, 68515-49-1)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.
Diisononyl phthalate (DINP) (CAS No.: 28553-12-0, 68515-48-0)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.
Di-n-octyl phthalate (DNOP) (CAS No.: 117-84-0)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.
Diisobutyl phthalate (DIBP)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.
Di-n-pentyl phthalate (DNPP) (CAS No.: 131-18-0)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.
Di-n-hexyl phthalate (DNHP) (CAS No.: 84-75-3)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.
Bis(2-methoxyethyl) phthalate (DMEP) (CAS No.: 117-82-8)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.
Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (α- HBCDD, β- HBCDD, γ- HBCDD) (CAS No.: 25637-99-4, 3194- 55-6 (134237-51-7, 134237-50-6, 134237-52-8))	With reference to IEC 62321-9: 2021, analysis was performed by GC/MS.	mg/kg	20	n.d.
Fluorine (F) (CAS No.: 14762-94-8)	With reference to BS EN 14582: 2016, analysis was performed by IC.	mg/kg	50	2600
Chlorine (Cl) (CAS No.: 22537-15-1)	With reference to BS EN 14582: 2016, analysis was performed by IC.	mg/kg	50	n.d.
Bromine (Br) (CAS No.: 10097-32-2)	With reference to BS EN 14582: 2016, analysis was performed by IC.	mg/kg	50	n.d.



No.: ETR23A04839 Date: 02-Nov-2023 Page: 4 of 13

NORDIC SEMICONDUCTOR ASA
OTTO NIELSENS VEG 12, 7052 TRONDHEIM, NORWAY

Test Item(s)	Method	Unit	MDL	Result
				No.1
PFOS and its salts (CAS No.: 1763-23-1 and its salts)	With reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS.	mg/kg	0.01	n.d.
PFOA and its salts (CAS No.: 335-67-1 and its salts)	With reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS.	mg/kg	0.01	n.d.
Beryllium (Be) (CAS No.: 7440-41-7)	With reference to US EPA 3052: 1996, analysis was performed by ICP-OES.	mg/kg	2	n.d.
Antimony (Sb) (CAS No.: 7440-36-0)	With reference to US EPA 3052: 1996, analysis was performed by ICP-OES.	mg/kg	2	n.d.

### Note:

- 1. mg/kg = ppm; 0.1wt% = 0.1% = 1000ppm
- 2. MDL = Method Detection Limit
- 3. n.d. = Not Detected (Less than MDL)
- 4. "-" = Not Regulated
- 5. The sample(s) was/were analyzed on behalf of the applicant as mixing sample in one testing. The above result(s) was/were only given as the informality value.



No.: ETR23A04839 Date: 02-Nov-2023 Page: 5 of 13

NORDIC SEMICONDUCTOR ASA
OTTO NIELSENS VEG 12, 7052 TRONDHEIM, NORWAY

#### PFAS Remark:

The quantitative technology of PFAS is to analyze the specific structure of PFAS substances. However, PFAS acid and its salts with the same carbon number group have the same specific structure that can be identified. The tested results of the analyzed specific structure cannot be distinguished to identify the contribution from PFAS acid or its salts. Therefore, the tested results display the sum of concentrations of PFAS acids and its salts with the same carbon number group. The concentration of PFAS substances in the below table have been included in the tested results, please refer to the table for relevant information: (The listed PFAS substances are examples only, it do not include all PFAS salts with the same carbon number group.)

Classification of Substance Concentration	Substance Name	CAS No.
Perfluorooctane sulfonates and its salts (PFOS and its salts) (CAS No.: 1763-23-1 and its salts)	Potassium perfluorooctanesulfonate (PFOS-K)	2795-39-3
	Perfluorooctanesulfonic acid, lithium salt (PFOS-Li)	29457-72-5
	Perfluorooctanesulfonic acid, ammonium salt (PFOS-NH <sub>4</sub> )	29081-56-9
	Perfluorooctane sulfonate diethanolamine salt (PFOS-NH(OH) <sub>2</sub> )	70225-14-8
	Perfluorooctanesulfonic acid, tetraethylammonium salt (PFOS-N( $C_2H_5$ ) <sub>4</sub> )	56773-42-3
	N-decyl-N,N-dimethyldecan-1-aminium 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluorooctane- 1-sulfonate (PFOS-DDA)	251099-16-8
	Perfluorooctane sulfonyl fluoride (POSF)	307-35-7
	Perfluorooctanesulfonic acid, magnesium salt (PFOS-Mg)	91036-71-4
	Perfluorooctanesulfonic acid, sodium salt (PFOS-Na)	4021-47-0
Perfluorooctanoic acid and its salts (PFOA and its salts) (CAS No.: 335-67-1 and its salts)	Sodium perfluorooctanoate (PFOA-Na)	335-95-5
	Potassium perfluorooctanoate (PFOA-K)	2395-00-8
	Silver perfluorooctanote (PFOA-Ag)	335-93-3
	Perfluorooctanoyl fluoride (PFOA-F)	335-66-0
	Ammonium pentadecafluorooctanoate (APFO)	3825-26-1
	Lithium perfluorooctanoate (PFOA-Li)	17125-58-5



