



NSAI

ECE TYPE-APPROVAL CERTIFICATE

E24

Concerning:²

Approval granted
~~Approval extended~~
~~Approval refused~~
~~Approval withdrawn~~
~~Production definitively discontinued~~

Of a type of ~~vehicle~~/component/~~separate technical unit~~² with regard to Regulation No. 10.

Of a type of electrical/electronic sub-assembly² with regard to Regulation No.10.

Approval No: **E24*10R06/03*6830*00**

Reason for extension:

-N/A

1. Make (trade name of manufacturer):

RENOGY

2. Type and general commercial description:

RBT12200LFP-BT

Smart Lithium Iron Phosphate Battery

3. Means of identification of type, if marked on the ~~vehicle~~/
component/~~separate technical unit~~²:

***By digits and letters. Sticked on the
product casing by labels.***

3.1 Location of that marking:

Sticked on the product casing by labels.

4. Category of vehicle:

N/A

5. Name and address of manufacturer:

**RENOGY New Energy Co., Ltd.
Room 624-625, Taicang German
Overseas Students Pioneer Park, 66
Ningbo East Road, Taicang Economic
Development Zone China.**

6. In the case of components and separate technical units,
location and method of affixing of the approval mark:

Sticked on the product casing by labels.

7. Address(es) of assembly plant(s):

**Enerblok Co.,Ltd.
98 Huicheng Road, Changan Street
Huishan District,Wuxi City, Jiangsu
Province, China**

Approval No: E24*10R06/03*6830*00

8. Additional information (where applicable): *See appendix below*
9. Technical service responsible for carrying out the tests: *CETOC Technical Service srl .
Via della Bufalotta, 374,
00139 Roma*
10. Date of test report: *15.03.2025*
11. Number of test report: *CN-54-17-766-COM25-24912-IR*
12. Remarks (if any): *See Appendix below*
13. Place: *Dublin*
14. Date: *22nd May, 2025*
15. Signature: 
16. The index to the information package lodged with the approval authority, which may be obtained on Request, is attached.



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1. Distinguishing number of the country which issued/extended/refused or withdrawn approval.
(see Regulation, provisions on approval).
2. Strike out what does not apply.

Appendix

To type-approval communication concerning the type approval of an electrical/electronic sub-assembly under Regulation No.10.

1. Additional information
 - 1.1. Electrical system rated voltage: ***Input: 14.4V DC, negative grounding. Output: 12.8V DC***
 - 1.2. This ESA can be used on any vehicle type with the following restrictions: ***See manufacturer's specifications.***
 - 1.2.1 Installation conditions, if any: ***See manufacturer's specifications.***
 - 1.3. This ESA can only be used on the following vehicle types: ***N/A***
 - 1.3.1 Installation conditions, if any: ***N/A***
 - 1.4. The specific test method(s) used and the frequency ranges covered to determine immunity were: ***Bulk Current Injection Method:
Frequency: (20 – 400 MHz)
Absorber Chamber Test:
Frequency: (400 – 2000 MHz)***
 - 1.5. Laboratory accredited to ISO 17025 and recognized by the Approval Authority responsible for carrying out the tests: ***CETOC Technical Service srl.***
2. Remarks: ***N/A***

Appendix to type-approval communication concerning the type approval of a vehicle under Regulation No.10.

1. Additional information
2. Electrical system rated voltage: ***N/A***
3. Type of bodywork: ***N/A***
4. List of electronic systems installed in the tested vehicle(s) not limited to the items in the information document: ***N/A***
 - 4.1. Vehicle equipped with 24 GHz short-range radar equipment (yes/no/optional)²: ***N/A***
5. Laboratory accredited to ISO 17025 and recognized by the Approval Authority responsible for carrying out the tests: ***N/A***
6. Remarks: ***N/A***



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Index to the Information Package

Date of issue:	<i>22nd May, 2025</i>
Date of latest amendment:	<i>N/A</i>
Reason for extension/revision:	<i>N/A</i>
1. Additional conditions, and advisory notes on legal alternatives.	
2. Test report(s)	
- numbers(s):	<i>CN-54-17-766-COM25-24912-IR</i>
- date of issue:	<i>15.03.2025</i>
- date of latest amendment:	<i>N/A</i>
3. Information document	
- number(s):	<i>01-IF_R10.06_Component_RBT12200LFP-BT_00</i>
- date of issue:	<i>04.12.2024</i>
- date of latest amendment:	<i>N/A</i>
Documentation:	<i>62 pages</i>



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Appendix: Additional conditions, and advisory notes on legal alternatives

A: Additional conditions:

