Test Report issued under the responsibility of :

TEST REPORT
United Nations, Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (Rev. 5th, Amendment 1), Section 38.3

Report Reference No. ..... :	142931-688550
Total number of pages	25
Testing Laboratory..... :	Laboratoire Central des Industries Electriques (LCIE)
Address ..... :	33 Avenue du General Leclerc – 92260 FONTENAY-AUX-ROSES (FRANCE)
Applicant's name..... :	SCHILLER MEDICAL
Address ..... :	4 rue Louis Pasteur 67162 WISSEMBOURG Cedex - France
Test specification:	
Standard..... :	United Nations, Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (Rev. 5th, Amendment 1), Section 38.3.
Test procedure ..... :	--
Non-standard test method……..:	N/A
Test item description .....:	Prismatic Lithium Primary Battery Pack
Trade Mark .....:	SCHILLER
Manufacturer .....:	FORSEE POWER Sp.z0.0.
Model/Type reference .....:	4-07-0025
Ratings .....:	15Vdc - 2800 mAh - Li/MnO2 Pack Battery

Date of issue ..... : Fontenay-aux-Roses, on 2016-07-05

Conclusion : The sample complies with the requirements of the tests performed.

Technical manager
Alain POSLUSZNY

LABORATOIRE CENTRAL DES INDUSTRIES ELECTRIQUES
S.A.S au capital de 15.745.984 €
RCS Nanterre B 408 363 174
33 avenue du General Leclerc
F - 92266 FONTENAY AUX ROSES

Summary of testing :

Tests performed (name of test and test clause) :

Clause	Contents of Test
38.3.4.1	Test T.1: Altitude simulation
38.3.4.2	Test T.2: Thermal test
38.3.4.3	Test T.3: Vibration
38.3.4.4	Test T.4: Shock
38.3.4.5	Test T.5: External short circuit

Testing location :

Laboratoire Central des Industries Electriques (LCIE)

33 Avenue du General Leclerc

92260 FONTENAY-AUX-ROSES

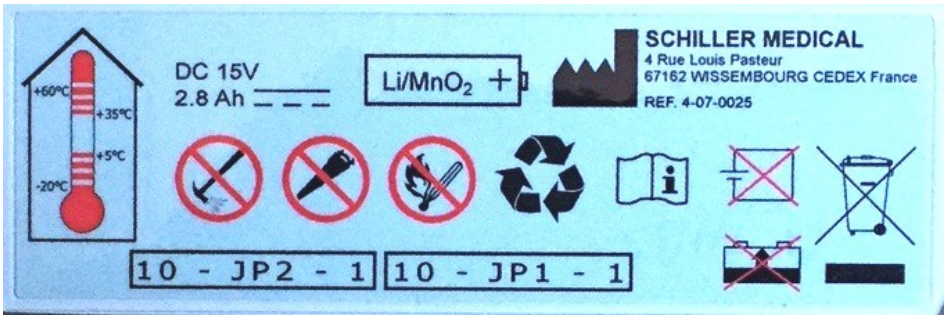
(FRANCE)

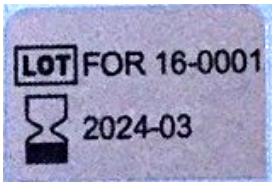
Summary of compliance with National Differences:

None

4-07-0025

Copy of marking plate :





Test item particulars ..... :	
Classification of installation and use ..... :	Transportable, the equipment is for medical product.
Supply connection ..... :	Terminals.
Recommend charging method declaired by the manufacturer..... :	-
Discharge current (0,2 I_t A) ..... :	0.560A
Specified final voltage ..... :	8V
Chemistry ..... :	☐ nickel systems..... ☒ lithium systems
Recommend of charging limit for lithium system	
Upper limit charging voltage per cell..... :	-
Maximum charging current..... :	-
Charging temperature upper limit..... :	-
Charging temperature lower limit ..... :	-
Polymer cell electrolyte type ..... :	☐ gel polymer..... ☐ solid polymer
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement .....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item.....:	January and June, 2016
Date (s) of performance of tests.....:	January to July 2016

General remarks:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

Remark 1: Tested primary battery is composed by DURACELL Li/MnO2 Primary cell, reference CR17345 (ULTRA 123) and is assembled 5s2P. (See annex 4).

Remark 2 : The T4 test was performed with 4 updated samples, the internal design has been slightly modified. No electrical changes have been made, performance and security remains unchanged.

Name and address of factory (ies).....:	**FORSEE POWER Sp.z0.0.** Ligota Piekna, ul.Prosta 27A PL-55-114 Wisznia MALA

General product information:

1) The equipment under test (EUT) is a prismatic Lithium pack battery.

(2) The maximum ambient temperature is specified as -20°C/+60°C for Discharging.

(3) Dimensions:

Height: H = 52.3mm, Width : W = 190.1mm, Thickness : L = 23.9mm.

(4) Typical weight: 275g

(5) Number of connected cells : 5s2p

Test condition:

Temperature: 20±5°C
Relative humidity: 50-60%

Test condition:

Temperature: 20±5°C
Relative humidity: 50-60%

Distribution of samples for testing:

38.3.4.1 Test 1 - Altitude : Samples 1 to 8

38.3.4.2 Test 2 - Thermal cycling : Samples 1 to 8

38.3.4.3 Test 3 - Vibration : Samples 1 to 8

38.3.4.4 Test 4 - Shock : Samples 9 to 16

38.3.4.5 Test 5 - External short-circuit : Samples 1 to 8

United Nations, Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (Rev. 5th, Amendment 1), Section 38.3			
Clause	Requirement + Test	Result - Remark	Verdict
38.3	**Lithium batteries**		**P**
38.3.2	**Scope**		**P**
38.3.2.1	Lithium cells or batteries which differ from a tested type by: (a) A change of more than 0.1 g or 20% by mass, whichever is greater, to the cathode, to the anode, or to the electrolyte; or (b) A change that would materially affect the test results.	This a new product (new application)	N/A
38.3.2.2	Classification	The EUT is prismatic Lithium pack battery	P
38.3.3	**The number and condition of cells and batteries**		**P**
	Cells (Primary/Rechargeable)	The EUT is prismatic Lithium pack battery	N/A
	Batteries (Primary/Rechargeable)	The EUT is prismatic Lithium pack battery	P
38.3.4	**Procedure**		**P**
	Each cell and battery type must be subjected to tests 1 to 8. Tests 1 to 5 must be conducted in sequence on the same cell or battery. Tests 6 and 8 should be conducted using not otherwise tested cells or batteries. Test 7 may be conducted using undamaged batteries previously used in Tests 1 to 5 for purposes of testing on cycled batteries.	Considered for the test.	P
38.3.4.1	Altitude simulation	The cells were no mass loss, no leakage, no venting, no disassembly, no rupture and no fire and the OCV of batteries after testing was not less than 90% of its voltage before testing.	P
38.3.4.2	Thermal test	The cells were no mass loss, no leakage, no venting, no disassembly, no rupture and no fire and the OCV of batteries after testing was not less than 90% of its voltage before testing.	P