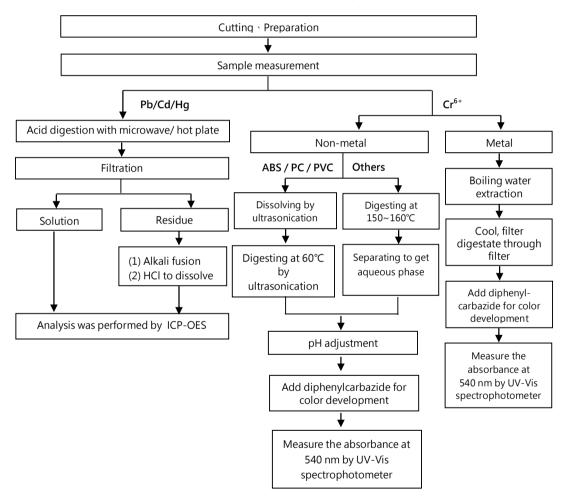
No.: ETR23A04839 Date: 02-Nov-2023

NORDIC SEMICONDUCTOR ASA
OTTO NIELSENS VEG 12, 7052 TRONDHEIM, NORWAY

#### Analytical flow chart of heavy metal

These samples were dissolved totally by pre-conditioning method according to below flow chart.

( Cr<sup>6+</sup> test method excluded )



This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com.tw/terms-of-service">https://www.sgs.com.tw/terms-of-service</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instruction, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced, except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

Page: 6 of 13



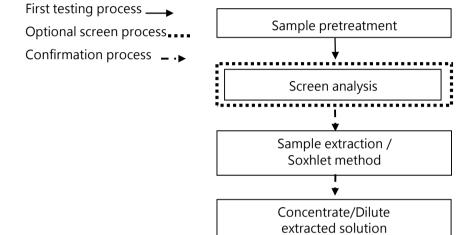
No.: ETR23A04839 Date: 02-Nov-2023

Filter

▼ GC/MS

NORDIC SEMICONDUCTOR ASA
OTTO NIELSENS VEG 12, 7052 TRONDHEIM, NORWAY

### Analytical flow chart - PBBs / PBDEs



This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com.tw/terms-of-service">https://www.sgs.com.tw/terms-of-service</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instruction, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced, except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

Page: 7 of 13

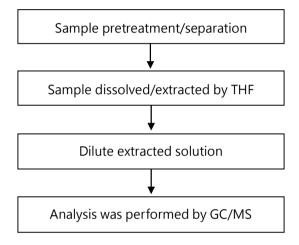


No.: ETR23A04839 Date: 02-Nov-2023

NORDIC SEMICONDUCTOR ASA
OTTO NIELSENS VEG 12, 7052 TRONDHEIM, NORWAY

Analytical flow chart - Phthalate

[Test method: IEC 62321-8]



This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com.tw/terms-of-service">https://www.sgs.com.tw/terms-of-service</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instruction, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced, except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

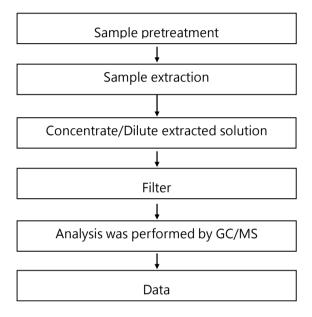
Page: 8 of 13



No.: ETR23A04839 Date: 02-Nov-2023

NORDIC SEMICONDUCTOR ASA
OTTO NIELSENS VEG 12, 7052 TRONDHEIM, NORWAY

### Analytical flow chart - HBCDD



This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com.tw/terms-of-service">https://www.sgs.com.tw/terms-of-service</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instruction, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced, except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