1. The attached technical report, with any of its attachments, forms part of this Type Approval certificate.
2. Each device from series production shall be to the measurements specified in the attached drawings, and shall be manufactured only from the materials specified in the Approval documents.
3. Changes in the type are permitted only with the explicit permission of NSAI. Breaches of this requirement will lead to a withdrawal of the Type Approval, and in addition may be subject to criminal prosecution.
4. At regular intervals, any tests or associated checks prescribed by the applicable legislation to verify continued conformity with the approved type shall be carried out. The manufacturer shall demonstrate compliance with this by submitting to NSAI evidence of adequate arrangements and documented control plans for each type approved.
5. Any set of samples or test pieces showing evidence of non-conformity shall give rise to further sampling and testing and all steps shall be taken to restore conformity of production.
6. This Type Approval will expire when it is surrendered by the holder, or withdrawn by NSAI, or when the approved type no longer conforms to legal requirements. The recall of the Type Approval can be issued by NSAI when the conditions required for the issuing or continuation of the Type Approval are no longer current, or when the Approval holder is in breach of the duties attached to the Type Approval, or when it is established that the approved type no longer meets the requirements of traffic safety.
7. Changes in the company name, address or manufacturing site, as well as in any of the sales or other agents specified in the issuing of the approval must immediately be notified to NSAI.
8. The duties imposed by the issuing of this certificate are not transferable. The legal protection of third parties is not affected by this certificate.
9. When the manufacture or sale of the system, component or separate technical unit has not been started within one year of the date of issue of this certificate, then NSAI is to be informed. This requirement also applies when the manufacture or sale has been halted for more than one year, or when it ought to have been halted for more than one year. The initial commencement of manufacture or sale, or the resumption of manufacture or sale, shall then be notified to NSAI within one month of commencement or resumption.

B: Legal Options:

Any objection to the requirements set out in this certificate shall be made within one month of the date of issue. The objection shall be made, in writing, to NSAI in Dublin.

Electromagnetic Compatibility – ESA

0. Legislation:

0.1. Requirements according to : UNECE Regulation 10.06, Supplement 3

1. General

1.1. Reason for Inspection Report : New approval / ~~Extension of approval~~ / ~~Test report only~~ / COP
 1.1.1. Previous Type Approval Number : N/A
 1.2. Manufacturer's Representative(s) : N/A
 1.3. CETOC TS Representative(s) : Charlie Li
 1.4. Location of test : Shenzhen QC Test Laboratory Co., Ltd.
 East of 1/F., Building E, Xinghong Science Park, No.111, Shuiku Road, Fenghuanggang, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China.
 1.5. Date of test : 16/01/2025

2. Manufacturer Details

2.1. Make : RENOGY
 2.2. Type : RBT12200LFP-BT
 2.3. Variant/Version : RBT12100LFP-BT
 2.4. Commercial Name : Smart Lithium Iron Phosphate Battery
 2.5. Category : ESA
 2.6. Name and Address of manufacturer : RENOGY New Energy Co., Ltd.
 Room 624-625, Taicang German Overseas Students Pioneer Park, 66 Ningbo East Road, Taicang Economic Development Zone China

3. Conclusion:

3.1. Final conclusion of the inspection: : The above mentioned type was tested in accordance with the above mentioned legislation and was found to comply in all respects. This Inspection report relates only to the items tested.

Signature :

Name : Charlie Li

Position : Type Approval Engineer

Place and date : Guangzhou, China, 15/03/2025



Marco Pagliari

Tech. Mgr.

Roma, 15/03/2025

4. List of Appendixes:

Appendix Nr.	Page Nr.	Subject
Appendix 1	2	: Test report history
Appendix 2	2-3	: General specification
Appendix 3	4-11	: Inspection results
Appendix 4	12-33	: Test results

APPENDIX 1 - TEST REPORT HISTORY

List this report and previous reports, with extension details.

Inspection Report Number	Reason for Extension	Date of Issue
CN-54-17-766-COM25-24912-IR	N/A	15/03/2025

APPENDIX 2 – GENERAL SPECIFICATION

1. **Worst Case Rationale** : The type RBT12200LFP-BT with its variant RBT12100LFP-BT are same in:
1. Circuitry design
 2. PCB layout
 3. Electronic components used
 4. Internal wiring and functions
- The only difference is in the name and battery capacity, because the sales areas are different and the packaging is also different.
- RBT12100LFP-BT and RBT12200LFP-BT are all tested.

2. **Significant Interpretations, Alternative Test Methods, New Technologies** : N/A

3. **Summary of test results**

	PASS	FAIL	N/A	COVERED PREVIOUS EXTENSION	See approval/Report Nr.
Radiated Emissions:	☒	☐	☐	☐	
Radiated Immunity:	☒	☐	☐	☐	
BCI Immunity:	☒	☐	☐	☐	
Free Field Immunity:	☒	☐	☐	☐	
150 mm Stripline Immunity:	☐	☐	☒	☐	
800 mm Stripline Immunity:	☐	☐	☒	☐	
Transient Testing:	☒	☐	☐	☐	

4. **Component Specification**

Component Part Number:	RBT12200LFP-BT
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5. **Facility and Equipment Checks**

