Repubblica di San Marino
Autorità per l'Omologazione
Republic of San Marino
Authority for Homologation

Via Consiglio dei Sessanta, 99
47891 Dogana - Repubblica di San Marino

Comunicazione
Communication

E57	Concernente [2/] *Concerning [2/]*	**Il rilascio dell'omologazione** ***Approval granted*** ~~L'estensione dell'omologazione~~ ~~*Approval extended*~~ ~~Il rifiuto dell'omologazione~~ ~~*Approval refused*~~ ~~La revoca dell'omologazione~~ ~~*Approval withdrawn*~~ ~~La cessazione definitiva della produzione~~ ~~*Production definitively discontinued*~~

of a type of ~~electrical~~/electronic sub-assembly [(2)] with regard to Regulation no. 10.06

Omologazione N. ***Approval No.***	**E57*10R06/02*0387**	**Estensione N.** ***Extension No.***	**00**

Marchio di omologazione ***Approval mark***	***See information document No. 12.8V 60Ah-00***

1. Make (trade name of manufacturer): ENERGIE MOBILE

2. Type and general commercial description(s): Type: 12.8V 60Ah
   Commercial description: LiFePO4 battery

3. Means of identification of type, if marked on the ~~vehicle~~/component/~~separate technical unit~~ [(2)]: Letters and digits

3.1 Location of that marking: Labelled on the device

4. Category of vehicle: M, N, O

5.	Name and address of manufacturer:	ENERGIE MOBILE Zone Marcel Doret Cellule At2 195 Rue Louis Bréguet 62100 Calais
6.	In the case of components and separate technical units, location and method of affixing of the approval mark:	Labelled on the device
7.	Address(es) of assembly plant(s):	***Confidential***
8.	Additional information (where applicable):	See appendix below
9.	Technical Service responsible for carrying out the tests:	**AUTOMOTIVE TECHNICAL SERVICE S.r.l.** Via Consiglio dei Sessanta, 99 47891 – DOGANA Repubblica di San Marino
10.	Date of test report:	16/06/2023
11.	No. of test report:	ATS-SM-IR-10-06690
12.	Remarks (if any):	See appendix below
13.	Place:	DOGANA – Repubblica di San Marino
14.	Date:	20/06/2023
15.	Signature:	

AUTORITA' PER L'OMOLOGAZIONE Repubblica di San Marino E57

Ing. Marco CONTI
Direttore Generale
General Director

16. The index to the information package lodged with the Approval Authority, which may be obtained on request, is attached.
17. Reasons for extension: Not Applicable

(2) Strike out what does not apply.

E57*10R06/02*0387*00

Appendix to type-approval communication form No. E57*10R06/02*0387*00 concerning the type-approval of an ~~electrical~~/electronic sub-assembly under Regulation No. 10

1. Additional information:

1.1. Electrical system rated voltage:	DC 12V/24V ~~pos.~~/neg. ground(2)
1.2. This ESA can be used on any vehicle type with the following restrictions:	No restriction
1.2.1. Installation conditions, if any:	No restriction
1.3. This ESA can be used only on the following vehicle type:	No restriction
1.3.1. Installation conditions, if any:	No restriction
1.4. The specific test method(s) used and the frequency ranges covered to determine immunity were: (Please specify precise method used from Annex 9):	Measured by bulk current injection (20 MHz – 400 MHz) and in the anechoic chamber (400 MHz -2 GHz) as described in annex 9 of ECE-Regulation No. 10.
1.5. Laboratory accredited to ISO 17025 and recognised by the Approval Authority responsible for carrying out the tests:	Zhejiang Huachen Inspection and Testing Co., Ltd. Building 23, No.1336, Hangfu Road, Chongfu Town, Tongxiang City, Jiaxing City, Zhejiang Province, China

2. Remarks: None

(2) Strike out what does not apply.

Allegato *Enclosure*				
Al certificato di omologazione ECE N. *To ECE approval certificate No.*		**E57*10R06/02*0387*00**		
Indice del fascicolo di omologazione *Index to the information package*				
Data *Date of issue*	**20/06/2023**		**Data ultima modifica** *Last amendment date*	--
1.	***Clausole di garanzia e istruzioni sul diritto di presentare ricorso*** *Collateral clauses and instruction on right to appeal*			
2.	**Rapporto(i) Finale di Ispezione No.** *Test report(s) No.*	**ATS-SM-IR-10-06690**	**Data** *Date*	**16/06/2023**
3.	**Scheda informativa N.** *Information document No.*	**12.8V 60Ah-00**	**Data** *Date*	**14/06/2023**
			Data ultima modifica *Last amendment date*	**--**

Clausole di garanzia e istruzioni sul diritto di presentare ricorso

Clausole di garanzia

La produzione in serie deve essere esattamente conforme ai documenti di omologazione. Le variazioni di produzione in serie sono consentite solo con il consenso espresso del **Autorità per l'Omologazione**.

Le variazioni del nome della società, l'indirizzo e lo stabilimento di produzione, nonché una delle parti che hanno l'autorità alla consegna o eventuali rappresentanti nominati al momento del rilascio dell'omologazione, devono essere immediatamente comunicate al **Autorità per l'Omologazione**. La violazione di queste regole può portare al ritiro dell'omologazione ed inoltre può essere legalmente perseguita.

L'omologazione decade se viene restituita o ritirata o se il tipo omologato non è più conforme ai requisiti di legge. La revoca può essere fatta se non esistono più i requisiti richiesti per il rilascio e la continuazione dell'omologazione, se il titolare dell'omologazione viola gli obblighi dettati dall'omologazione, anche nel caso in cui gli obblighi derivino dalle condizioni assegnate all'interno dell'omologazione, o se è accertato che il tipo approvato non è conforme ai requisiti di sicurezza del traffico e di tutela dell'ambiente.

L'**Autorità per l'Omologazione** può verificare la corretta applicazione della delega conferita rilasciata nella presente omologazione, in qualsiasi momento. In particolare, questo include la verifica della produzione, che sia conforme, nonché le misure di controllo di conformità della produzione. Per questo, possono essere presi dei campioni dalla produzione. I dipendenti o rappresentanti dell'**Autorità per l'Omologazione** possono avere accesso senza ostacoli agli impianti di produzione e stoccaggio.

La delega conferita contenuta nella presente omologazione non è trasferibile. I diritti del marchio di terzi non sono interessati da questa omologazione.

Istruzione su diritto di ricorso

Questa omologazione è appellabile entro un mese dalla notifica. Il ricorso deve essere presentato per iscritto o come una domanda inviata all' **Autorità per l'Omologazione** - Via Consiglio dei Sessanta, 99 - 47891 Dogana - Repubblica di San Marino.

********** **********

Collateral clauses and instruction on right to appeal

Collateral clauses

*The individual production of serial fabrication must be in exact accordance with the approval documents. Changes in the individual production are only allowed with express consent of the **Authority for Homologation**.*

*Changes in the name of the company, the address and the manufacturing plant as well as one of the parties given the authority to delivery or authorized representative named when the approval was granted is to be immediately disclosed to the **Authority for Homologation**. Breach of this regulation can lead to recall of the approval and moreover can be legally prosecuted.*

The approval expires if it is returned or withdrawn or if the type approved no longer complies with the legal requirements. The revocation can be made if the demanded requirements for issuance and the continuance of the approval no longer exist, if the holder of the approval violates the duties involved in the approval, also to the extent that they result from the assigned conditions to this approval, or if it is determined that the approved type does not comply with the requirements of traffic safety or environmental protection.

*The **Authority for Homologation** may check the proper exercise of the conferred authority taken from this approval at any time. In particular this means the compliant production as well as the measures for conformity of production. For this purpose samples can be taken or have taken. The employees or the representatives of the **Authority for Homologation** may get unhindered access to the production and storage facilities.*

The conferred authority contained with issuance of this approval is not transferable. Trade mark rights of third parties are not affected with this approval.

