Test Report No.: **31361101.002R**

Client: **Maxwell Technologies**
9244 Balboa Ave San Diego, CA 92123 USA

Buyer's name: N/A

Manufacturer's name: N/A

Test item(s): **RAD PAK / Metal Casing**

Identification/ Model No(s): **7809LPRPFx**

Testing Laboratory: TUV Rheinland of North America
2709 SE Otis Corley Dr, Suite 11 Bentonville, AR 72712

Sample Receiving date: 14 August 2013

Testing Period: 15 August 2013 – 23 August 2013

Test specification:

Overall results according to tests performed

Customer Requirement:

1. Risk Assessment of Articles: Screening of Substances of very high concern (SVHC) subject to authorisation (according to (EU) no. 143/2011 and (EU) no. 125/2012, Annex XIV of EC no. 1907/2006)

2. Substances of very high concern (SVHC) in candidate list, by European Chemical Agency (ECHA),

With reference to Corrigendum to Regulation (EC) no.1907/2006, concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

Test result:

Please refer to pages 2 - 8

Other Information:

None

For and on behalf of
TÜV Rheinland of North America, Inc.

8/23/2013	Cody Carson / Chemistry Technician	9/4/2013	Mark Smith / Lab Manager
Date	*Name/Position*	*Date*	*Name/Position*

Test result is drawn according to the kind and extent of tests performed.
This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.

Screening of SVHCs in subject to authorisation (according to EU no. 143/2011 (Annex XIV of EC no. 1907/2006), & candidate list, by European Chemical Agency (ECHA).

Product Classification

With reference to Corrigendum to Regulation (EC) no.1907/2006 and ECHA, this product is classified as:

☒ Article which **does not contain** substances released by the product under normal or reasonably foreseeable conditions of use

☐ Article which **contains** substances released by the product under normal or reasonably foreseeable conditions of use

☐ Preparation in special container

☐ Preparation

Conclusion:

Product Location	Conclusion	Detected Substance (if any)
Main Unit	Acc. to **authorisation list EU no. 143/2011 (Annex XIV of EC no. 1907/2006), and candidate list by ECHA**, the detected SVHC concentration is: ☒ < 0.1% ☐ > 0.1% ***Obligation of Importer:*** ☐ Necessary ☒ Not necessary (For article) To communicate information down the supply chain according to article. 33 of REACH. **OR** 1. Notification to ECHA, if the quantities of SVHC in the produced/imported articles are above 1 ton in total per year per company. 2. Provide sufficient information to ensure safe use of the article and, as a minimum, include the name of the substance, to their customers and on request to consumers within 45 days of the receipt of this request. (For preparation / preparation in special container) Provide a safety data sheet if the individual concentration is more than or equal to 0.1% (w/w) for non gaseous preparations, and more than or equal to 0.2% by volume for gaseous preparations if at least one substance poses human health and/or environmental hazards, persistent, bioaccumulative and toxic or very persistent and very bioaccumulative.	-- See test results and *note

Material list Item: 7809LPRPFx

Material No.	Material	Color	Location
M001	Component(s)	Gold	Refer to photo [Material 1]
M002	Component(s)	Gold / Gray	Refer to photo [Material 2]

Test results

1. Screening of SVHCs subject to authorisation, according to EU no. 143/2011 (Annex XIV of EC no. 1907/2006) & SVHCs in Candidate List by ECHA

Test Method:
1) The non-metal part of test article is grinded to a homogeneous powder by cryogenic milling.
2) Test portion is digested with acid and assisted with microwave, the elements are analysed by ICP-OES.
3) Organic solvent extraction, GC-MS analysis.

Test No.:	T001(20)	T002(20)
Material No.:	M001	M002
Results %	The theoretical content of: Cobalt(II) dichloride = 3.11% Cobalt (II) sulphate = 3.72% Cobalt (II) dinitrate = 4.44% Cobalt (II) carbonate = 2.90% Cobalt (II) diacetate = 4.31%	The theoretical content of: Cobalt(II) dichloride = 1.80% Cobalt (II) sulphate = 2.17% Cobalt (II) dinitrate = 2.57% Cobalt (II) carbonate = 1.68% Cobalt (II) diacetate = 2.49%

Abbreviation: % = Percentage ND = None detected

Adjusted percentage of SVHC in entire article * (A)	
SVHC	**Percentage (%)**
Cobalt(II) dichloride	<0.10 %
Cobalt (II) sulphate	<0.10 %
Cobalt (II) dinitrate	<0.10 %
Cobalt (II) carbonate	<0.10 %
Cobalt (II) diacetate	<0.10 %

(A) Based on information supplied by the manufacturer it is concluded the source of the cobalt content in the material is primarily elemental rather than the theoretical content of the SVHCs listed.