- 5.1. Calibration certificates checked and valid, recorded in the following table : Conform
- 5.2. All instruments are equipped with identification label : Yes
- 5.3. Calibration certificates are complete of calibration-chain with detailed information regarding primary used. : Yes

- 5.4. Is the anechoic/semi-anechoic chamber correctly set up in all its electrical/mechanical parts to ensure the validity of the measurements? : Yes

No.	Equipment	Serial / Certificate No.	Calibration due*
01	EMI Test Receiver	SN 2277573376 / CN 2GB24030776276-0039	13/03/2025
02	Linear impedance stable network	SN 8125449 / CN 2GB24030776276-0020	13/03/2025
03	Linear impedance stable network	SN 8125450 / CN 2GB24030776276-0021	13/03/2025
04	Biconical antenna	SN 1275 / CN 1GA23033156495-0001	31/03/2025
05	Log Periodic Antenna	SN 00414 / CN 1GA23033156495-0002A	31/03/2025
06	Power probe	SN MY54009065 / CN 2GB24030776276-0007	13/03/2025
07	Power probe	SN MY52120033 / CN 2GB24030776276-0022	13/03/2025
08	Power meter	SN GB42420953 / CN 2GB24030776276-0024	13/03/2025
09	Signal generator	SN MY49070124 / CN 2GB24030776276-0025	14/03/2025
10	RF power amplifier	SN 1594320 / CN 2GB24030776276-0026	13/03/2025
11	RF power amplifier	SN 1594321 / CN 2GB24030776276-0027	13/03/2025
12	Field strength probe	SN 711WX81278 / CN 2GB24030776276-0028	19/03/2025
13	Power amplifier	SN 302944 / CN 2GB24030776276-0009	14/03/2025
14	BCI current injection forceps	SN 180674 / CN 2GB24030776276-0014	14/03/2025
15	Transient pulse jamming simulator	SN ES0711604 / CN 2GB24030776276-0031	13/03/2025
16	Vehicle power supply voltage change simulator	SN ES0761601 / CN 2GB24030776276-0032	13/03/2025
17	Automotive electronic transient interference tester	SN EC9801701 / CN 2GB24030776276-0034	13/03/2025
18	Oscilloscope	SN CO46135 / CN ZHDX202402230019	22/02/2025
19	Oscilloscope probe	SN P4100 / CN ZHDX202402230016	22/02/2025

*Specify calibrated date + (interval) or calibration due date.

APPENDIX 3 – INSPECTION RESULTS

		PASS	FAIL	N/A
Radiated Emissions				
CISPR25, 4.5.	Measuring equipment complies with CISPR 16-1-4 (2010).	☒	☐	☐
Test Location				
Ann 7, 3.1. Ann 7, 3.3.	Test performed in: - A.L.S.E (Absorber-lined Shielded Enclosure)* - O.A.T.S (Open Area Test Site)* <i>*Strikethrough, as appropriate.</i>	☒	☐	☐
Ann 7, 3.3.	O.A.T.S level is a clear area, free from electromagnetic reflecting surfaces, within a circle of 15 m minimum radius.	☐	☐	☒
Ann 7, 3.3.	Measuring equipment is outside 15 m minimum radius circle.	☐	☐	☒
Ann 7, 3.4.	Ambient noise is at least 6 dB below reference limits, in either case.	☒	☐	☐
Test Arrangements				
CISPR25, 4.4.2.	EUT and antenna are more than 2 m from the walls and ceiling, and 1 m from the nearest absorber material.	☒	☐	☐
CISPR25, 6.1.1.	Ground plane is 900 ± 50 mm high and made from 0.5 mm thick copper, brass or galvanised steel.	☒	☐	☐
CISPR25, 6.1.1.	Ground plane is at least 2,000 mm length x 1,000 mm width.	☒	☐	☐
CISPR25, 6.4.2.3.	ESA and harness are supported at 50 ± 5 mm above the ground plane on low relative permittivity material.	☒	☐	☐
CISPR25, 6.4.2.3.	Face of the ESA is within 200 mm ± 10 mm from the edge of the ground plane.	☒	☐	☐
CISPR25, 6.4.2.4.	Length of test harness, parallel to the front of the ground plane, is 1,500 ± 75 mm and does not exceed 2,000 mm.	☒	☐	☐
CISPR25, 6.4.2.4.	Long segment of test harness is located parallel to the edge of the ground plane, facing the antenna at a distance of 100 ± 10 mm from the edge.	☒	☐	☐
CISPR25, 6.1.2.	Power supply is Artificial Network (AN) rated at 5 Ω/50 μH.	☒	☐	☐
CISPR25, 6.1.2.	EUT is: - Remotely grounded (vehicle power return line longer than 200 mm): two artificial networks are required, one for the positive supply line and one for the power return line* - Locally grounded (vehicle power return line 200 mm or shorter): one artificial network is required for the positive supply* <i>*Strikethrough, as appropriate.</i>			
CISPR25, 6.1.2.	Case of the ESA is: - Grounded, simulating actual vehicle configuration* - Not grounded, simulating actual vehicle configuration* <i>*Strikethrough, as appropriate.</i>	☒	☐	☐
CISPR25, 6.1.2.	AN is electrically bonded to the ground plane.	☒	☐	☐