United Nations, Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (Rev. 5th, Amendment 1), Section 38.3			
Clause	Requirement + Test	Result - Remark	Verdict
38.3.4.3	Vibration	The cells were no mass loss, no leakage, no venting, no disassembly, no rupture and no fire and the OCV of batteries after testing was not less than 90% of its voltage before testing.	P
38.3.4.4	Shock	The cells were no mass loss, no leakage, no venting, no disassembly, no rupture and no fire and the OCV of batteries after testing was not less than 90% of its voltage before testing.	P
38.3.4.5	External short test	The cells were no disassembly, no fire and no rupture, and the external temperature did not exceed 170°C.	P
38.3.4.6	Impact	Test not required.	N/A
	Crush	Test not required.	N/A
38.3.4.7	Overcharge	Test not required.	N/A
38.3.4.8	Forced discharge	Test not required.	N/A

United Nations, Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (Rev. 5th, Amendment 1), Section 38.3			
Clause	Requirement + Test	Result - Remark	Verdict

38.3.2.2	TABLE: List of critical Components	N/A

Object/part no.	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity [1)]
Insulation					
- Insulation tape					
- Insulation sheet					
Internal wiring					
Encapsulation					
- Enclosure					
- Jacket					
Temperature/current management devices					
- CID					
- Fuse	**LITTELFUSE**	Fuse CMS 10AF / 0448010.MR	10AF	Tested in this report	-
- PTC					
- Control IC	**MAXIM**	IC 2401/DS2401P S/N CHIP TSOC6 / DS2401P+	-	Tested in this report	-
	TI	**IC 26231/BQ26231 B. GAUGE CMS**	-	Tested in this report	-
- FET					
Terminal contacts					
Terminal insulation					
Cells	**DURACELL**	123A	3V- 1500mAh	IEC60086-4:2007 See LCIE Test Report n°128689-658487A	-
- Electrolyte					
- Separator					
- Anode					
- Cathode					

Supplementary information:

[1)] Provided evidence ensures the agreed level of compliance. See OD-CB2039.

United Nations, Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (Rev. 5th, Amendment 1), Section 38.3			
Clause	Requirement + Test	Result - Remark	Verdict

38.3.4.1	Altitude simulation							P
Model / Sample No.	Sample Status	Before test		After test		Mass loss (%)	Residual OCV (%)	Other Event
		Weight (g)	OCV (V)	Weight (g)	OCV (V)			
1	Charged	270.2	16.22	270.2	16.22	0.00%	0.00%	OK
2	Charged	269.9	16.22	269.9	16.23	0.00%	0.06%	OK
3	Charged	270.4	16.21	270.4	16.19	0.00%	-0.12%	OK
4	Charged	270.6	16.21	270.7	16.22	0.04%	0.06%	OK
5	Discharge	269.3	13.90	269.4	14.18	0.04%	1.97%	OK
6	Discharge	270.1	13.74	270.1	14.07	0.00%	2.35%	OK
7	Discharge	268.8	13.45	268.9	14.19	0.04%	5.21%	OK
8	Discharge	270.0	13.10	270.1	14.20	0.04%	7.75%	OK

Note(s):

Mass loss limit:

Mass M of cell or battery	Mass loss limit
M<1g	0.5%
1g<M<5g	0.2%
M>5g	0.1%

L-Leakage
V-Venting
D-Disassembly
R-Rupture
F-Fire

OK - No mass loss, no leakage, no venting, no disassembly, no rupture and no fire and the OCV of batteries after testing was not less than 90% of its voltage before testing.

United Nations, Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (Rev. 5th, Amendment 1), Section 38.3			
Clause	Requirement + Test	Result - Remark	Verdict

38.3.4.2	**Thermal test**							**P**
Model / Sample No.	Sample Status	Before test		After test		Mass loss (%)	Residual OCV (%)	Other Event
		Weight (g)	OCV (V)	Weight (g)	OCV (V)			
1	Charged	270.2	16.22	270.2	16.33	0.00	0.67%	OK
2	Charged	269.9	16.23	269.9	16.29	0.00	0.37%	OK
3	Charged	270.4	16.19	270.4	16.33	0.00	0.86%	OK
4	Charged	270.7	16.22	270.7	16.30	0.00	0.49%	OK
5	Discharge	269.4	14.18	269.4	14.38	0.00	1.39%	OK
6	Discharge	270.1	14.07	270.1	14.25	0.00	1.26%	OK
7	Discharge	268.9	14.19	268.9	14.42	0.00	1.60%	OK
8	Discharge	270.1	14.20	270.1	14.40	0.00	1.39%	OK

Note(s):

Mass loss limit:

Mass M of cell or battery	Mass loss limit
M<1g	0.5%
1g<M<5g	0.2%
M>5g	0.1%

L-Leakage
V-Venting
D-Disassembly
R-Rupture
F-Fire

OK - No mass loss, no leakage, no venting, no disassembly, no rupture and no fire and the OCV of batteries after testing was not less than 90% of its voltage before testing.

United Nations, Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (Rev. 5th, Amendment 1), Section 38.3			
Clause	Requirement + Test	Result - Remark	Verdict

38.3.4.3	**Vibration**							**P**
Model / Sample No.	Sample Status	Before test		After test		Mass loss (%)	Residual OCV (%)	Other Event
		Weight (g)	OCV (V)	Weight (g)	OCV (V)			
1	Charged	270.2	16.33	270.2	16.33	0.00	0.00%	OK
2	Charged	269.9	16.31	269.9	16.29	0.00	-0.12%	OK
3	Charged	270.4	16.33	270.4	16.33	0.00	0.00%	OK
4	Charged	270.7	16.33	270.7	16.3	0.00	-0.18%	OK
5	Discharge	269.4	14.27	269.4	14.38	0.00	0.76%	OK
6	Discharge	270.1	14.23	270.1	14.25	0.00	0.14%	OK
7	Discharge	268.9	14.32	268.9	14.42	0.00	0.69%	OK
8	Discharge	270.1	14.33	270.1	14.40	0.00	0.49%	OK

0Note(s):

Mass loss limit:

Mass M of cell or battery	Mass loss limit
M<1g	0.5%
1g<M<5g	0.2%
M>5g	0.1%

L-Leakage
V-Venting
D-Disassembly
R-Rupture
F-Fire

OK - No mass loss, no leakage, no venting, no disassembly, no rupture and no fire and the OCV of batteries after testing was not less than 90% of its voltage before testing.