***Note: SVHC content of the entire article produced and/or imported is not above a concentration of 0.1% (w/w). Therefore the obligations as required per Article 33 of EC no. 1907/2006 are not required.**

Unit weight = 3g - Entire Article

	Substances	**CAS No.**	**Reporting Limit**
1	4,4'- Diaminodiphenylmethane (MDA)	101-77-9	0.01%
2	Benzylbutyl phthalate (BBP)	85-68-7	0.01%
3	Bis (2-ethylhexyl)phthalate (DEHP)	117-81-7	0.01%
4	Dibutyl phthalate (DBP)	84-74-2	0.01%
5	Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified: Alpha-hexabromocyclododecane Beta-hexabromocyclododecane Gamma-hexabromocyclododecane	25637-99-4/3194-55-6	0.01%
6	5-Tert-butyl-2,4,6-trinitro-m-xylene (Musk Xylene, MX)	81-15-2	0.01%

	Substances	CAS No.	Reporting Limit
7	2,4-Dinitrotoluene (2,4-DNT)	121-14-2	0.01%
8	Diisobutyl phthalate (DIBP)	84-69-5	0.01%
9	Tris(2-chloroethyl)phosphate	115-96-8	0.01%
10	Diarsenic pentoxide(*3)	1303-28-2	0.01%
11	Diarsenic trioxide(*3)	1327-53-3	0.01%
12	Lead chromate(*3)(*4)	7758-97-6	0.01%
13	Lead chromate molybdate sulphate red (C.I. Pigment Red 104) (*3)(*4)	12656-85-8	0.01%
14	Lead sulfochromate yellow (C.I.Pigment Yellow 34) (*3)	1344-37-2	0.01%
15	Anthracene	120-12-7	0.01%
16	Bis(tributyltin)oxide (TBTO) (*5)	56-35-9	0.01%
17	Triethyl arsenate(*3)	15606-95-8	0.01%
18	Lead hydrogen arsenate(*3)	7784-40-9	0.01%
19	Cobalt(II) dichloride(*3)	7646-79-9	0.01%
20	Sodium dichromate, dihydrate (*4)	7789-12-0/10588-01-9	0.01%
21	Acrylamide	79-06-1	0.01%
22	Anthracene oil(*7)	90640-80-5	0.01%(*8)
23	Anthracene oil,anthracene paste,distn.lights(*7)	91995-17-4	
24	Anthracene oil, anthracene paste, anthracene fraction (*7)	91995-15-2	
25	Anthracene oil, anthracene-low(*7)	90640-82-7	
26	Anthracene oil, anthracene paste (*7)	90640-81-6	
27	Coal tar pitch, high temperature (*7)	65996-93-2	
28	Trichloroethylene	79-01-6	0.01%
29	Boric acid(*3) (*6)	10043-35-3/11113-50-1	0.01%
30	Disodium tetraborate, anhydrous(*3) (*6)	1330-43-4/12179-04-3/ 1303-96-4	0.01%
31	Tetraboron disodium heptaoxide, hydrate(*3) (*6)	12267-73-1	0.01%
32	Sodium chromate(*4)	7775-11-3	0.01%
33	Potassium chromate(*4)	7789-00-6	0.01%
34	Ammonium dichromate(*4)	7789-09-5	0.01%
35	Potassium dichromate(*4)	7778-50-9	0.01%
36	2-Methoxyethanol	109-86-4	0.01%
37	2-Ethoxyethanol	110-80-5	0.01%
38	Cobalt(II) sulphate(*3)	10124-43-3	0.01%
39	Cobalt(II) dinitrate(*3)	10141-05-6	0.01%
40	Cobalt(II) carbonate(*3)	513-79-1	0.01%
41	Cobalt(II) diacetate(*3)	71-48-7	0.01%
42	Chromium trioxide(*4)	1333-82-0	0.01%
43	Acids generated from chromium trioxide and their oligomers: Chromic acid Dichromic acid Oligomers of chromic acid and dichromic acid(*4)	7738-94-5 13530-68-2	0.01%
44	Alkanes C10-C13, chloro (Short chain chlorinated paraffins) (SCCP)	85535-84-8	0.01%