Instruction on right to appeal

*This approval can be appealed within one month after notification. The appeal is to be filed in writing or as a transcript at the **Authority for Homologation** - Via Consiglio dei Sessanta, 99 - 47891 Dogana - Repubblica di San Marino.*

Inspection Report No.:	ATS-SM-IR-10-06690
Of:	16/06/2023
Type:	12.8V 60Ah
Manufacturer:	ENERGIE MOBILE

Inspection Report

No. ATS-SM-IR-10-06690

Inspection concerning ~~vehicles~~ / components with regard to:

Electromagnetic Compatibility (EMC) for M, N, O, L vehicle categories

performed according to

ECE Regulation No. 10

as last amended by

06 series of amendments (supplement no. 02)

of the Economic Commission for Europe

Approval status	
ECE	Number of approval
	E57*10R06/02*0387*00

0. General information

0.1.	Make (trade name of manufacturer):	ENERGIE MOBILE
0.2.	Type:	12.8V 60Ah
0.2.1.	Variants:	12.8V 90Ah, 12.8V 100Ah, 12.8V 135Ah, 12.8V 150Ah, 12.8V 200Ah, 12.8V 300Ah, 12.8V 400Ah, 25.6V 100Ah, 25.6V 200Ah, 25.6V 300Ah
0.3.	Name and address of manufacturer:	ENERGIE MOBILE Zone Marcel Doret Cellule At2 195 Rue Louis Bréguet 62100 Calais
0.3.1	Name and address of manufacturer's authorized representative:	N/A
0.3.2.	Production plant(s) address(es):	***Confidential***
0.4.	No. of the information document:	12.8V 60Ah-00 Date: 14/ 06/ 2023
0.5.	Position of the approval mark:	Labelled on the device
0.6	Vehicle category:	M, N, O

1. Test Condition

1.1.	Test sample:	The model of test report is according to customer's requirements. Performance criterion A: During and after the test, EUT work normally, the EUT properly.
1.2.	Test procedures used:	According to ECE Regulation No. 10.06
1.3.	Specimen submitted to test on:	09/06/2023
1.4.	Place of test:	Zhejiang Huachen Inspection and Testing Co., Ltd. Building 23, No.1336, Hangfu Road, Chongfu Tow Tongxiang City, Jiaxing City, Zhejiang Provinc China
1.5.	Date of test:	15/06/2023

2. Test records

2.1.	Equipment for measuring and testing:	The test equipment used were in testing compliance with the test requirements. List of main equipment see Appendix 4.
2.2	Conformity with the technical sheet and attached drawings:	SI / *YES* [X] NO / *NO* [ ] NR / *NA* [ ]

2.3 Test results

2.3.1	Broadband electromagnetic interference generated by ESAs	
2.3.1.1	Method of measurement:	Measured by the method described in Annex 7 of ECE Regulation No. 10.
2.3.1.2	Results:	Conform / ~~Not Conform~~ (Test data see Appendix 2)
2.3.2.	Narrowband electromagnetic interference generated by ESAs	
2.3.2.1.	Method of measurement:	Measured by the method described in Annex 8 of ECE Regulation No. 10.
2.3.2.2.	Results:	Conform / ~~Not Conform~~ (Test data see Appendix 2)
2.3.3	Immunity of ESAs to electromagnetic radiation:	
2.3.3.1.	Method of measurement:	Measured by bulk current injection (20 MHz ~ 400 MHz) and in the anechoic chamber (400 MHz ~ 2 GHz) as described in annex 9 of ECE Regulation No. 10.
2.3.3.2.	Performance criteria:	No degradation of function by testing with 60 mA (bulk current injection) and 30 V/m (anechoic chamber).
2.3.3.3.	Results:	Conform / ~~Not Conform~~ (Test data see Appendix 2)

2.3.4.	Immunity of ESAs to transient disturbances	
2.3.4.1.	Method of measurement:	Measured by the method described in Annex 10 of ECE Regulation No. 10.
2.3.4.2.	Results:	Conform / ~~Not Conform~~ (Test data see Appendix 2)
2.3.5.	Emission of transient conducted disturbances generated by ESAs	
2.3.5.1.	Method of measurement:	Measured by the method described in Annex 10 of ECE Regulation No. 10.
2.3.5.2.	Results:	Conform / ~~Not Conform~~ (Test data see Annex 2)
3.	**Remark concerning tested object(s)**	N/A

4. Other information

Place of inspection:	Zhejiang Huachen Inspection and Testing Co., Ltd. Building 23, No.1336, Hangfu Road, Chongfu Town, Tongxiang City, Jiaxing City, Zhejiang Province, China	
Date of inspection:	15/06/2023	
Technical service representative:	**Senior Inspector**	**Junior Inspector (if applicable)**
	Ms. Yi Shujuan	N/A
Manufacturer's representative:	N/A	
Remarks:	None	

4.1 Appendix

1. List of modifications
2. Test Data
3. Sample Photo(s)
4. List of main test equipment

4.2 Enclosures

Information Folder

5. Statement of conformity

The information document as given in paragraph 0.4 and the type described there are in compliance with the test specification mentioned above.

With regard to the required level of performance to be achieved, the tested items were representative for the type to be approved (see paragraph 1).

The tests were carried out in accordance with the relevant requirements of EN ISO/IEC 17025 and EN ISO/IEC 17020 / R10- 06 ECE/UN.

The inspection report comprises pages 1 to 27

Il shall not be reproduced except in full, without written approval of the laboratory.

Dogana, Repubblica di San Marino, 16/06/2023

Number of project and protocol	***Originality Check*** (*) **ATS-SM-PR-06690**	**Automotive Technical Service S.r.l.** ***Inspector*** 伊树娟 (Ms. Yi Shujuan) **Automotive Technical Service S.r.l.** ***Deputy Technical Director*** (Eng. Bogdan Nicolae Domnescu)	AUTOMOTIVE TECHNICAL SERVICE S.r.l. · Via Consiglio dei Sessanta, 99 · 47891 RSM ATS Technical Service RSMAO-01

Appendix 1

List of modifications **~~Applicable~~ / Not Applicable** **Appendix 1**

More details for application of **Date :**

Correction of : -

Modification of : -

Addition of : -

Deletion of : -

Appendix 2

Test data **Appendix 2**

1 Test object(s)

1.1.	Commercial description:	LiFePO4 battery
1.2.	Type:	12.8V 60Ah
1.2.1.	Variants:	12.8V 90Ah, 12.8V 100Ah, 12.8V 135Ah, 12.8V 150Ah, 12.8V 200Ah, 12.8V 300Ah, 12.8V 400Ah, 25.6V 100Ah, 25.6V 200Ah, 25.6V 300Ah
1.3.	Technical data of the tested ESA type	
1.3.1.	Electrical system rated voltage:	DC 12V/24V neg. ground
1.3.2.	This ESA can be used on any vehicle type with the following restrictions:	No restrictions
1.3.3	Installation conditions:	No restrictions
1.3.4	This ESA can be used on the following vehicle types:	No restrictions
1.3.5	Installation conditions	No restrictions

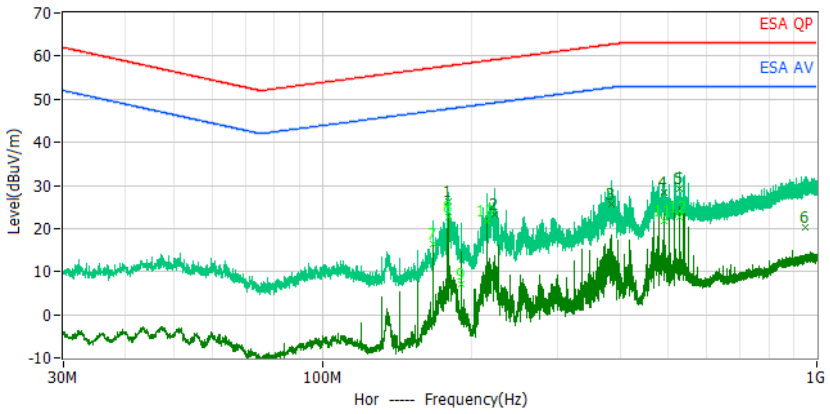
Test data **Appendix 2**

Test results (12V DC 60Ah)

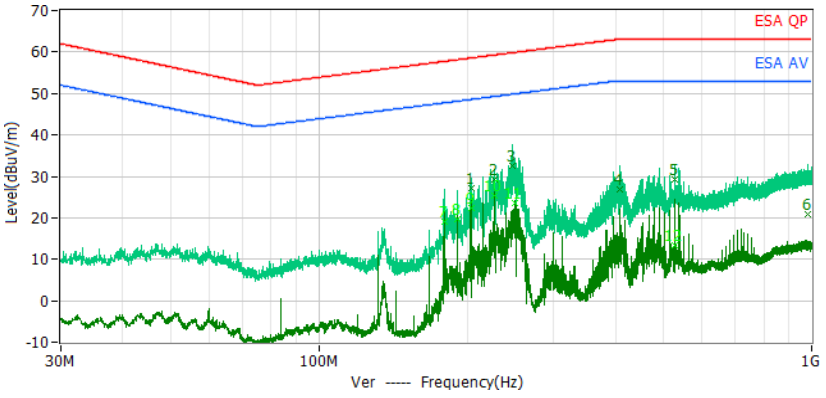
1. Broadband / narrowband electromagnetic interference generated by ESAs