United Nations, Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (Rev. 5th, Amendment 1), Section 38.3			
Clause	Requirement + Test	Result - Remark	Verdict

38.3.4.4	**Shock**							**P**
Model / Sample No.	Sample Status	Before test		After test		Mass loss (%)	Residual OCV (%)	Other Event
		Weight (g)	OCV (V)	Weight (g)	OCV (V)			
9	Charged	295.4	16.16	295.4	16.15	0.00	-0.06%	OK
10	Charged	293.2	16.18	293.2	16.18	0.00	0.00%	OK
11	Charged	294.6	16.17	294.6	16.17	0.00	0.00%	OK
12	Charged	294.6	16.17	294.6	16.18	0.00	0.06%	OK
13	Discharge	297.0	14.05	297.0	14.08	0.00	0.21%	OK
14	Discharge	287.7	13.83	287.7	14.02	0.00	1.36%	OK
15	Discharge	291.1	13.75	291.1	14.01	0.00	1.86%	OK
16	Discharge	287.8	12.84	287.8	13.94	0.00	7.89%	OK

Note(s):

Mass loss limit:

Mass M of cell or battery	Mass loss limit
M<1g	0.5%
1g<M<5g	0.2%
M>5g	0.1%

L-Leakage
V-Venting
D-Disassembly
R-Rupture
F-Fire

OK - No mass loss, no leakage, no venting, no disassembly, no rupture and no fire and the OCV of batteries after testing was not less than 90% of its voltage before testing.

United Nations, Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (Rev. 5th, Amendment 1), Section 38.3			
Clause	Requirement + Test	Result - Remark	Verdict

38.3.4.5	**External short circuit**		**P**
Model / Sample No.	**Sample Status**	**Max. External temperature of EUT surface(℃)**	**Other Event**
1	Charged	58.3	OK
2	Charged	55.9	OK
3	Charged	55.6	OK
4	Charged	54.8	OK
5	Discharge	55.5	OK
6	Discharge	54.8	OK
7	Discharge	54.7	OK
8	Discharge	54.4	OK

Note(s):
D-Disassembly
R-Rupture
F-Fire
OK- No Disassembly, No Fire, The external temperature of cell not exceeds 170°C.

United Nations, Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (Rev. 5th, Amendment 1), Section 38.3			
Clause	Requirement + Test	Result - Remark	Verdict

38.3.4.6	Impact		N/A
Model / Sample No.	**Sample Status**	**Max. External temperature of EUT surface(℃)**	**Other Event**
--	-	-	-

Note(s):
D-Disassembly
F-Fire
OK- No Disassembly, No Fire, The external temperature of cell not exceeds 170°C.

38.3.4.6	Crush		N/A
Model / Sample No.	**Sample Status**	**Max. External temperature of EUT surface(℃)**	**Other Event**
-	-	-	-

Note(s):
D-Disassembly
F-Fire
OK- No Disassembly, No Fire, The external temperature of cell not exceeds 170°C.

38.3.4.7	Overcharge	N/A
Model / Sample No.	**Sample Status**	**Other Event**
-	-	-

Note(s):
OK- No Disassembly, No Fire,

United Nations, Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (Rev. 5th, Amendment 1), Section 38.3			
Clause	Requirement + Test	Result - Remark	Verdict

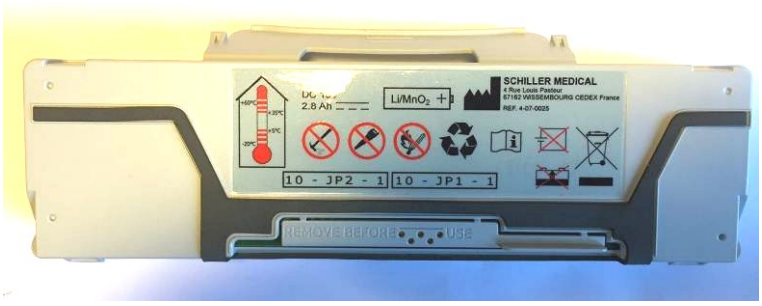
38.3.4.8	Forced discharge		N/A
Model / Sample No.		**Sample Status**	**Other Event**
-		-	-

Note(s):
D-Disassembly
F-Fire
OK- No Disassembly, No Fire

ANNEX 1

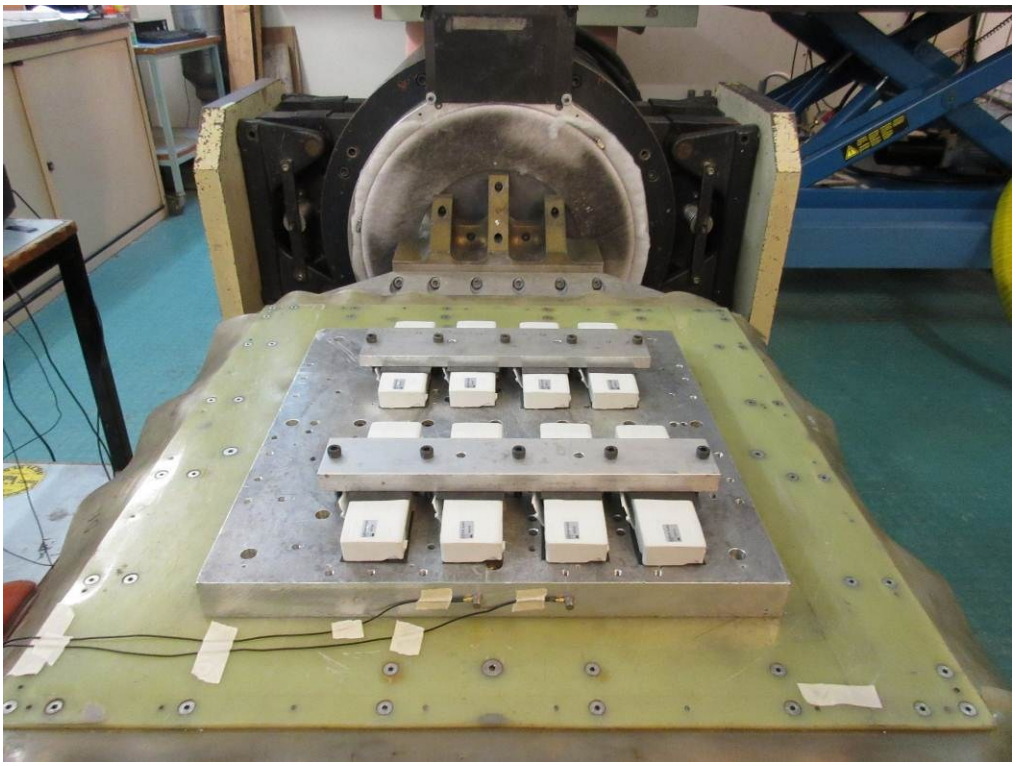
PHOTOS OF PRODUCT :