	Substances	CAS No.	Reporting Limit
45	2-Ethoxyethyl acetate	111-15-9	0.01%
46	Strontium chromate (*4)	7789-06-2	0.01%
47	1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters (DHNUP)	68515-42-4	0.01%
48	Hydrazine	7803-57-8 302-01-2	0.01%
49	1-Methyl-2-pyrrolidone	872-50-4	0.01%
50	1,2,3-Trichloropropane	96-18-4	0.01%
51	1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters C7-rich (DIHP)	71888-89-6	0.01%
52	Dichromium tris(chromate) (*4)	24613-89-6	0.01%
53	Potassium hydroxyoctaoxodizincatedi-chromate (*4)	11103-86-9	0.01%
54	Pentazinc chromate octahydroxide (*4)	49663-84-5	0.01%
55	Aluminosilicate Refractory Ceramic Fibres (RCF) (*9)	-	0.01%
56	Zirconia Aluminosilicate Refractory Ceramic Fibres (Zr-RCF) (*9)	-	0.01%
57	Formaldehyde, oligomeric reaction products with aniline (technical MDA) (*11)	25214-70-4	0.01%
58	Bis(2-methoxyethyl) phthalate	117-82-8	0.01%
59	2-Methoxyaniline; o-Anisidine	90-04-0	0.01%
60	4-(1,1,3,3-tetramethylbutyl)phenol,(4-tert-Octylphenol)	140-66-9	0.01%
61	1,2-Dichloroethane	107-06-2	0.01%
62	Bis(2-methoxyethyl) ether	111-96-6	0.01%
63	Arsenic acid (*3)	7778-39-4	0.01%
64	Calcium arsenate (*3)	7778-44-1	0.01%
65	Trilead diarsenate (*3)	3687-31-8	0.01%
66	N,N-dimethylacetamide (DMAC)	127-19-5	0.01%
67	2,2'-dichloro-4,4'-methylenedianiline (MOCA)	101-14-4	0.01%
68	Phenolphthalein	77-09-8	0.01%
69	Lead dipicrate (*3)	6477-64-1	0.01%
70	Lead diazide, Lead azide (*3)	13424-46-9	0.01%
71	Lead styphnate (*3)	15245-44-0	0.01%
72	1,2-bis(2-methoxyethoxy)ethane (TEGDME; triglyme)	112-49-2	0.01%
73	1,2-dimethoxyethane; ethylene glycol dimethyl ether (EGDME)	110-71-4	0.01%
74	Diboron trioxide	1303-86-2	0.01%
75	Formamide	75-12-7	0.01%
76	Lead(II) bis(methanesulfonate) (*3)	17570-76-2	0.01%
77	1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione (TGIC)	2451-62-9	0.01%
78	1,3,5-tris[(2S and 2R)-2,3-epoxypropyl]-1,3,5-triazine-2,4,6-(1H,3H,5H)-trione (β-TGIC)	59653-74-6	
79	4,4'-bis(dimethylamino)benzophenone (Michler's ketone), MK	90-94-8	0.01%
80	N,N,N',N'-tetramethyl-4,4'-methylenedianiline (Michler's base), RMK	101-61-1	0.01%
81	[4-[[4-anilino-1-naphthyl][4-(dimethylamino)phenyl]methylene]cyclohexa-2,5-dien-1-	2580-56-5	0.01%