Radiated broadband electromagnetic Emissions	:	as shown in table 1
Radiated narrow band electromagnetic Emissions	:	as shown in table 2
Antenna position	:	horizontal and vertical
Rated voltage	:	DC 12 V

Horizontal Polarity Test Result Diagram (Broadband and Narrow band)



Vertical Polarity Test Result Diagram (Broadband and Narrow band)



Test data **Appendix 2**

Maximum broadband QP value (Horizontal Polarity):

Frequency (MHz)	QuasiPeak (dBuV/m)	Height (cm)	Polarization	Margin (dB)	Limit (dB/m)
179.550MHz	26.3	100.0	H	-31.4	57.7
223.450MHz	23.3	100.0	H	-35.9	59.2
384.950MHz	25.7	100.0	H	-37.0	62.7
490.800MHz	28.3	100.0	H	-34.7	63.0
526.650MHz	29.4	100.0	H	-33.6	63.0
946.950MHz	20.4	100.0	H	-42.6	63.0

Maximum broadband QP value (Vertical Polarity):

Frequency (MHz)	QuasiPeak (dBuV/m)	Height (cm)	Polarization	Margin (dB)	Limit (dB/m)
203.550MHz	27.3	100.0	V	-31.3	58.6
227.550MHz	29.3	100.0	V	-30.0	59.3
247.450MHz	32.5	100.0	V	-27.3	59.8
408.850MHz	26.8	100.0	V	-36.2	63.0
526.850MHz	29.4	100.0	V	-33.6	63.0
984.200MHz	20.8	100.0	V	-42.2	63.0

Maximum narrowband AV value (Horizontal Polarity):

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Margin (dB)	Limit (dB/m)
167.600MHz	16.4	100.0	H	-30.9	47.3
179.600MHz	22.7	100.0	H	-25.0	47.7
191.600MHz	7.2	100.0	H	-41.0	48.2
215.550MHz	21.9	100.0	H	-27.0	48.9
490.800MHz	21.8	100.0	H	-31.2	53.0
526.750MHz	22.8	100.0	H	-30.2	53.0

Maximum narrowband AV value (Vertical Polarity):

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Margin (dB)	Limit (dB/m)
179.550MHz	19.0	100.0	V	-28.7	47.7
191.550MHz	19.8	100.0	V	-28.4	48.2
203.550MHz	22.4	100.0	V	-26.2	48.6
227.450MHz	25.3	100.0	V	-24.0	49.3
249.600MHz	23.6	100.0	V	-26.3	49.9
526.800MHz	13.4	100.0	V	-39.6	53.0

Test data **Appendix 2**

2. Immunity of ESAs to electromagnetic radiation

Test method : ISO 11452-4 3rd edition: 2011
Bulk current injection testing method (from 20 MHz to 400MHz)

ISO 11452-2 2nd edition: 2004
Free field testing method (from 400 MHz to 2000MHz)

Measurement result:

Frequency range (MHz)	Test level	Type of modulation	Test distance	Antenna position	Result
20~400	60mA	AM,80%	150mm	---	Pass*
400~800	30V/m	AM,80%	1m	Vertical	Pass*
800~2000	30V/m	PM,577us	1m	Vertical	Pass*

Remark:
* no degradation of performance of 'immunity-related functions.

3. Immunity of ESAs to transient disturbances

Test method : ISO 7637-2 2nd edition: 2004

Measurement result:

Test pulse	Test level	Number of pulse / test time	Burst cycle / pulse Repetition time	Required minimum function status*	Status of function true value	Result
1	-75V	5000 pulses	0.5s	C	C	Pass
2a	+37V	5000 pulses	0.2s	B	A	Pass
2b	+10V	10 pulses	0.5s	C	C	Pass
3a	-112V	1h	90ms	A	A	Pass
3b	+75V	1h	90ms	A	A	Pass
4	-6V	1 pulse	---	C	B	Pass

Remark:

** Class A: all functions of a device/system perform as designed during and after exposure to disturbance.*

Class B: all functions of a device/system perform as designed during exposure. However, one or more of them can go beyond specified tolerance. All functions return automatically to within normal limits after exposure is removed. Memory functions shall remain class A.

Class C: one or more functions of a device/system do not perform as designed during exposure but return automatically to normal operation after exposure is removed.

Class D: one or more functions of a device/system do not perform as designed during exposure and do not return to normal operation until exposure is removed and the device/system is reset by simple "operator/use" action.

Class E: one or more functions of a device/system do not perform as designed during and after exposure and cannot be returned to proper operation without repairing or replacing the device/system.

Test data **Appendix 2**

2. Emission of transient conducted disturbances generated by ESAs

Test method ISO 7637-2 2nd edition: 2004

Polarity of pulse amplitude	Maximum allowed value for vehicles with 12V systems	Measured Pulse amplitude True Value(Fast)	Measured Pulse amplitude True Value(Slow)
Positive	+75V	+0 V	+0.3 V
Negative	-100V	-18.6 V	-16.6 V

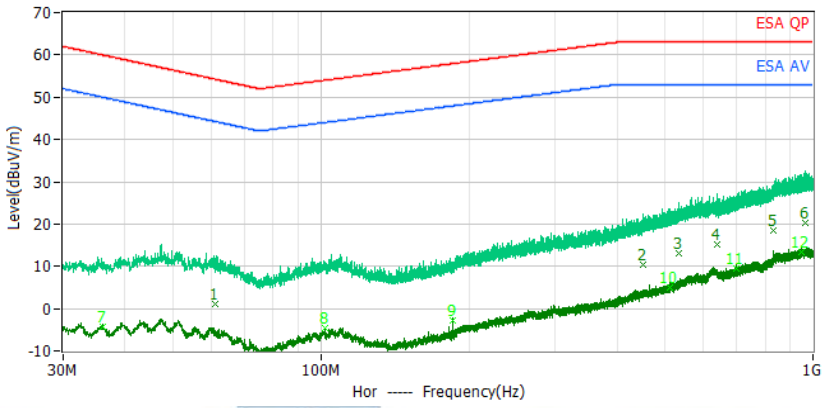
Test data **Appendix 2**

Test results (12V DC 400Ah)

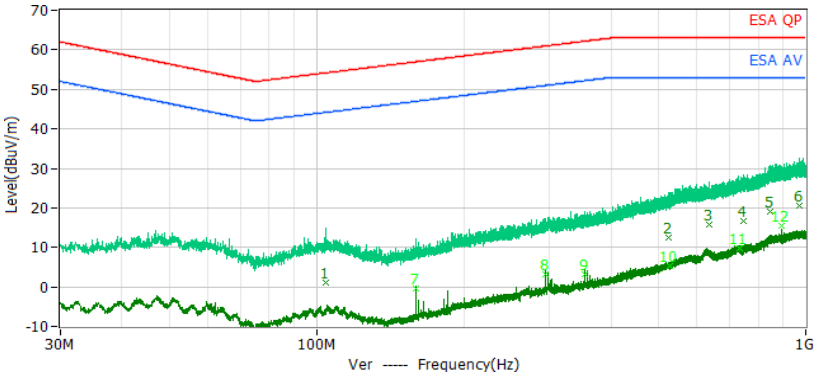
1. Broadband / narrowband electromagnetic interference generated by ESAs

Radiated broadband electromagnetic Emissions	:	as shown in table 1
Radiated narrow band electromagnetic Emissions	:	as shown in table 2
Antenna position	:	horizontal and vertical
Rated voltage	:	DC 12 V

Horizontal Polarity Test Result Diagram (Broadband and Narrow band)



Vertical Polarity Test Result Diagram (Broadband and Narrow band)



Test data **Appendix 2**

Maximum broadband QP value (Horizontal Polarity):

Frequency (MHz)	QuasiPeak (dBuV/m)	Height (cm)	Polarization	Margin (dB)	Limit (dB/m)
61.100MHz	1.1	100.0	H	-53.1	54.2
450.800MHz	10.5	100.0	H	-52.5	63.0
534.650MHz	13.0	100.0	H	-50.0	63.0
640.150MHz	15.3	100.0	H	-47.7	63.0
832.350MHz	18.6	100.0	H	-44.4	63.0
962.550MHz	20.4	100.0	H	-42.6	63.0

Maximum broadband QP value (Vertical Polarity):

Frequency (MHz)	QuasiPeak (dBuV/m)	Height (cm)	Polarization	Margin (dB)	Limit (dB/m)
104.500MHz	1.0	100.0	V	-53.2	54.2
524.550MHz	12.6	100.0	V	-50.4	63.0
634.200MHz	15.7	100.0	V	-47.3	63.0
748.200MHz	16.8	100.0	V	-46.2	63.0
844.800MHz	19.2	100.0	V	-43.8	63.0
972.450MHz	20.5	100.0	V	-42.5	63.0