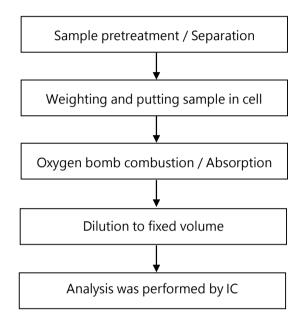
Page: 9 of 13



No.: ETR23A04839 Date: 02-Nov-2023

NORDIC SEMICONDUCTOR ASA
OTTO NIELSENS VEG 12, 7052 TRONDHEIM, NORWAY

### Analytical flow chart - Halogen



This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com.tw/terms-of-service">https://www.sgs.com.tw/terms-of-service</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instruction, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced, except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

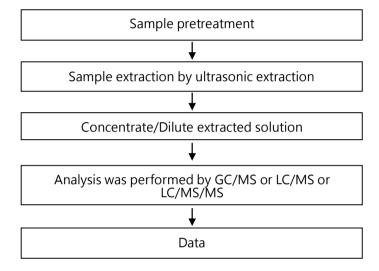
Page: 10 of 13



No.: ETR23A04839 Date: 02-Nov-2023

NORDIC SEMICONDUCTOR ASA
OTTO NIELSENS VEG 12, 7052 TRONDHEIM, NORWAY

### Analytical flow chart – PFAS (including PFOA/PFOS/its related compound, etc.)



This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com.tw/terms-of-service">https://www.sgs.com.tw/terms-of-service</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instruction, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced, except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

Page: 11 of 13



Date: 02-Nov-2023

Page: 12 of 13

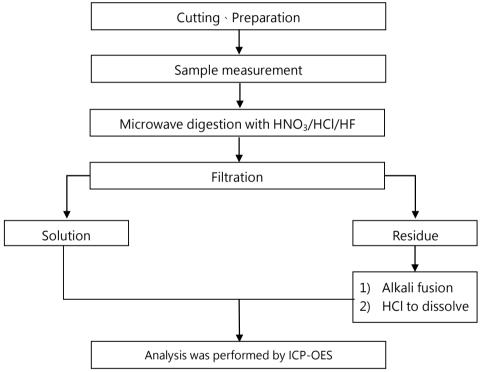
NORDIC SEMICONDUCTOR ASA
OTTO NIELSENS VEG 12, 7052 TRONDHEIM, NORWAY

### Analytical flow chart of elements (Heavy metal included)

These samples were dissolved totally by pre-conditioning method according to below flow chart.

No.: ETR23A04839

【Reference method: US EPA 3051A \ US EPA 3052】



\* US EPA 3051A method does not add HF.

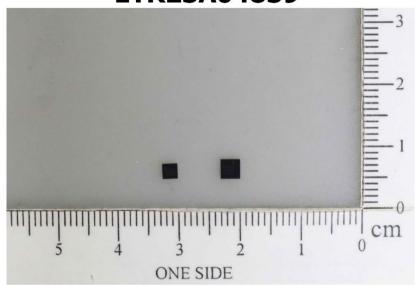


No.: ETR23A04839 Date: 02-Nov-2023

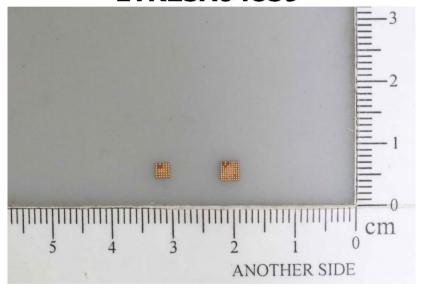
NORDIC SEMICONDUCTOR ASA
OTTO NIELSENS VEG 12, 7052 TRONDHEIM, NORWAY

\* The tested sample / part is marked by an arrow if it's shown on the photo. \*

### ETR23A04839



### ETR23A04839



\*\* End of Report \*\*

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="https://www.sgs.com.tw/terms-of-service">https://www.sgs.com.tw/terms-of-service</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instruction, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced, except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

Page: 13 of 13