4-07-0025

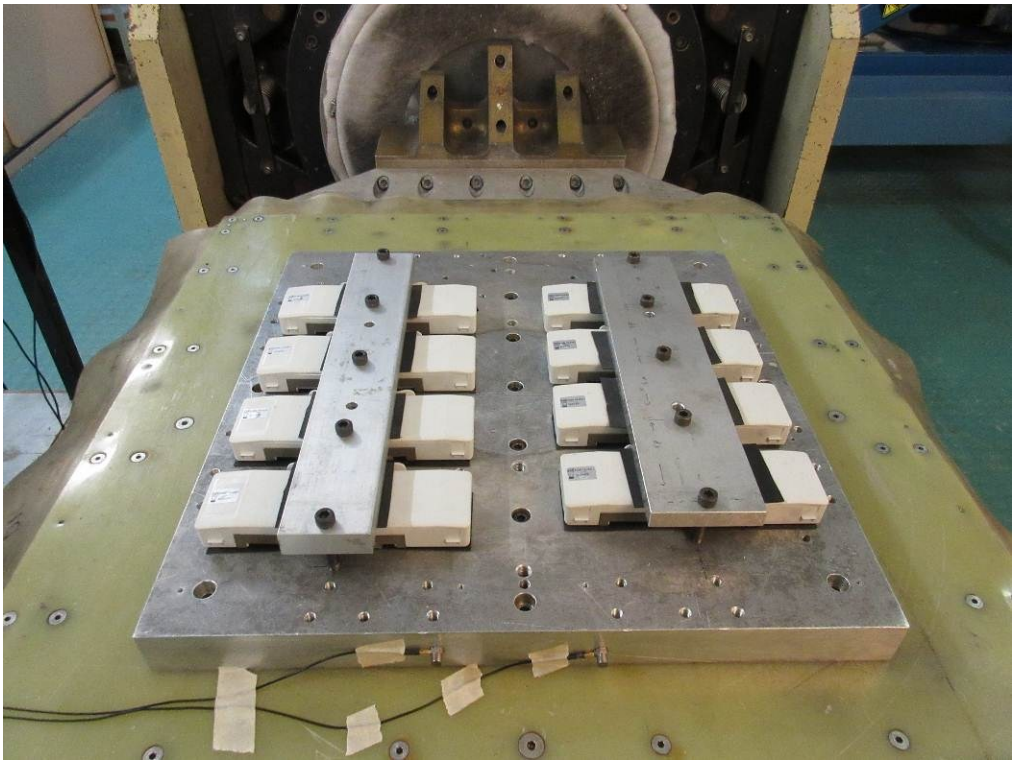


ANNEX 2
Vibration test

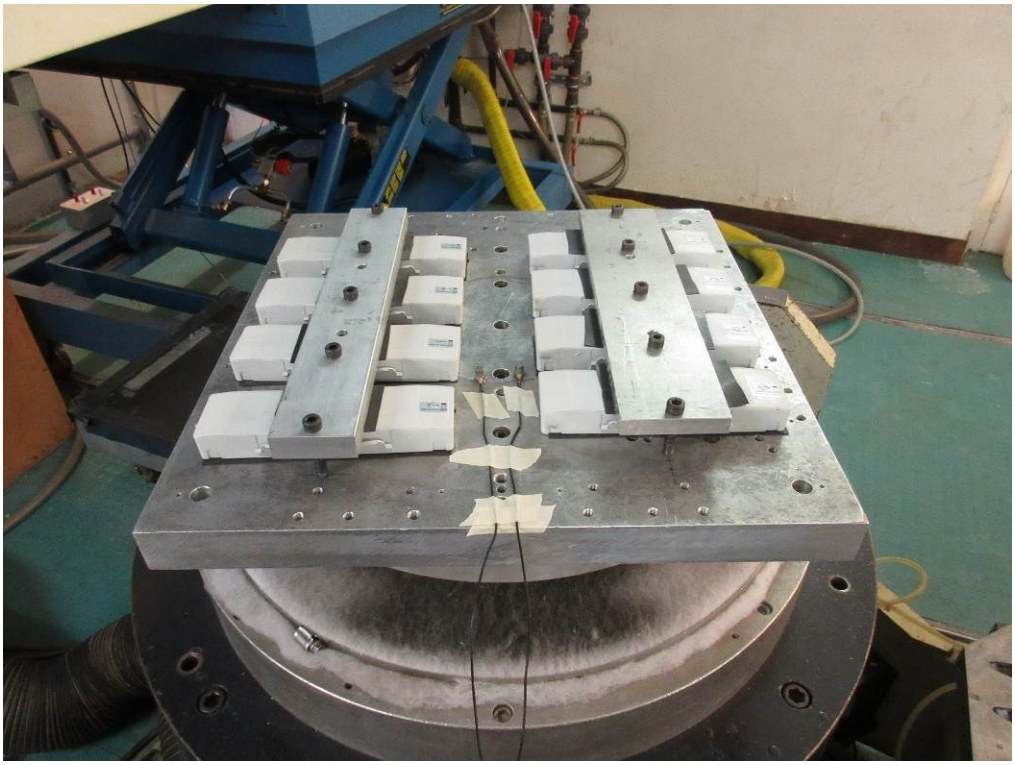
38.3.4.3: Vibration test condition-1 (X axis direction), fixed by screws