Antenna

<i>CISPR25, 6.4.2.6.</i>	Height of the phase centre is 100 ± 10 mm above the ground plane.	☒	☐	☐
<i>CISPR25, 6.4.2.6.</i>	No part of any antenna radiating element is closer than 250 mm to the floor.	☒	☐	☐
<i>CISPR25, 6.4.2.6.</i>	Radiating elements of the measuring antenna are not closer than 1,000 mm to any absorber material, except that used on the floor, and are not closer than 2,000 mm to the walls or ceiling of the shielded enclosure.	☒	☐	☐
<i>CISPR25, 6.4.2.6.</i>	Phase centre (for biconical) or tip (for log-periodic) is $1,000 \pm 50$ mm from the harness.	☒	☐	☐
<i>CISPR25, 6.4.2.6.</i>	Antenna calibrated for this distance to correct measuring point (phase centre or tip).	☒	☐	☐
<i>CISPR25, 6.4.2.6.</i>	Phase centre of the antenna is in line with the centre of the longitudinal part of the wiring harness.	☒	☐	☐
<i>Ann 7, Ann 8, 4.3.</i>	Pre-test sweep supplied to show compliance throughout frequency range 30 to 1,000 MHz.	☒	☐	☐
<i>Ann 7, Ann 8, 4.3.</i>	Test frequencies chosen from pre-test data.	☒	☐	☐

Narrowband Test Results

<i>Ann 8, 2.</i>	Operational mode of ESA: Normal operation	☒	☐	☐
<i>Ann 8, 4.2.</i>	Detector used and bandwidth: Average, 120kHz	☒	☐	☐
<i>6.6.2.</i>	ESA meets narrowband emissions limits, with both vertical and horizontal polarisations.	☒	☐	☐

Broadband Test Results

<i>Ann 7, 2.</i>	Operational mode of ESA: Normal operation	☒	☐	☐
<i>Ann 7, 4.2.</i>	Detector used and bandwidth: Peak and Quasi Peak, 120kHz	☒	☐	☐
<i>6.5.2.</i>	ESA meets broadband emissions limits, with both vertical and horizontal polarisations.	☒	☐	☐

Radiated Immunity

Test Method(s) used and Frequency Range(s)

<i>ISO11452-4</i>	BCI frequency range between 20 and 400 MHz:	☒	☐	☐
<i>ISO11452-2</i>	Free field frequency range between 400 and 2,000 MHz:	☒	☐	☐
<i>ISO11452-3</i>	TEM cell frequency range between 20 and 200 MHz:	☐	☐	☒
<i>ISO11452-5</i>	150 mm stripline frequency range between 20 and 400 MHz:	☐	☐	☒
<i>ISO11452-5</i>	800 mm stripline frequency range between 20 and 2,000 MHz:	☐	☐	☒

Maximum frequency step sizes do not exceed:

Frequency Band (MHz)	Linear Steps (MHz)	Log Steps (%)	Actual Steps Used
20 - 200	5	5	5%
200 - 400	10	5	5%
400 - 1000	20	2	2%
1000 - 2000	40	2	2%

Test Arrangements (General)

Ann 9, 2.2.	Operational mode of ESA:	☒	☐	☐
	Normal operation			
Ann 9, 2.3.	Extraneous equipment in place during calibration.	☒	☐	☐
Ann 9, 2.4.	Test equipment used is the same as for calibration.	☒	☐	☐
Ann 9, 2.5.	Loads and actuators are as realistic as possible.	☒	☐	☐
Ann 9, 2.5.	Case of ESA is:	☒	☐	☐
	- Grounded, simulating actual vehicle configuration*			
	- Not grounded, simulating actual vehicle configuration*			
	*Strikethrough, as appropriate.			
Ann 9, 3.1.	Test frequency range is 20 to 2,000 MHz.	☒	☐	☐
Ann 9, 3.1.	Test signal is R.F. sine wave amplitude, modulated by a 1 kHz sine wave at a modulation depth of 0.8 ± 0.04 , in the 20 - 800 MHz band and pulse modulation (time on 577 μ s, period 4,600 μ s) in the 800 - 2,000 MHz band.	☒	☐	☐
6.8.2.1.	Pre-test sweep supplied to show compliance throughout frequency range 20 to 2,000 MHz.	☒	☐	☐
Ann 9, 3.2.	Test frequencies chosen from pre-test data.	☒	☐	☐
6.8.2.2.	No degradation of immunity related functions during the tests.	☒	☐	☐