Maximum narrowband AV value (Horizontal Polarity):

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Margin (dB)	Limit (dB/m)
36.050MHz	-4.4	100.0	H	-54.4	50.0
101.950MHz	-4.6	100.0	H	-48.6	44.0
185.900MHz	-2.9	100.0	H	-50.9	48.0
510.950MHz	5.0	100.0	H	-48.0	53.0
700.000MHz	9.6	100.0	H	-43.4	53.0
946.450MHz	13.4	100.0	H	-39.6	53.0

Maximum narrowband AV value (Vertical Polarity):

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Margin (dB)	Limit (dB/m)
159.950MHz	-0.3	100.0	V	-47.3	47.0
293.900MHz	3.1	100.0	V	-47.9	51.0
353.900MHz	3.3	100.0	V	-48.9	52.2
526.850MHz	5.4	100.0	V	-47.6	53.0
733.350MHz	9.8	100.0	V	-43.2	53.0
891.000MHz	15.4	100.0	V	-37.6	53.0

Test data **Appendix 2**

2. Immunity of ESAs to electromagnetic radiation

Test method : ISO 11452-4 3rd edition: 2011
Bulk current injection testing method (from 20 MHz to 400MHz)

ISO 11452-2 2nd edition: 2004
Free field testing method (from 400 MHz to 2000MHz)

Measurement result:

Frequency range (MHz)	Test level	Type of modulation	Test distance	Antenna position	Result
20~400	60mA	AM,80%	150mm	---	Pass*
400~800	30V/m	AM,80%	1m	Vertical	Pass*
800~2000	30V/m	PM,577us	1m	Vertical	Pass*

Remark:
* no degradation of performance of 'immunity-related functions.

3. Immunity of ESAs to transient disturbances

Test method : ISO 7637-2 2nd edition: 2004

Measurement result:

Test pulse	Test level	Number of pulse / test time	Burst cycle / pulse Repetition time	Required minimum function status*	Status of function true value	Result
1	-75V	5000 pulses	0.5s	C	C	Pass
2a	+37V	5000 pulses	0.2s	B	A	Pass
2b	+10V	10 pulses	0.5s	C	C	Pass
3a	-112V	1h	90ms	A	A	Pass
3b	+75V	1h	90ms	A	A	Pass
4	-6V	1 pulse	---	C	B	Pass

Remark:

** Class A: all functions of a device/system perform as designed during and after exposure to disturbance.*

Class B: all functions of a device/system perform as designed during exposure. However, one or more of them can go beyond specified tolerance. All functions return automatically to within normal limits after exposure is removed. Memory functions shall remain class A.

Class C: one or more functions of a device/system do not perform as designed during exposure but return automatically to normal operation after exposure is removed.

Class D: one or more functions of a device/system do not perform as designed during exposure and do not return to normal operation until exposure is removed and the device/system is reset by simple "operator/use" action.

Class E: one or more functions of a device/system do not perform as designed during and after exposure and cannot be returned to proper operation without repairing or replacing the device/system.

Test data **Appendix 2**

2. Emission of transient conducted disturbances generated by ESAs

Test method ISO 7637-2 2nd edition: 2004

Polarity of pulse amplitude	Maximum allowed value for vehicles with 12V systems	Measured Pulse amplitude True Value(Fast)	Measured Pulse amplitude True Value(Slow)
Positive	+75V	+0 V	+0 V
Negative	-100V	-21.9 V	-17.5 V

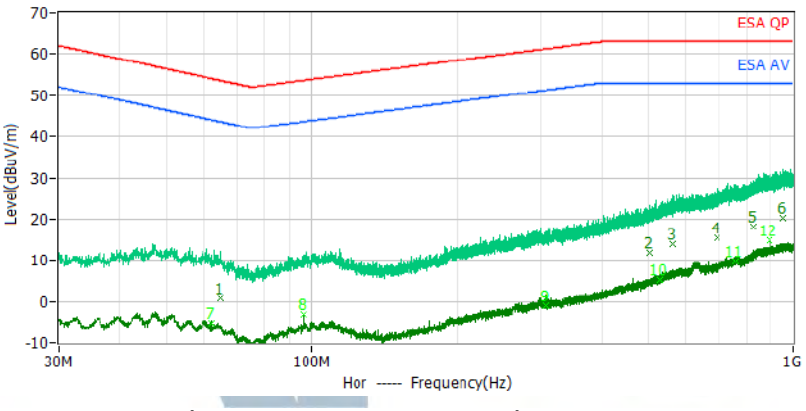
Test data **Appendix 2**

Test results (24V DC 100Ah)

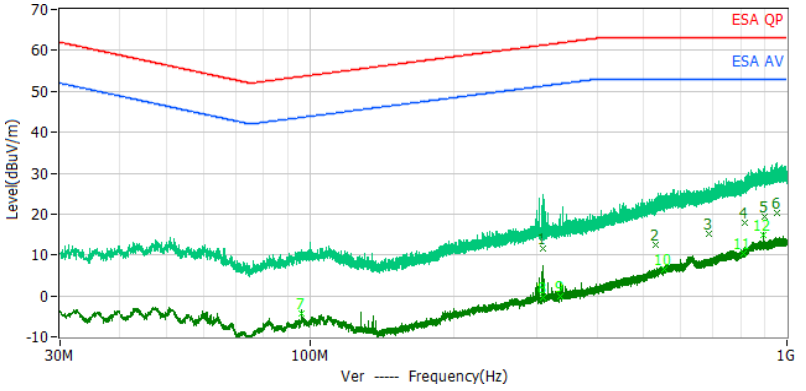
1. Broadband / narrowband electromagnetic interference generated by ESAs

Radiated broadband electromagnetic Emissions	:	as shown in table 1
Radiated narrow band electromagnetic Emissions	:	as shown in table 2
Antenna position	:	horizontal and vertical
Rated voltage	:	DC 24 V

Horizontal Polarity Test Result Diagram (Broadband and Narrow band)



Vertical Polarity Test Result Diagram (Broadband and Narrow band)



Test data **Appendix 2**

Maximum broadband QP value (Horizontal Polarity):

Frequency (MHz)	QuasiPeak (dBuV/m)	Height (cm)	Polarization	Margin (dB)	Limit (dB/m)
64.950MHz	0.7	100.0	H	-52.9	53.6
502.150MHz	11.8	100.0	H	-51.2	63.0
563.900MHz	13.9	100.0	H	-49.1	63.0
695.500MHz	15.5	100.0	H	-47.5	63.0
825.700MHz	18.2	100.0	H	-44.8	63.0
954.050MHz	20.4	100.0	H	-42.6	63.0

Maximum broadband QP value (Vertical Polarity):

Frequency (MHz)	QuasiPeak (dBuV/m)	Height (cm)	Polarization	Margin (dB)	Limit (dB/m)
308.600MHz	11.6	100.0	V	-49.7	61.3
530.950MHz	12.6	100.0	V	-50.4	63.0
685.550MHz	15.3	100.0	V	-47.7	63.0
816.450MHz	18.0	100.0	V	-45.0	63.0
896.350MHz	19.3	100.0	V	-43.7	63.0
952.300MHz	20.3	100.0	V	-42.7	63.0

Maximum narrowband AV value (Horizontal Polarity):

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Margin (dB)	Limit (dB/m)
62.250MHz	-5.2	100.0	H	-49.2	44.0
96.000MHz	-3.1	100.0	H	-46.7	43.6
306.700MHz	-0.9	100.0	H	-52.2	51.3
527.200MHz	5.4	100.0	H	-47.6	53.0
759.900MHz	9.9	100.0	H	-43.1	53.0
891.000MHz	15.0	100.0	H	-38.0	53.0

Maximum narrowband AV value (Vertical Polarity):

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Margin (dB)	Limit (dB/m)
96.000MHz	-4.2	100.0	V	-47.8	43.6
308.050MHz	-0.5	100.0	V	-51.8	51.3
335.700MHz	-0.0	100.0	V	-51.8	51.8
553.900MHz	6.4	100.0	V	-46.6	53.0
809.050MHz	10.5	100.0	V	-42.5	53.0
891.000MHz	15.0	100.0	V	-38.0	53.0

Test data **Appendix 2**

2. Immunity of ESAs to electromagnetic radiation

Test method : ISO 11452-4 3rd edition: 2011
Bulk current injection testing method (from 20 MHz to 400MHz)

ISO 11452-2 2nd edition: 2004
Free field testing method (from 400 MHz to 2000MHz)

Measurement result:

Frequency range (MHz)	Test level	Type of modulation	Test distance	Antenna position	Result
20~400	60mA	AM,80%	150mm	---	Pass*
400~800	30V/m	AM,80%	1m	Vertical	Pass*
800~2000	30V/m	PM,577us	1m	Vertical	Pass*

Remark:
* no degradation of performance of 'immunity-related functions.