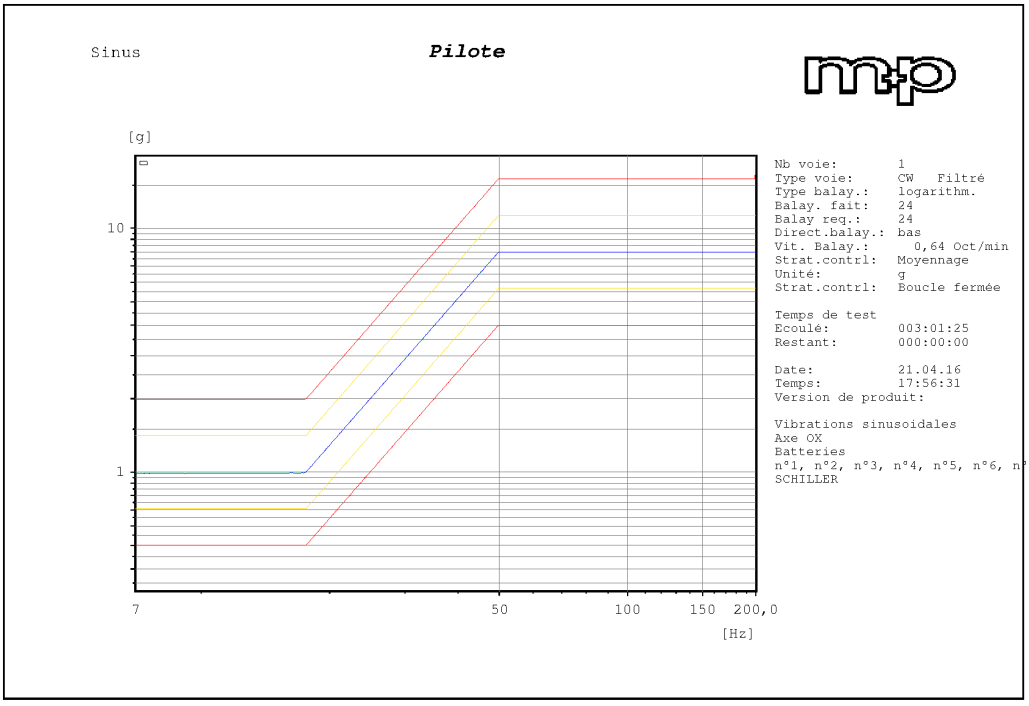
38.3.4.3: Vibration test condition-1 (Y axis direction), fixed by screws



38.3.4.3: Vibration test condition-1 (Z axis direction), fixed by screws

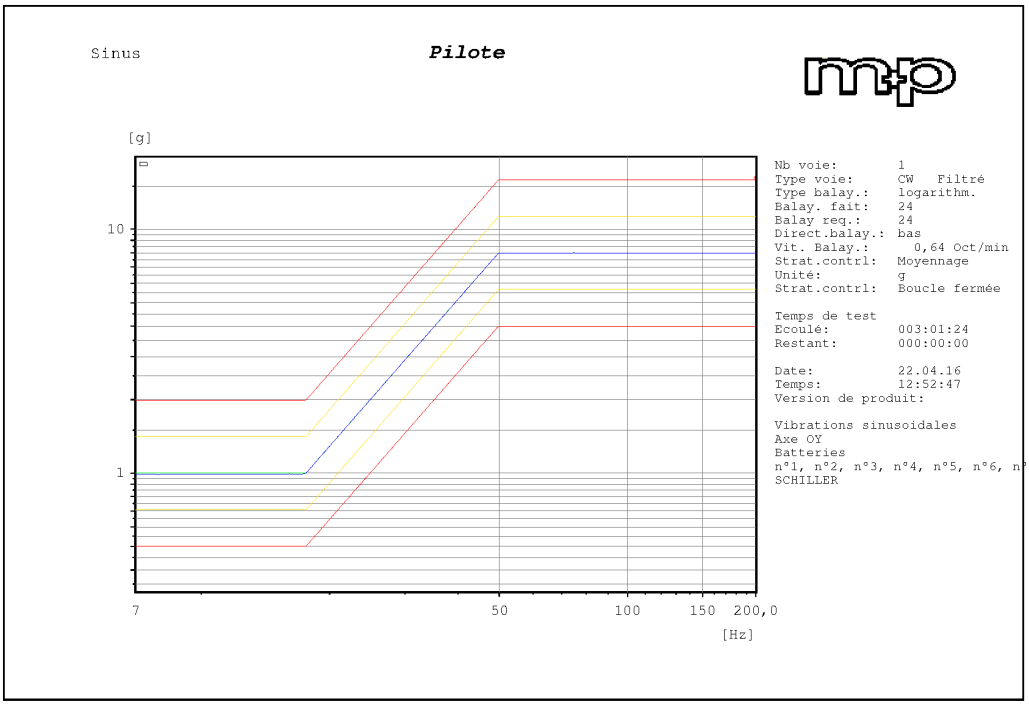


38.3.4.3: Vibration test chart-X axis direction



C:\VcpNT\Daten\m+p\674342-SCHILLER AXE OX_002.rsn

38.3.4.3: Vibration test chart-Y axis direction



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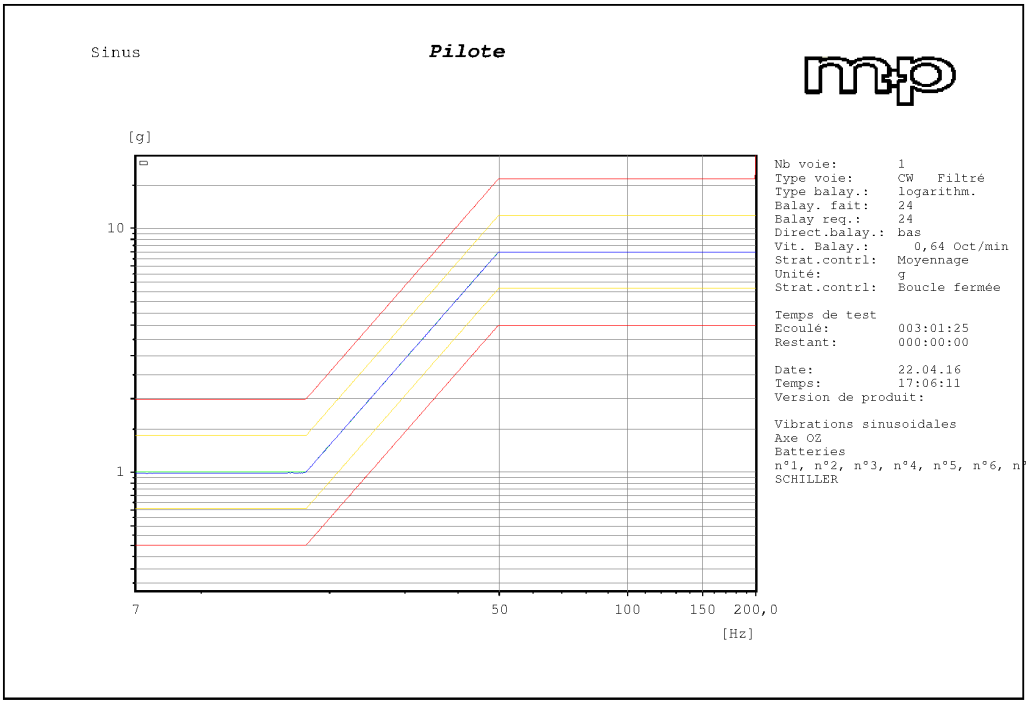
38.3.4.3: Vibration test chart-Z axis direction