BCI Immunity

ISO11452-4, 5.	Shielded area used:	☒	☐	☐
	A.L.S.E			
ISO11452-4, 8.3.2.1.	Forward power used to achieve specified current.	☒	☐	☐

Installation of ESA under Test

Ann 9, 4.3.2.	Current probe located 150 ± 10 mm from ESA connectors.	☒	☐	☐
Ann 9, 4.3.2.	ESA installed:	☒	☐	☐
	- In a vehicle, as per ISO 11451-4*			
	- On a ground plane, as per ISO 11452-4*			
	*Strikethrough, as appropriate.			
ISO11452-4, 7.1.	Ground plane is made from at least 0.5 mm thick copper, brass or galvanised steel.	☒	☐	☐
ISO11452-4, 7.1.	Minimum width of the ground plane is 1,000 mm and the minimum length is 1,500 mm, or length of the entire underneath of equipment plus 200 mm, whichever is greater.	☒	☐	☐

ISO11452-4, 7.1.	Height of the ground plane is 900 ± 100 mm.	☒	☐	☐
ISO11452-4, 7.1.	Ground plane is bonded to the shielded enclosure, with the straps at a distance no greater than 300 mm apart.	☒	☐	☐
ISO11452-4, 7.2.	<ul style="list-style-type: none"> - ESA remotely grounded (vehicle power return line longer than 200 mm): two artificial networks are required, one for the positive supply line and one for the power return line)* - ESA locally grounded (vehicle power return line 200 mm or shorter): one artificial network is required, for the positive supply* <p><i>*Strikethrough, as appropriate.</i></p>			
ISO11452-4, 7.2.	Power supply is Artificial Network (AN) rated at $50 \Omega/5 \mu\text{H}$.	☒	☐	☐
ISO11452-4, 7.3.	ESA and harness supported 50 ± 5 mm above ground plane, on low relative permittivity material.	☒	☐	☐
ISO11452-4, 7.3.	Face of the ESA within 100 mm from the edge of the ground plane.	☒	☐	☐
ISO11452-4, 7.3.	Distance of at least 500 mm between ESA and any metal parts, such as the walls of the shielded enclosure (exception is ground plane).	☒	☐	☐
ISO11452-4, 7.4.	Length of test harness is $1,700 + 300$ mm, unless specified.	☒	☐	☐
BCI Test Results				
6.8.2.1.	No malfunction at 60 mA.	☒	☐	☐
Free Field Immunity				
ISO11452-2, 8.3.1.	Test field defined by:	☒	☐	☐
	<ul style="list-style-type: none"> - Forward power* - Another parameter, directly related* <p><i>*Strikethrough, as appropriate.</i></p>			
ISO11452-2, 8.3.2.	Antenna is at a distance of $1,000 \pm 10$ mm from the reference point.	☒	☐	☐
ISO11452-2, 8.3.2.	Reference point is 150 ± 10 mm above the ground plane.	☒	☐	☐
ISO11452-2, 8.3.2.	Reference point is 100 ± 10 mm from the edge of the ground plane.	☒	☐	☐
ISO11452-2, 8.3.2.	For frequencies from 80 - 1,000 MHz, the reference point is in the centre of the harness.	☒	☐	☐
ISO11452-2, 8.3.2.	For frequencies from 1,000 - 2,000 MHz, the reference point is in line with the ESA.	☒	☐	☐
Test Arrangements				
ISO11452-2, 7.1.	Ground plane is made from at least 0.5 mm thick copper, brass or galvanised steel.	☒	☐	☐
ISO11452-2, 7.1.	Minimum width of the ground plane is 1,000 mm and the minimum length is 2,000 mm.	☒	☐	☐
ISO11452-2, 7.1.	Height of the ground plane is 900 ± 100 mm.	☒	☐	☐
ISO11452-2, 7.1.	Bonding straps are at a distance no greater than 300 mm apart.	☒	☐	☐