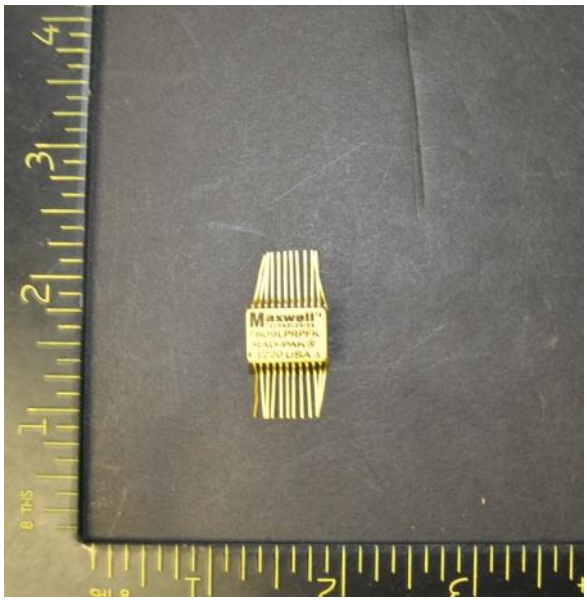
	Substances	CAS No.	Reporting Limit
	ylidene] dimethylammonium chloride (C.I. Basic Blue 26) (*10)		
82	[4-[4,4'-bis(dimethylamino) benzhydrylidene]cyclohexa-2,5-dien-1-ylidene]dimethylammonium chloride (C.I. Basic Violet 3) (*10)	548-62-9	
83	4,4'-bis(dimethylamino)-4''-(methylamino)trityl alcohol (*10)	561-41-1	
84	α,α-Bis[4-(dimethylamino)phenyl]-4 (phenylamino)naphthalene-1-methanol (C.I. Solvent Blue 4) (*10)	6786-83-0	
85	Bis(pentabromophenyl) ether (DecaBDE)	1163-19-5	0.01%
86	Pentacosafluorotridecanoic acid	72629-94-8	0.01%
87	Tricosafluorododecanoic acid	307-55-1	0.01%
88	Henicosafluoroundecanoic acid	2058-94-8	0.01%
89	Heptacosafluorotetradecanoic acid	376-06-7	0.01%
91	Diazene-1,2-dicarboxamide (C,C'-azodi(formamide))	123-77-3	0.01%
92	4-Nonylphenol, branched and linear *[substances with a linear and/or branched alkyl chain with a carbon number of 9 covalently bound in position 4 to phenol, covering also UVCB- and well-defined substances which include any of the individual isomers or a combination thereof]*	-	0.01%
93	Hexahydro-2-benzofuran-1,3-dione (HHPA) cis-cyclohexane-1,2-dicarboxylic anhydride trans-cyclohexane-1,2-dicarboxylic anhydride	85-42-7 13149-00-3 14166-21-3	0.01%
94	Hexahydromethylphathalic anhydride (MHHPA) Hexahydro-4-methylphathalic anhydride Hexahydro-1-methylphathalic anhydride Hexahydro-3-methylphathalic anhydride	25550-51-0 19438-60-9 48122-14-1 57110-29-9	0.01%
95	1,2-Benzenedicarboxylic acid, dipentylester, branched and linear	84777-06-0	0.01%
96	Diisopentylphthalate	605-50-5	
97	N-pentyl-isopentylphthalate	776297-69-9	
98	Methoxy acetic acid (MAA)	625-45-6	0.01%
99	N,N-dimethylformamide; dimethyl formamide	68-12-2	0.01%
100	1,2-Diethoxyethane (diethyl glycol)	629-14-1	0.01%
101	Diethyl sulphate	64-67-5	0.01%
102	Dimethyl sulphate	77-78-1	0.01%
103	N-methylacetamide	79-16-3	0.01%
104	1-bromopropane	106-94-5	0.01%
105	Furan	110-00-9	0.01%
106	Propylene oxide; 1,2-epoxypropane; methyloxirane	75-56-9	0.01%
107	3-ethyl-2-methyl-2-(3-methylbutyl)-1,3-oxazolidine (Zoldine MS+)	143860-04-2	0.01%
108	Dibutyltin dichloride (DBT) (*5)	683-18-1	0.01%
109	Dinoseb	88-85-7	0.01%
110	4,4'-methylenedi-o-toluidine	838-88-0	0.01%
111	4,4'-oxydianiline and its salts	101-80-4	0.01%
112	4-Aminoazobenzene; 4-Phenylazoaniline	60-09-3	0.01%
113	4-methyl-m-phenylenediamine (2,4-toluene-diamine)	95-80-7	0.01%