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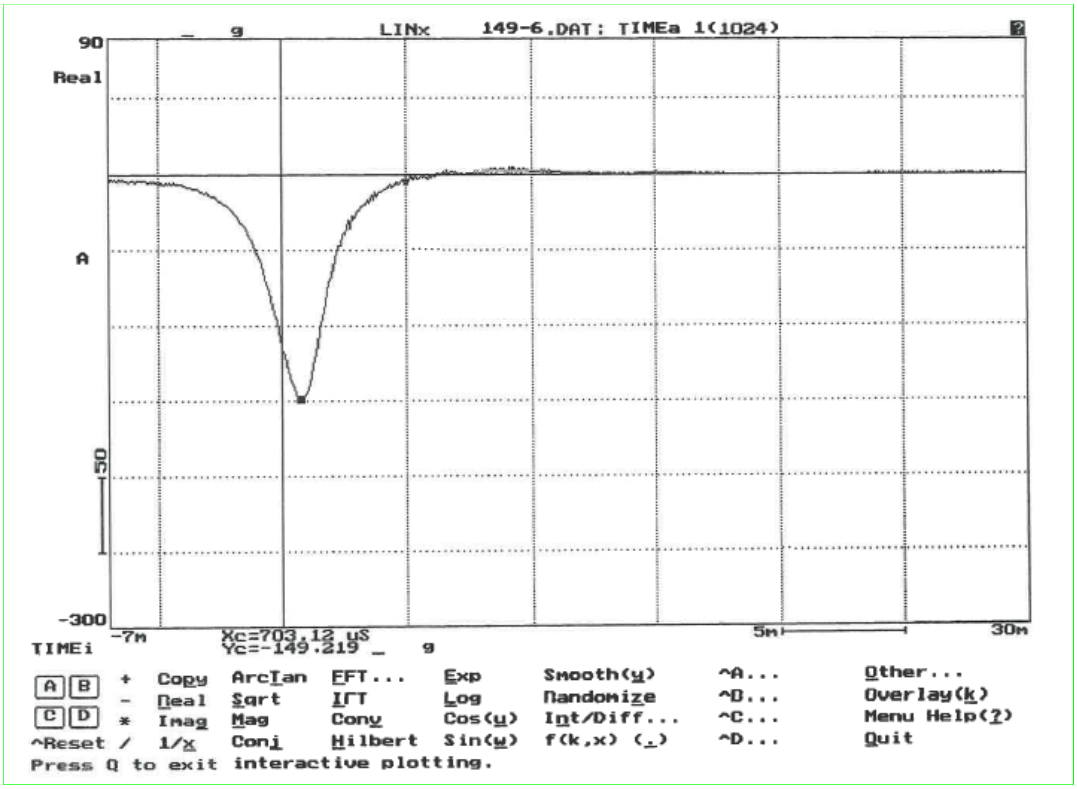
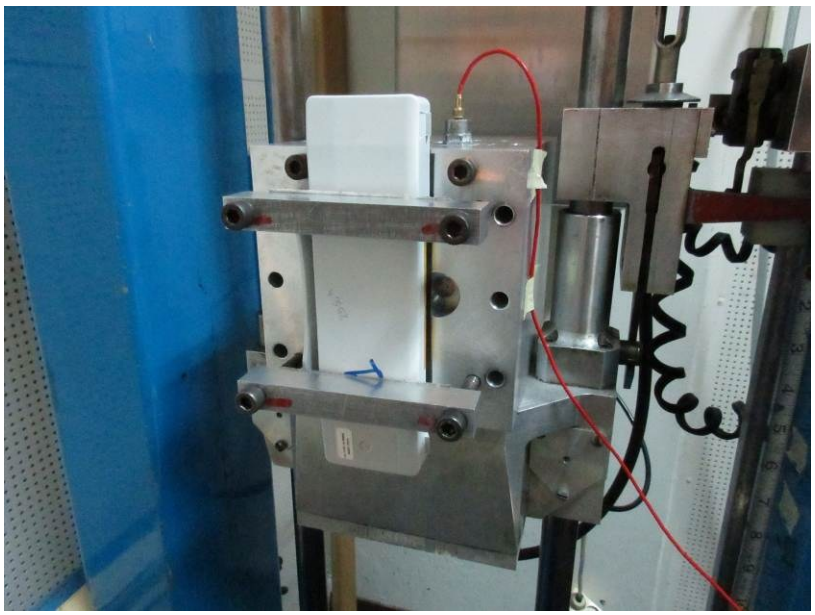
ANNEX 3
Shock test