ISO11452-2, 7.2.	Power supply is Artificial Network (AN) rated at 50 Ω/5 μH.	☒	☐	☐
ISO11452-2, 7.2.	<p>- ESA remotely grounded (vehicle power return line longer than 200 mm): two artificial networks are required, one for the positive supply line and one for the power return line)*</p> <p>- ESA locally grounded (vehicle power return line 200 mm or shorter): one artificial network is required, for the positive supply*</p> <p><i>*Strikethrough, as appropriate.</i></p>			
ISO11452-2, 7.3.	AN mounted directly on the ground plane and cases bonded to the ground plane.	☒	☐	☐
ISO11452-2, 7.3.	ESA and harness supported 50 ± 5 mm above table, on low relative permittivity material.	☒	☐	☐
ISO11452-2, 7.3.	Face of the ESA located 200 ± 10 mm from the edge of the ground plane.	☒	☐	☐
ISO11452-2, 7.4.	Test harness parallel to the front edge of the ground plane.	☒	☐	☐
ISO11452-2, 7.4.	Total length of harness does not exceed 2,000 mm.	☒	☐	☐
ISO11452-2, 7.4.	Actual wiring harness length: N/A	☒	☐	☐
	or Length is 1,500 ± 75 mm between ECU and AN.	☒	☐	☐
ISO11452-2, 7.4.	Harness is at a distance of 100 ± 10 mm from the edge of the ground plane.	☒	☐	☐
ISO11452-2, Fig 1	Front face of ESA is at least 1.0 m from all other conductive structures.	☒	☐	☐
ISO11452-2, Fig 1	ESA harness is at least 2.0 m forward from the chamber wall.	☒	☐	☐
Antenna Type(s) and Frequency Range(s)				
Ann 9, 4.1.2.	Antenna is vertically polarised.	☒	☐	☐
ISO11452-2, 7.6.	Antenna is in the same position as the calibration.	☒	☐	☐
ISO11452-2, 7.6.	Phase centre is 100 ± 10 mm above the ground plane.	☒	☐	☐
ISO11452-2, 7.6.	Antenna elements are no closer than 250 mm to the floor of the facility, no closer than 0.5 m to any radio absorbent material, and no closer than 1.5 m to the wall of the facility.	☒	☐	☐
ISO11452-2, 7.6.	Distance between wiring harness and antenna is 1,000 mm ± 10 mm, measured from the phase-centre of the biconical antenna, or the nearest part of the log-periodic and horn antennas.	☒	☐	☐
Ann 9, 3.1.	Test signal modulation is: - AM, 1 kHz modulation, 80 % depth in 20 - 800 MHz frequency range; - PM, ton 577 μs, period 4,600 μs in 800 - 2,000 MHz frequency range.	☒	☐	☐
Free Field Immunity Test Results				
6.8.2.	No malfunction at 30 V/m.	☒	☐	☐
150 mm Stripline Immunity				
ISO11452-5, 5.3.1.	Stripline housed in a shielded room.	☐	☐	☒

ISO11452-5, 6.2.2.	Test field defined by:	☐	☐	☒
	- Forward power*			
	- Another parameter, directly related*			
	*Strikethrough, as appropriate.			
ISO11452-5, 6.2.3.	Field probe in the centre of stripline.	☐	☐	☒
	Installation of ESA under Test	☐	☐	☒
ISO11452-5, 5.3.1.	ESA is 200 + 20 - 0 mm from the edge of the active conductor.	☐	☐	☒
ISO11452-5, 5.3.1.	Peripherals are a minimum of 200 mm from the edge of the active conductor.	☐	☐	☒
ISO11452-5, 5.3.1.	Harness supported 50 mm above the ground plane and is placed in the centre of the stripline.	☐	☐	☒
ISO11452-5, 5.3.1.	Actual wiring harness length: N/A	☒	☐	☐
	or			
	Minimum length under stripline is 1,000 mm.	☐	☐	☒
ISO11452-5, 5.3.1.	All wires in the harness are terminated or open, according to the vehicle application.	☐	☐	☒
		☐	☐	☒
ISO11452-5, 5.3.1.	Device and peripherals connected to the ground plane, as specified by the vehicle installation.	☐	☐	☒
ISO11452-5, 5.3.1.	Power supply is Artificial Network (AN) rated at 50 Ω/5 μH.	☐	☐	☒
ISO11452-5, 5.3.1.	- ESA remotely grounded (vehicle power return line longer than 200 mm): two artificial networks are required, one for the positive supply line and one for the power return line)*			
	- ESA locally grounded (vehicle power return line 200 mm or shorter): one artificial network is required, for the positive supply*			
	*Strikethrough, as appropriate.			
	150 mm Stripline Test Results			
6.8.2.	No malfunction at 60 V/m.	☐	☐	☒
	800 mm Stripline Immunity			
Ann 9, 4.5.2.1.	Stripline housed in a screened room.	☐	☐	☒
Ann 9, 4.5.2.1.	Stripline positioned a minimum of 2,000 mm from the walls or metallic enclosure.	☐	☐	☒
Ann 9, 4.5.2.1.	Stripline placed on non-conducting supports at least 400 mm above the floor.	☐	☐	☒
Ann 9, 4.5.2.2.	Field probe positioned within the central one-third of the longitudinal, vertical and transverse dimensions of the space between the parallel plates, with the system under test absent.	☐	☐	☒
Ann 9, 4.5.2.2.	Test field defined by:	☐	☐	☒
	- Forward power*			
	- Another parameter, directly related*			
	*Strikethrough, as appropriate.			