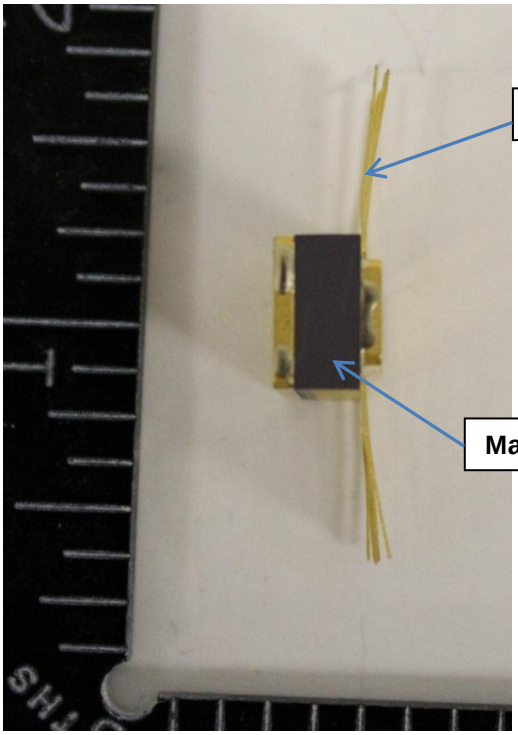
	Substances	CAS No.	Reporting Limit
114	6-methoxy-m-toluidine (p-cresidine)	120-71-8	0.01%
115	Biphenyl-4-ylamine	92-67-1	0.01%
116	o-aminoazotoluene	97-56-3	0.01%
117	o-Toluidine; 2-Aminotoluene	95-53-4	0.01%
118	Acetic acid, lead salt, basic (*3)	51404-69-4	0.01%
119	Trilead bis(carbonate)dihydroxide (basic lead carbonate) (*3)	1319-46-6	0.01%
120	Lead oxide sulfate (*3)	12036-76-9	0.01%
121	[Phthalato(2-)]dioxotrilead (*3)	69011-06-9	0.01%
122	Dioxobis(stearato)trilead (*3)	12578-12-0	0.01%
123	Fatty acids, C16-18, lead salts (*3)	91031-62-8	0.01%
124	Lead bis(tetrafluoroborate) (*3)	13814-96-5	0.01%
125	Lead cyanamidate (*3)	20837-86-9	0.01%
126	Lead dinitrate (*3)	10099-74-8	0.01%
127	Lead oxide (lead monoxide) (*3)	1317-36-8	0.01%
128	Lead tetroxide (orange lead) (*3)	1314-41-6	0.01%
129	Lead titanium trioxide (*3)	12060-00-3	0.01%
130	Lead Titanium Zirconium Oxide (*3)	12626-81-2	0.01%
131	Pyrochlore, antimony lead yellow (*3)	8012-00-8	0.01%
132	Pentalead tetraoxide sulphate (*3)	12065-90-6	0.01%
133	Silicic acid, barium salt, lead-doped (*3)	68784-75-8	0.01%
134	Silicic acid, lead salt (*3)	11120-22-2	0.01%
135	Sulfurous acid, lead salt, dibasic (*3)	62229-08-7	0.01%
136	Tetraethyllead (*3)	78-00-2	0.01%
137	Tetralead trioxide sulphate (*3)	12202-17-4	0.01%
138	Trilead dioxide phosphonate (*3)	12141-20-7	0.01%
139	Cadmium	7440-43-9	0.01%
140	Ammonium pentadecafluorooctanoate (APFO)	3825-26-1	0.01%
141	Pentadecafluorooctanoic acid (PFOA)	335-67-1	0.01%
142	Dipentyl phthalate (DPP)	131-18-0	0.01%
143	4-Nonylphenol, branched and linear, ethoxylated *[substances with a linear and/or branched alkyl chain with a carbon number of 9 covalently bound in position 4 to phenol, ethoxylated covering UVCB- and well-defined substances, polymers and homologues, which include any of the individual isomers and/or combinations thereof]*		0.01%
144	Cadmium oxide (*3)	1306-19-0	0.01%

(*3) The substance is tested in terms of its respective elements (As, Pb, Co, B)
(*4) The substance is tested in terms of Cr (VI)
(*5) The substance is tested and calculated in terms of Tributyl tin.
(*6) The substance is confirmed and tested in terms of Boric acid
(*7) The substances are UVCB (substance of unknown or variable composition, complex reaction products or biological materials), which are identified by its main constituents.

(*8) Individual concentrations to the constituent of UVCB with an amount of < 0.01% were not considered by the calculation of the sum.
(*9) The test result is based on microscopic and chemical evaluation.
(*10) The substance is quantified in terms of Michler's Ketone and Michler's Base by LC-MS, as Michler's Ketone or Michler's Base was found exceeds 0.01%
(*11) The oligomer content is determined by Py-GC/MS.
(*12) The material whose weight is <0.1% of the total weight in an article is neglected for testing.
(*13) For this mixed sample, the result was found to be more than the reporting limit. It's recommended that individual sample should be tested separately.
(*14) For battery sample, the anion content is confirmed by oxygen pump assessed digestion - Ion chromatography
(*15) The non-metal part of test article is grinded to a homogeneous powder by cryogenic milling.
(*16) The tested material(s) was screened only for selected SVHC substance(s). Selection of tests refers to the material type and application and the possibility of contamination during production & material specific contamination of the product.
(*17) The extractable content of substances are confirmed and tested in terms of Boric acid by in house method.
(*18) The theoretical content of XXX in an article is calculated, please to page X. By Calculation, this material may contains the mentioned SVHC substance(s), It is suggested to check the respective recipe if the theoretical content of the respective substance >0.1% in the weight of whole article.
(*19) The XXXX content of whole article is confirmed, please refer to page X.
(*20) The other SVHC substances which are not mentioned in test result were either not subject to testing according to remark *16 or not detected.

Sample Photos:





Test Article

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