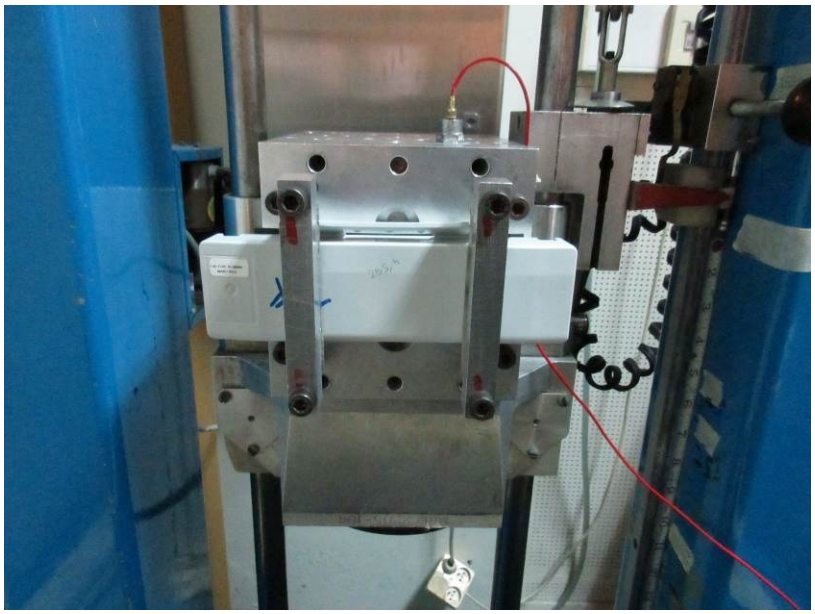
38.3.4.4: Mechanical shock test



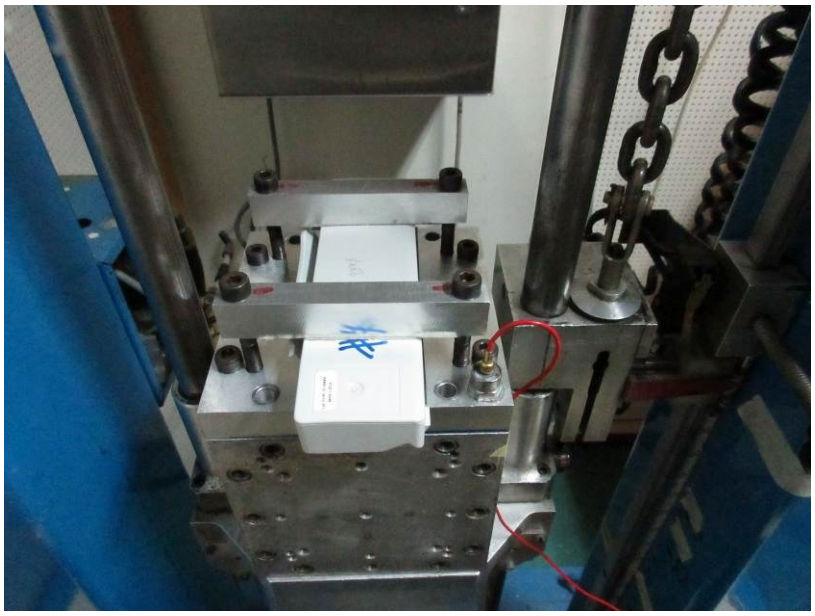
38.3.4.4: Shock test condition-1 (X axis direction), fixed by screws



38.3.4.4: Shock test condition-2 (Y axis direction), fixed by screws

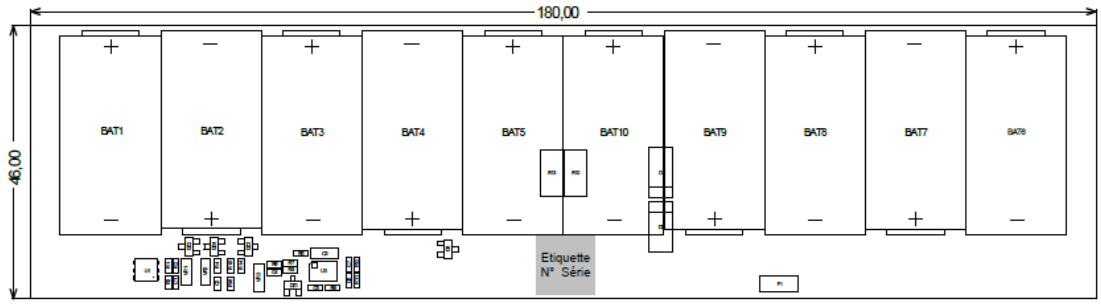


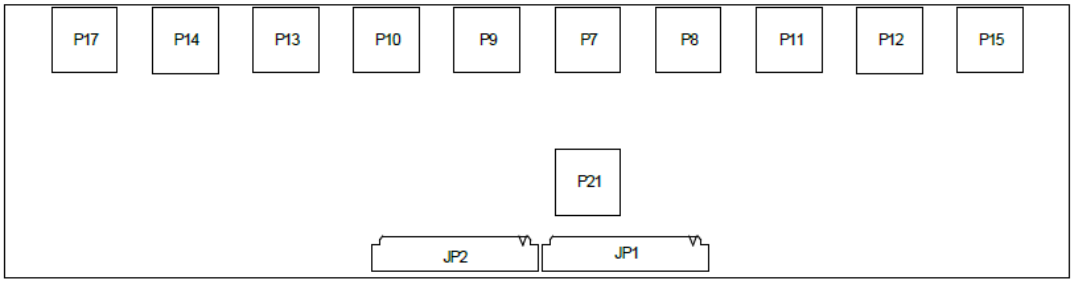
38.3.4.4: Shock test condition-3 (Z axis direction), fixed by screws



ANNEX 4

Assembling of the battery : 5s2p cells

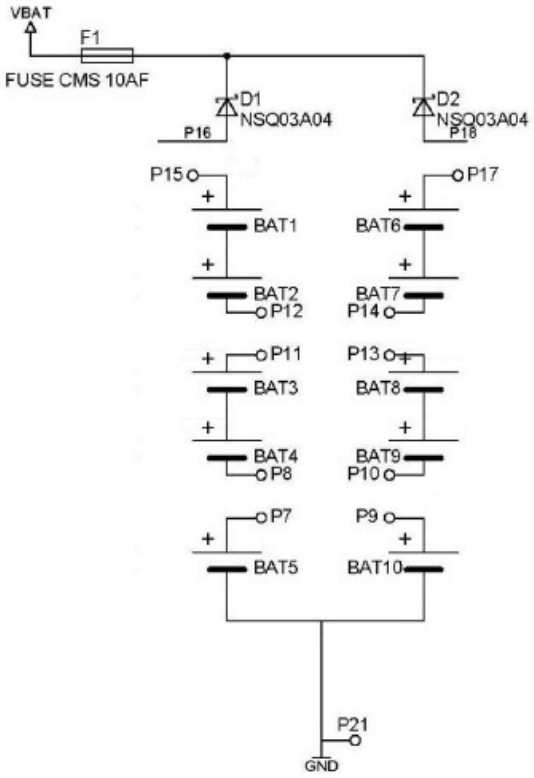




Components :