Installation of ESA under Test

Ann 9, 4.5.2.3.	ESA is within the central one-third of the stripline.	☐	☐	☒
Ann 9, 4.5.2.3.	ESA is supported on non-conducting material.	☐	☐	☒
Ann 9, 4.5.2.4.	Wiring loom is arranged as per Appendix 1, Figure 3.	☐	☐	☒
Ann 9, 4.5.2.4.	Associated equipment is a minimum of 1,000 mm from stripline.	☐	☐	☒

800 mm Stripline Test Results

Frequency Suggested (MHz)	Frequency (MHz)	Forward Power		Output Level		Field Strength (V/m)
		Cal. (w)	Test (w)	Cal. (dBm)	Test (dBm)	

6.8.2.	No malfunction at 15 V/m.	☐	☐	☒
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Transient Testing

Case of ESA is:

- Grounded, simulating actual vehicle configuration*
 - ~~Not grounded, simulating actual vehicle configuration*~~
- *Strikethrough, as appropriate.

☒ ☐ ☐

Transient Immunity

6.9.1.	Test set up according to ISO 7637-2 (second edition 2004 and Amd.1:2008).	☒	☐	☐
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Ann 10, 2.	Supply lines and other lines, which may be connected to supply lines, are tested.	☒	☐	☐
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Test voltage and time parameters are within allowed envelopes. ☒ ☐ ☐

Test pulses and duration according to the following: ☒ ☐ ☐

Test Pulse	Immunity Test Level	Functional Status for Systems		Test Duration
		Related to Immunity-related Functions	Not Related to Immunity-related Functions	
1	III	C	⊘	5000 pulses
2a	III	B	⊘	5000 pulses
2b	III	C	⊘	10 pulses
3a	III	A	⊘	1 hour
3b	III	A	⊘	1 hour
4	III	B (for ESA, which must be operational during engine start, or C, for other ESA)	⊘	1 pulse

ESA operational after the tests, according to the above classification. ☒ ☐ ☐

Emission of Conducted Disturbances

- | | | | | |
|------------|---|-------------------------------------|--------------------------|--------------------------|
| 6.9.1. | Test set up according to ISO 7637-2. | ☒ | ☐ | ☐ |
| Ann 10, 3. | Supply lines and other lines, which may be connected to supply lines, are tested. | ☒ | ☐ | ☐ |
| | Slow pulses and fast pulses tested on both powering up and powering down. | ☒ | ☐ | ☐ |

Polarity of Pulse Amplitude	Maximum Allowed Pulse Amplitude	
	Vehicles with 12 V systems	Vehicles with 24 V system
Positive	+ 75 V	+ 150 V
Negative	- 100 V	- 450 V

Remarks

None

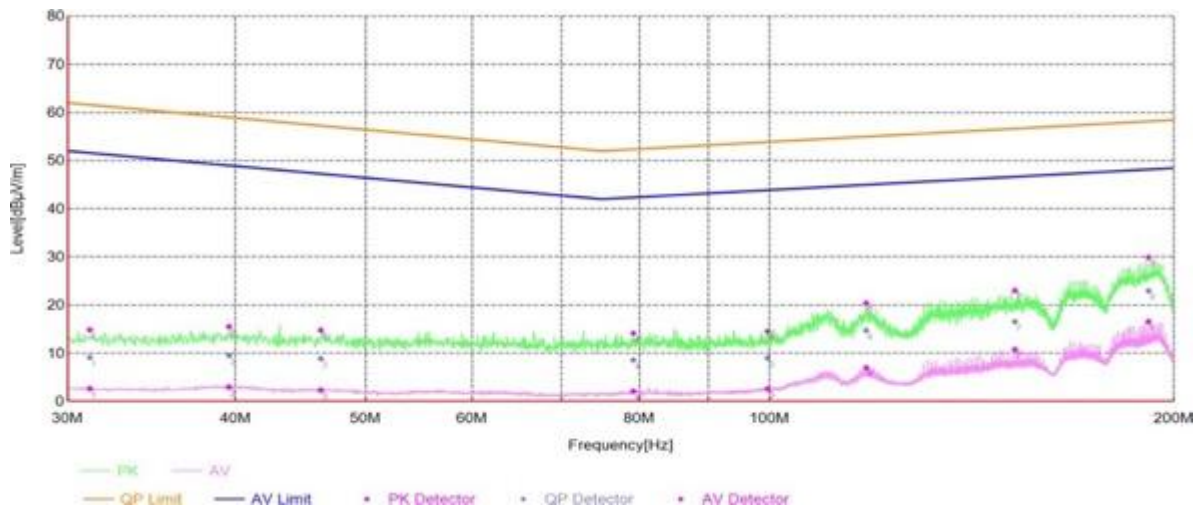
Note: CETOC TS apply measurement uncertainty to calibrated items but not test results.