3. Immunity of ESAs to transient disturbances

Test method : ISO 7637-2 2nd edition: 2004

Measurement result:

Test pulse	Test level	Number of pulse / test time	Burst cycle / pulse Repetition time	Required minimum function status*	Status of function true value	Result
1	-450V	5000 pulses	0.5s	C	C	Pass
2a	+37V	5000 pulses	0.2s	B	A	Pass
2b	+20V	10 pulses	0.5s	C	C	Pass
3a	-150V	1h	90ms	A	A	Pass
3b	+150V	1h	90ms	A	A	Pass
4	-12V	1 pulse	---	C	B	Pass

Remark:

** Class A: all functions of a device/system perform as designed during and after exposure to disturbance.*

Class B: all functions of a device/system perform as designed during exposure. However, one or more of them can go beyond specified tolerance. All functions return automatically to within normal limits after exposure is removed. Memory functions shall remain class A.

Class C: one or more functions of a device/system do not perform as designed during exposure but return automatically to normal operation after exposure is removed.

Class D: one or more functions of a device/system do not perform as designed during exposure and do not return to normal operation until exposure is removed and the device/system is reset by simple "operator/use" action.

Class E: one or more functions of a device/system do not perform as designed during and after exposure and cannot be returned to proper operation without repairing or replacing the device/system.

Test data **Appendix 2**

2. Emission of transient conducted disturbances generated by ESAs

Test method ISO 7637-2 2nd edition: 2004

Polarity of pulse amplitude	Maximum allowed value for vehicles with 24V systems	Measured Pulse amplitude True Value(Fast)	Measured Pulse amplitude True Value(Slow)
Positive	+150V	+0 V	+0.5 V
Negative	-450V	-28.3 V	-28.3 V

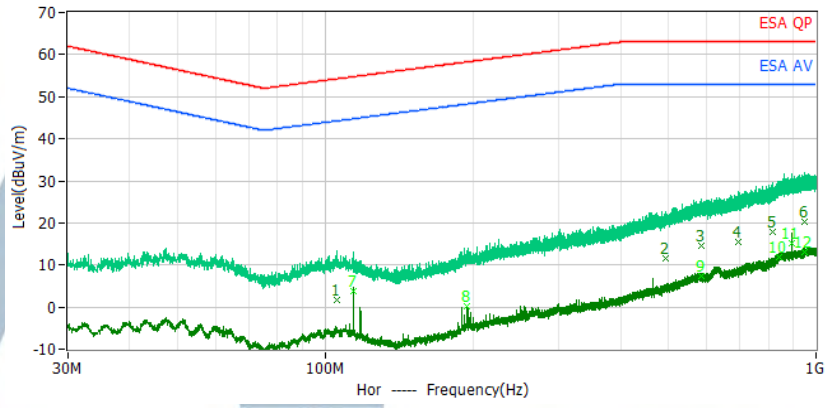
Test data **Appendix 2**

Test results (24V DC 300Ah)

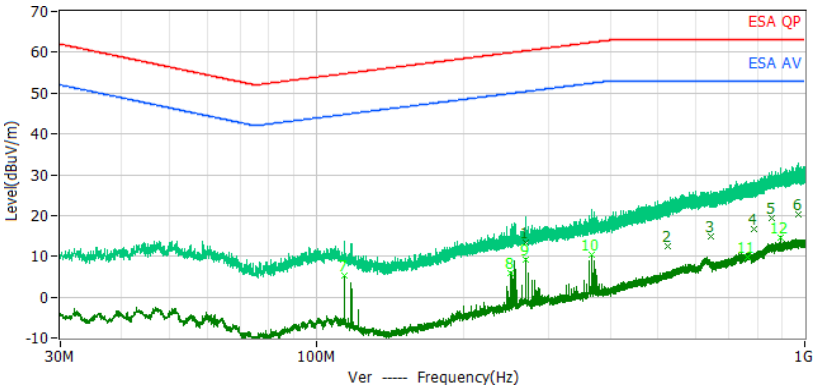
1. Broadband / narrowband electromagnetic interference generated by ESAs

Radiated broadband electromagnetic Emissions	:	as shown in table 1
Radiated narrow band electromagnetic Emissions	:	as shown in table 2
Antenna position	:	horizontal and vertical
Rated voltage	:	DC 24 V

Horizontal Polarity Test Result Diagram (Broadband and Narrow band)



Vertical Polarity Test Result Diagram (Broadband and Narrow band)



Test data **Appendix 2**

Maximum broadband QP value (Horizontal Polarity):

Frequency (MHz)	QuasiPeak (dBuV/m)	Height (cm)	Polarization	Margin (dB)	Limit (dB/m)
106.100MHz	1.6	100.0	H	-52.7	54.3
493.400MHz	11.7	100.0	H	-51.3	63.0
584.200MHz	14.6	100.0	H	-48.4	63.0
693.300MHz	15.5	100.0	H	-47.5	63.0
817.100MHz	17.9	100.0	H	-45.1	63.0
949.200MHz	20.4	100.0	H	-42.6	63.0

Maximum broadband QP value (Vertical Polarity):

Frequency (MHz)	QuasiPeak (dBuV/m)	Height (cm)	Polarization	Margin (dB)	Limit (dB/m)
268.400MHz	13.4	100.0	V	-47.0	60.4
526.000MHz	12.5	100.0	V	-50.5	63.0
641.650MHz	15.0	100.0	V	-48.0	63.0
786.850MHz	16.7	100.0	V	-46.3	63.0
857.200MHz	19.4	100.0	V	-43.6	63.0
972.600MHz	20.3	100.0	V	-42.7	63.0

Maximum narrowband AV value (Horizontal Polarity):

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Margin (dB)	Limit (dB/m)
114.150MHz	3.9	100.0	H	-40.9	44.8
194.300MHz	0.2	100.0	H	-48.1	48.3
584.950MHz	7.4	100.0	H	-45.6	53.0
838.800MHz	11.8	100.0	H	-41.2	53.0
891.000MHz	15.2	100.0	H	-37.8	53.0
948.800MHz	13.2	100.0	H	-39.8	53.0

Maximum narrowband AV value (Vertical Polarity):

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Margin (dB)	Limit (dB/m)
114.150MHz	5.3	100.0	V	-39.5	44.8
250.350MHz	5.8	100.0	V	-44.1	49.9
268.350MHz	9.3	100.0	V	-41.1	50.4
366.500MHz	10.3	100.0	V	-42.1	52.4
762.700MHz	9.9	100.0	V	-43.1	53.0
891.000MHz	14.7	100.0	V	-38.3	53.0

Test data **Appendix 2**

2. Immunity of ESAs to electromagnetic radiation

Test method : ISO 11452-4 3rd edition: 2011
Bulk current injection testing method (from 20 MHz to 400MHz)

ISO 11452-2 2nd edition: 2004
Free field testing method (from 400 MHz to 2000MHz)

Measurement result:

Frequency range (MHz)	Test level	Type of modulation	Test distance	Antenna position	Result
20~400	60mA	AM,80%	150mm	---	Pass*
400~800	30V/m	AM,80%	1m	Vertical	Pass*
800~2000	30V/m	PM,577us	1m	Vertical	Pass*

Remark:
* no degradation of performance of 'immunity-related functions.

3. Immunity of ESAs to transient disturbances

Test method : ISO 7637-2 2nd edition: 2004

Measurement result:

Test pulse	Test level	Number of pulse / test time	Burst cycle / pulse Repetition time	Required minimum function status*	Status of function true value	Result
1	-450V	5000 pulses	0.5s	C	C	Pass
2a	+37V	5000 pulses	0.2s	B	A	Pass
2b	+20V	10 pulses	0.5s	C	C	Pass
3a	-150V	1h	90ms	A	A	Pass
3b	+150V	1h	90ms	A	A	Pass
4	-12V	1 pulse	---	C	B	Pass

Remark:

** Class A: all functions of a device/system perform as designed during and after exposure to disturbance.*

Class B: all functions of a device/system perform as designed during exposure. However, one or more of them can go beyond specified tolerance. All functions return automatically to within normal limits after exposure is removed. Memory functions shall remain class A.

Class C: one or more functions of a device/system do not perform as designed during exposure but return automatically to normal operation after exposure is removed.

Class D: one or more functions of a device/system do not perform as designed during exposure and do not return to normal operation until exposure is removed and the device/system is reset by simple "operator/use" action.

Class E: one or more functions of a device/system do not perform as designed during and after exposure and cannot be returned to proper operation without repairing or replacing the device/system.