Position	Qté	Article	Désignation	Fabricant	Référence	entrée
BAT1, BAT2, BAT3, BAT4, BAT5, BAT6, BAT7, BAT8, BAT9, BAT10	10	NI	BATTERIE 3V LITHIUM CR17345	DURACELL	DURACELL ULTRA 123	19/12/14
C1, C4	2	4-19-0002	COND CMS 0603 100P 50V 10% COG			19/12/14
C2, C5	2	4-19-0000	COND CMS 0603 100N 16V 10% X7R			19/12/14
C3	1	4-19-0045	COND CMS 1206 1U 16V 10% X7R			19/12/14
C6, C7	2	4-19-0001	COND CMS 0603 10N 50V 20% X7R			19/12/14
D1, D2	2	4-27-0027	DIODE CMS NSQ03A04 LOW FV	NIHON	NSQ03A04	19/12/14
D3	1	22010	DIODE CMS BAV70 A4	FAIRCHILD	BAV70	19/12/14
DZ1, DZ2, DZ3, DZ4	4	4-27-0011	DIODE Z CMS BZX84C 5V6 SOT23	FAIRCHILD	BZX84C5V6	19/12/14
F1	1	4-44-0012	FUS CMS 10AF	LITTELFUSE	0448010.MR	19/12/14
PCB	1	WSM0199_	CI BATTERY		WSM0199_PCB1	19/12/14
R1	1	4-77-0263	RES CMS 2.74K 1% 0.1W 0603			19/12/14
R10, R13	2	4-77-0065	RES CMS 0.05R 1% 1.5W 2512	WELWYN	LRC 2512 0.05R 1%	19/12/14
R14, R15, R16	3	NI				19/12/14
R2, R3	2	4-77-0062	RES CMS 10 1% 0.1W 0603			19/12/14
R4	1	4-77-0078	RES CMS 22.1R 1% 0.1W 0603			19/12/14
R5, R6, R7	3	4-77-0026	RES CMS 100 1% 0.1W 0603			19/12/14
R8, R11, R12	3	4-77-0025	RES CMS 100K 1% 0.1W 0603			19/12/14
R9	1	4-77-0019	RES CMS 1M 1% 0.1W 0603			19/12/14
U1	1	4-52-0230	IC 2401/DS2401P S/N CHIP TSOC6	MAXIM	DS2401P+	19/12/14
U3	1	4-52-0273	IC 26231/BQ26231 B. GAUGE CMS	TI	BQ26231PW	19/12/14
VR1, VR2, VR3	3	NI		EPCOS	B72520V0060M062	19/12/14

Electrical diagram :



ANNEX 5

List of test equipment used:

List of test equipment used:

Clause	Measurement / testing	Testing / measuring equipment / material needed owned by the applicant CBTL	Characteristics of the Equipment	Calibration due date	Range used
38.3.4.1	Altitude	Vacuum Chamber Multimeter Clock	Brand: SECASI Type: - Serial no.: D1025021 Brand: Keithley Type: 2700 Serial no.: A6440081 Brand: OREGON Type: C510 Serial no.: B2040108	06/2016 12/2017 10/2017	-65°C to +150°C HR 30% to 95% in temperature range From 10°C to 90°C Vacuum From 1013 mbar to 10 mbar
38.3.4.2	Temperature cycling	Humidity Chamber Temperature recorder (multi-channel) Multimeter	Brand: CLIMATS Type: - Serial no.: D1022119 Brand: Graphtec Type: GL820 Serial no.:B4046065 Brand: Keithley Type: 2700 Serial no.: A6440081	12/2016 11/2016 12/2017	-40°C to +75°C HR 30% to 95% in temperature range From 10°C to 90°C
38.3.4.3	Vibration	Vibration generator Multimeter	Brand: LING Type: 27 Kn Serial no.: D2040002 Brand: Keithley Type: 2700 Serial no.: A6440081	11/2016 12/2017	5Hz to 2000Hz 100g without load 2 in
38.3.4.4	Shock	Shock Apparatus Multimeter	Brand: Impac Type: - Serial no.: D2126007 Brand: Keithley Type: 2700 Serial no.: A6440081	- 12/2017	100g without load 175g / 6ms
38.3.4.5	External short circuit	Oven Temperature recorder (multi-channel) Clock Switch	Brand: MPC Type: P74-300 Serial no.: D1022007 Brand: Graphtec Type: GL820 Serial no.: B4046065 Brand: OREGON Type: C510 Serial no.: B2040108 Brand: - Type: - Serial no.: -	- 11/2016 10/2017 -	+20°C to +55°C +20°C to +200°C - -

ANNEX 6

MAXIMUM UNCERTAINTIES CHART

This chart shows the maximum uncertainty values according to tests that may be related in this document

Test	Measurement uncertainty (k = 2)
Current	± 1 %
Voltage	± 1 %
Time	± 0.1 %
Temperature rise	± 2 K
Power dissipation	± 1 %
Power measure	± 2 %
Humidity measurement (hygroscopic treatment, conditioning) • 50 % RH to 90 % RH • > 90 % RH	 ± 3 % RH ± 4 % RH
Determination of mechanical properties in tensile and compression tests – applied force	± 4 %
Force measurement (dynamometer) for mechanical strength test, pull test, test probe entry	± 2.5 %
Mass measurement (weight) • 0 g to 5 kg (0 N to 49.05 N) • 5 kg to 9 kg (49.05 N to 88.29 N) • 9 kg to 50 kg (88.29 N to 490.5 N)	 ± 0.2 % ± 3 g (± 0.03 N) ± 14 g (± 0.14 N)
Dimensional measurement performed with a rule	± 0.7 mm
Dimensional measurements performed with a calliper rule	± 0.13 mm
Dimensional and angle measurements performed with profile projector	± 7 µm ± 0,07°
Mass loss	± 0.2 %
Acceleration - vibration - shock and bumps	 from ± 6.5% to ± 10% 6%
Frequency	From ± 0.5Hz at 1%
Temperature in test chamber -65°C to +150°C	from ± 0.5°C to ± 2°C according to environmental conditions
Relative humidity by dew-point hygrometer (80% to 95%) (25°C to 65°C)	± 2,5% RH
Static pressure Druck 20mbar to 49.9 mbar 50mbar to 1150 mbar	± 5,5% ± 3%

k = coverage factor BATT_EV_ **V2**