Test data **Appendix 2**

2. Emission of transient conducted disturbances generated by ESAs

Test method ISO 7637-2 2nd edition: 2004

Polarity of pulse amplitude	Maximum allowed value for vehicles with 24V systems	Measured Pulse amplitude True Value(Fast)	Measured Pulse amplitude True Value(Slow)
Positive	+150V	+0 V	+0.5 V
Negative	-450V	-29.5 V	-28.3 V

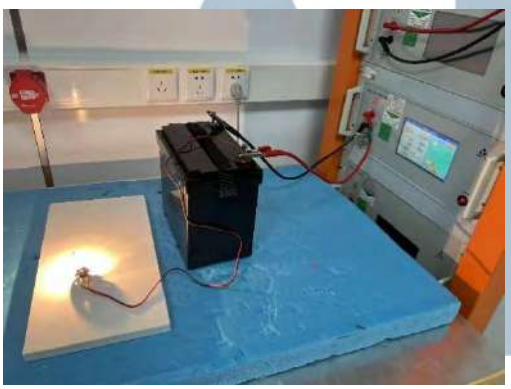
Appendix 3

Sample photos **Appendix 3**

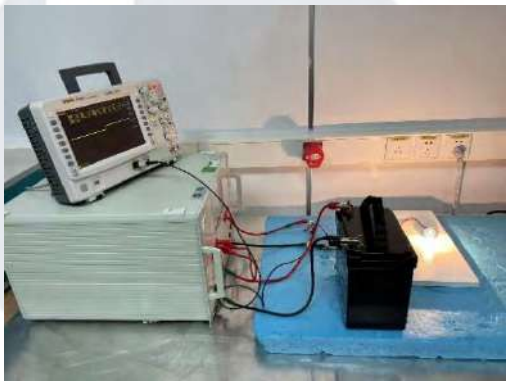
Radiated electromagnetic emissions

Immunity to electromagnetic radiation:

Immunity of ESAs to transient disturbances



Emission of transient conducted disturbances



Appendix 4

List of main equipment **Appendix 4**

No.	Name	Type	Serial No.	Valid Until
1	3 Meter semi-anechoic chamber	AC-3000	HC-EMC-001	2024.07.30
2	EMI receiver	ESR3	HC-EMC-007	2023.07.31
3	Artificial Network	NNBM 8124	HC-EMC-010	2023.07.31
4	Artificial Network	NNBM 8124	HC-EMC-011	2023.07.31
5	Log-periodic antenna	STLP9128DS	HC-EMC-013	2023.09.10
6	power sensor	E9304A H18	HC-EMC-014	2023.07.31
7	power sensor	E9304A H18	HC-EMC-015	2023.07.31
8	Field probe	EP601	HC-EMC-017	2023.07.31
9	Signal Generator	DSG836	HC-EMC-025	2023.07.31
10	Current injection	F-120-6A	HC-EMC-026	2023.07.31
11	Digital oscilloscope	DS6062	HC-EMC-031	2023.07.31
12	Pulse Generator	ISO7637-TP1,2a	HC-EMC-034	2023.07.31
13	Pulse Generator	ISO7637-TP3a,3b	HC-EMC-035	2023.07.31
14	Pulse Generator	PRM16750TG	HC-EMC-037	2023.07.31
15	Hybrid antenna	VULB 9163	HC-EMC-047	2024.02.03
16	power meter	E4419B	HC-EMC-049	2023.07.31

All the instruments have been calibrated and are in the period of validity.

APPLICATION FOR APPROVAL

PURSUANT TO THE ECE REGULATION No. 10.06

UNIFORM PROVISIONS CONCERNING THE APPROVAL

OF MOTOR VEHICLES WITH REGARD

TO ELECTROMAGNETIC COMPATIBILITY

For: ENERGIE MOBILE
Component: Electromagnetic Compatibility
Type: 12.8V 60Ah

Reason for extension: N/A
Total pages: 11
Signature of a responsible person: Frédéric DOUTRIAUX
Place: Calais
Date: 14/ 06/ 2023

ENERGIE MOBILE
195 Rue Louis Breguet - Cellule AT6
BP 482 - 62226 CALAIS Cedex
Tél. : 03 21 97 57 27 - Fax : 03 21 34 16 47
E-mail : contact@energiemobile.com

List of documentation

Confirmation

We hereby declare that the product of ENERGIE MOBILE, type 12.8V 60Ah submitted for the type approval

1. is compatible with the enclosed documentation

and

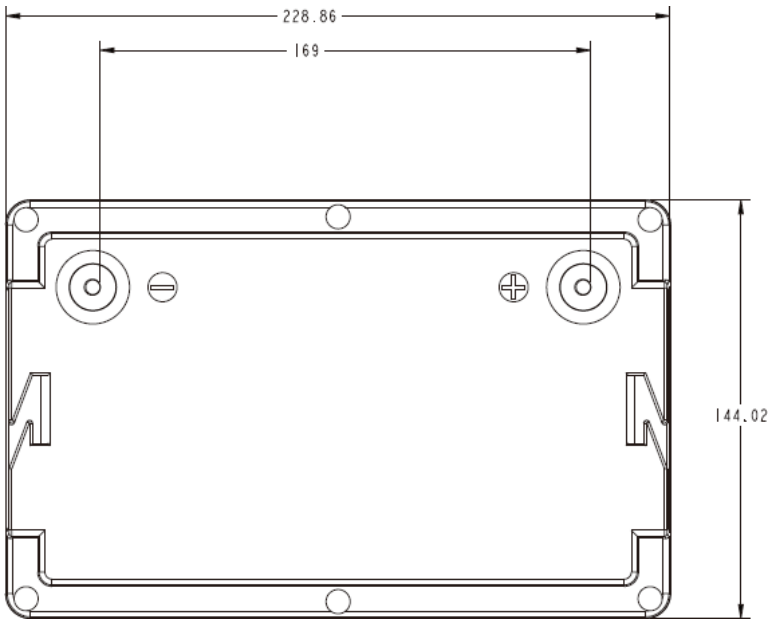
2. has been manufactured under condition of mass production.

INFORMATION DOCUMENT FOR TYPE-APPROVAL OF AN ELECTRIC/ELECTRONIC SUB-ASSEMBLY WITH RESPECT TO ELECTROMAGNETIC COMPATIBILITY ACCORDING ANNEX 2B

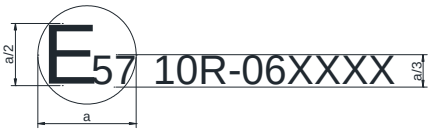
1.	Make (trade name of the manufacturer)	: ENERGIE MOBILE
2.	Type	: 12.8V 60Ah
2.1.	Variants (if applicable)	: 12.8V 90Ah, 12.8V 100Ah, 12.8V 135Ah, 12.8V 150Ah, 12.8V 200Ah, 12.8V 300Ah, 12.8V 400Ah, 25.6V 100Ah, 25.6V 200Ah, 25.6V 300Ah
2.2.	General commercial description(s)	: LiFePO4 battery
3.	Means of identification of type if marked on the ~~vehicle~~/component/~~STU~~	: Letters and digits
3.1.	Location of that marking	: Labelled on the device
4.	Category of vehicle	: M, N, O
5.	Name and address of the manufacturer	: ENERGIE MOBILE Zone Marcel Doret Cellule At2 195 Rue Louis Bréguet 62100 Calais
6.	In the case of components and separate technical units, location and method of affixing of the approval mark	: Labelled on the device
7.	Address(es) of assembly plant(s)	: ***Confidential***
8.	This ESA shall be approved as a	: Component
9.	Any restrictions of use and conditions for fitting	: No restrictions
10.	Electrical system rated voltage	: DC 12V/24V ~~pos~~./neg. ground (1)
11.	Charger: on board/external	: N/A
12.	Charging current: DC/AC (number of phases/frequency)	: N/A
13.	Maximal nominal current (in each mode if necessary)	: N/A
14.	Nominal charging voltage	: N/A
15.	Basic ESA interface functions: ex. L1/L2/L3/N/PE/control pilot	: N/A
16.	Minimum Rsce value (see paragraph 7.11. of this Regulation)	: N/A
17	Statement for model difference (if applicable)	: The Variant has the same Circuit diagram, PCB layout and all electrical construction and mechanical construction.The different lies in the current.
18	Part No.	N/A

List of attachments:

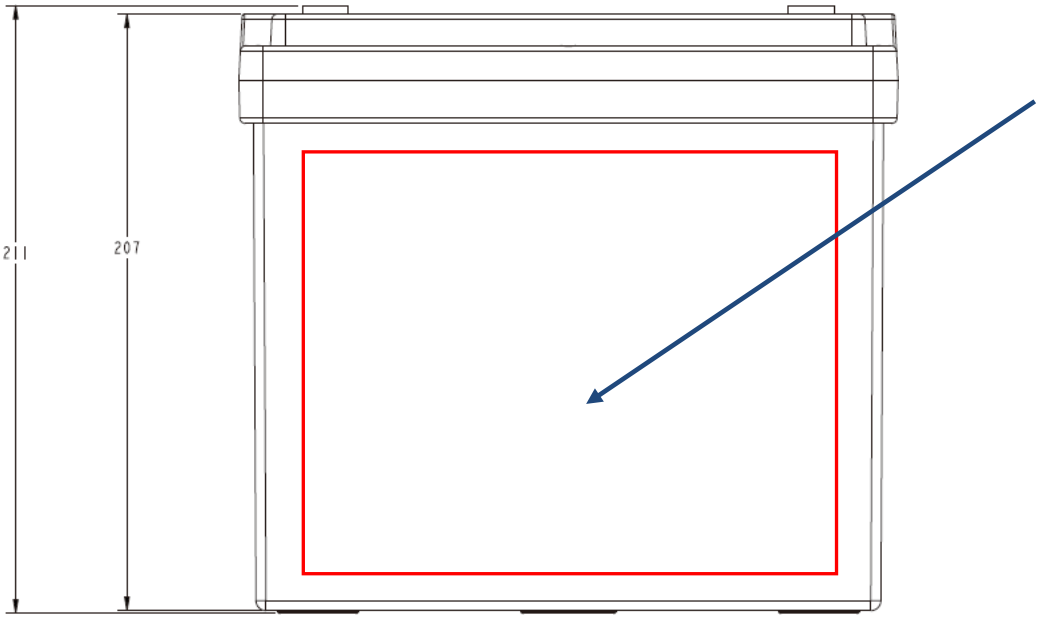
Label Drawing& Dimension Drawing	***Drawing No. 1***
Explosive view	***Drawing No. 2***
Circuit Diagram	***Drawing No. 3***
PCB Layout	***Drawing No. 4-5***
Bill of materials	***Consists of 1 pages***



Approval mark

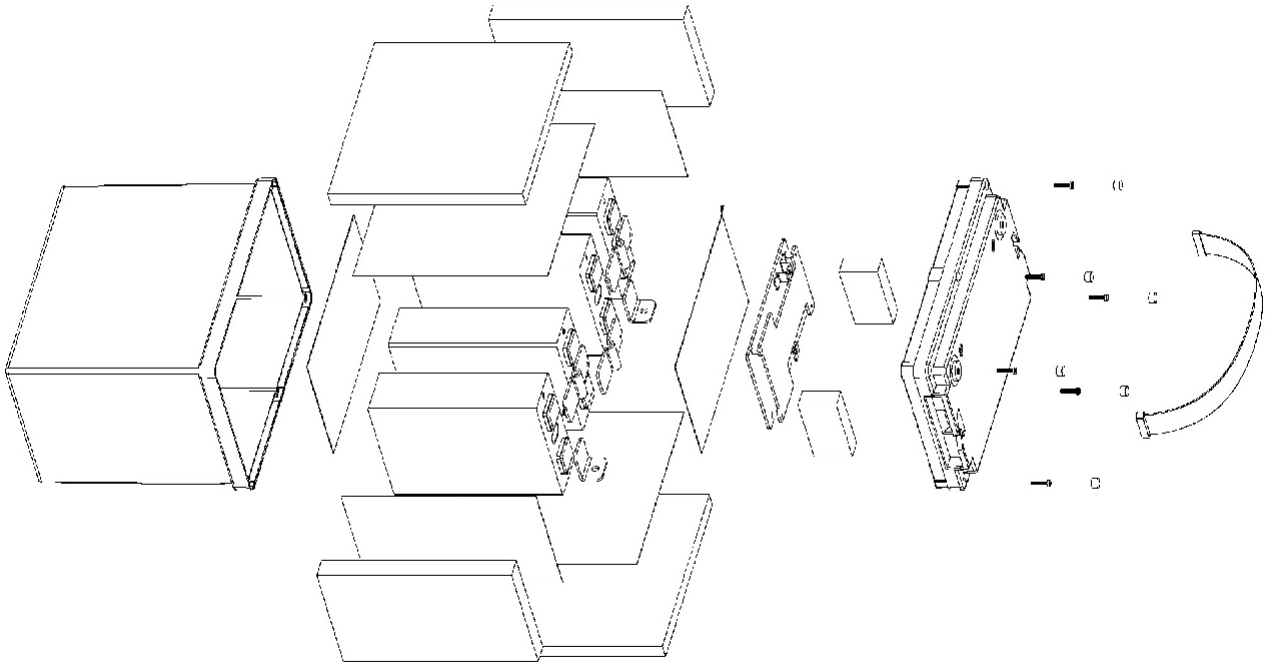


a=6mm min

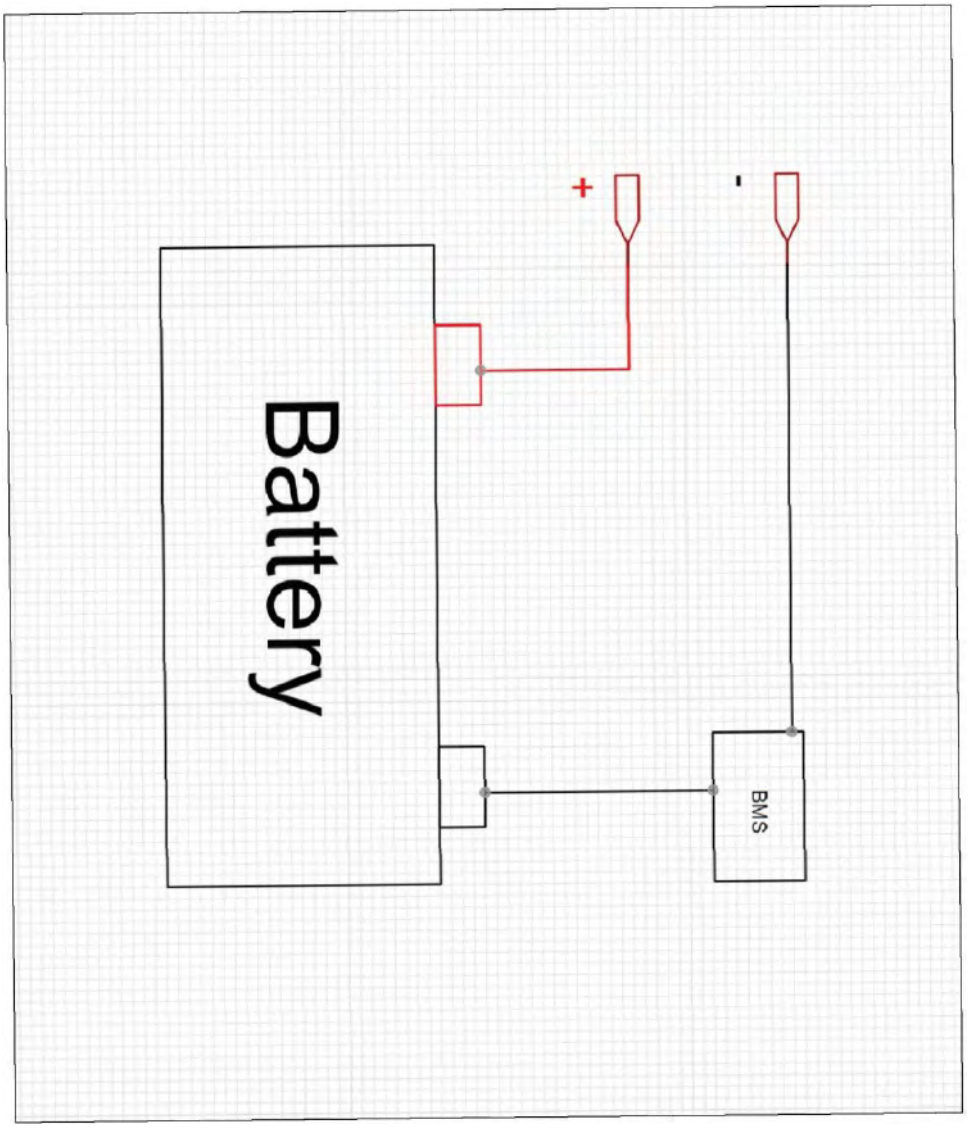


Approval mark
Trade mark
Type

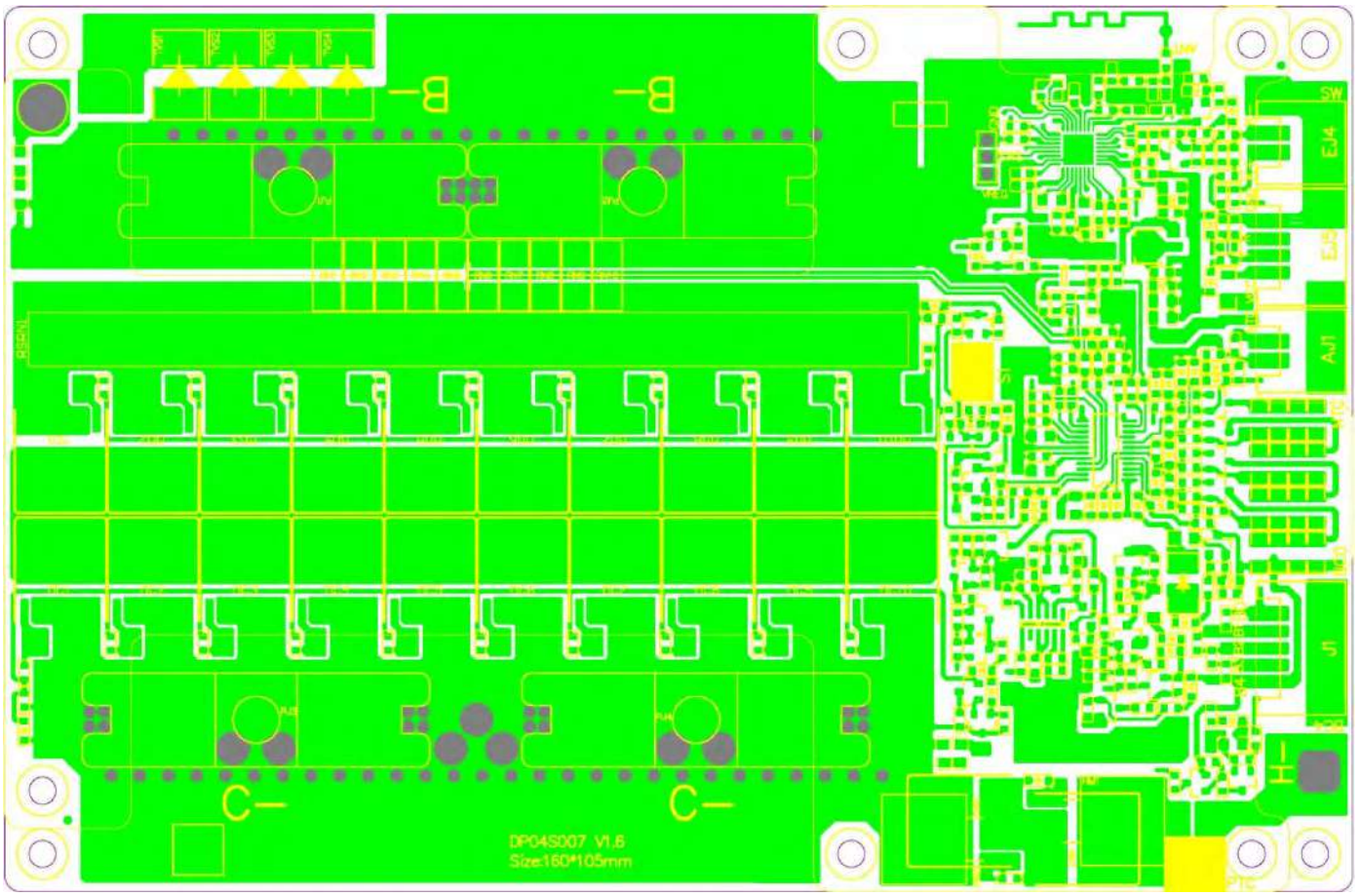
Drawing No. 1 ***Label Drawing& Dimension Drawing***



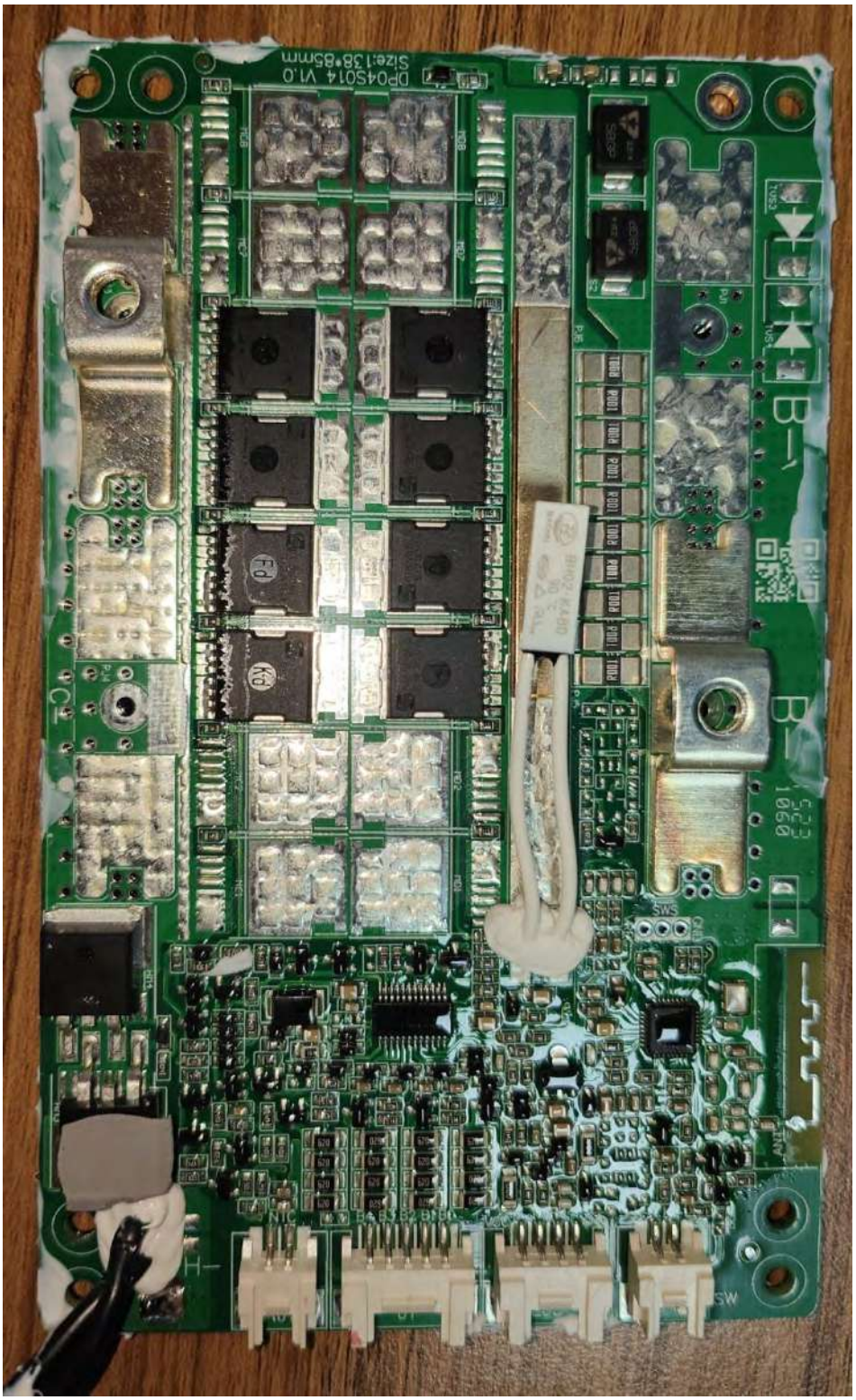
Drawing No. 2 **Explosive view**



Drawing No. 3 **Circuit Diagram**



Drawing No. 4 **PCB Layout**



Drawing No. 5 **PCB Layout**

Bill of Material				
Item No.	**Comment**	**Specification/Description**	**QTY (PC)**	**Position**
1	MOS	SS018N08LS TOLL-8 Sikai	8	MC6, MC7, MC8, MC5, MD6, MD7, MD8, MD5
2	resistance	manganese copper 3W 2512 0.0005R ±5% Juyongchang	5	RN3, RN4, RN5, RN6, RN7
3	TVS diode	5.0SMDJ70CA 5000W	2	TVS1, TVS2
4	copper bar	ZP04S014 M5 terminal 40*10*1.5mm V1.0 ROHS	2	PJ2, PJ4
5	temperature sensor	90℃ TB02 on plastic cover cable length 35mm	1	S1
6	NTC	10K 3950 250mm terminal HY2.0 ±1%	1	plug in AJ1

(1) Strike out what does not apply.