APPENDIX 4 – TEST RESULTS

1. Radiated Emissions Test Results (Horizontal)

1.1. Variant: RBT12100LFP-BT

1.1.1. Power Supply: DC 13.5 V; Mode: FULL LOAD

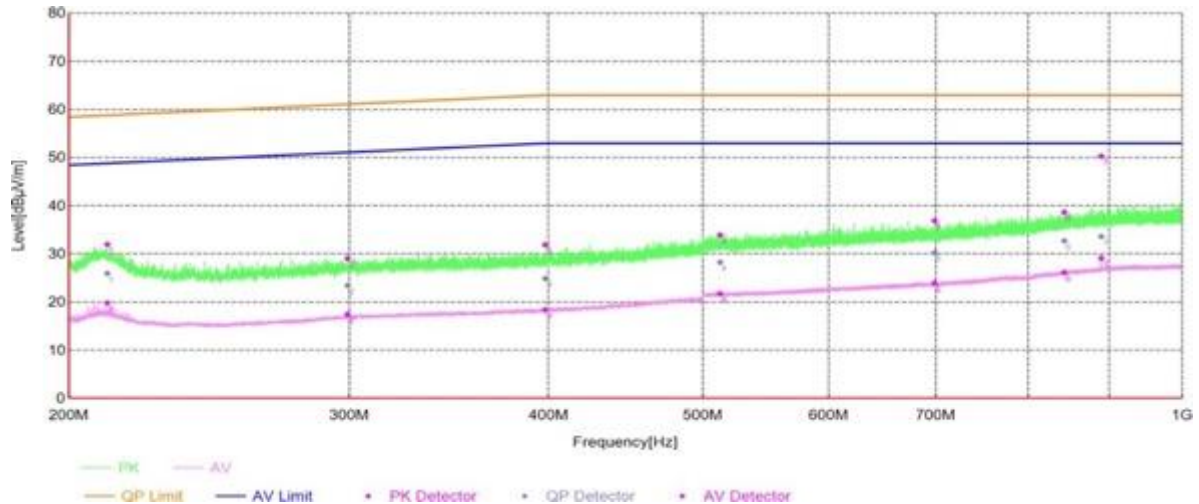


NO.	Frequency [Hz]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Verdict
1	31.15M	9.12	61.59	52.47	2.65	51.59	48.94	PASS
2	39.55M	9.49	58.98	49.49	2.95	48.98	46.03	PASS
3	46.3M	8.86	57.26	48.40	2.32	47.26	44.94	PASS
4	79.15M	8.59	52.35	43.76	2.10	42.35	40.25	PASS
5	99.65M	9.02	53.87	44.85	2.59	43.87	41.28	PASS
6	118M	14.73	54.98	40.25	6.96	44.98	38.02	PASS
7	152.3M	16.55	56.65	40.10	10.76	46.65	35.89	PASS
8	191.6M	22.95	58.16	35.21	16.55	48.16	31.61	PASS

1. Radiated Emissions Test Results (Horizontal)

1.1. Variant: RBT12100LFP-BT

1.1.1. Power Supply: DC 13.5 V; Mode: FULL LOAD

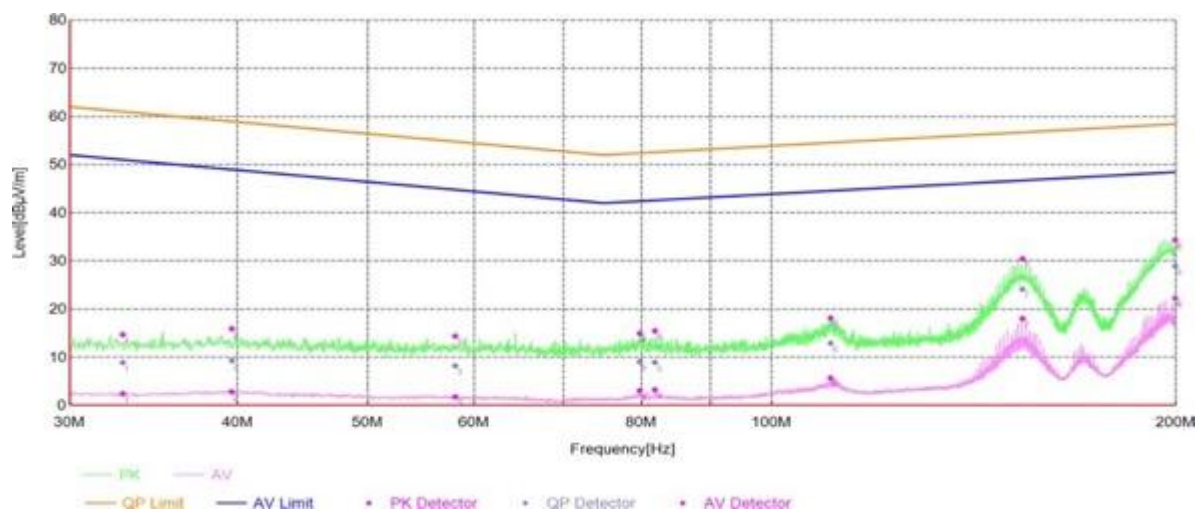


NO.	Frequency [Hz]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Verdict
1	211.4M	25.93	58.81	32.88	19.81	48.81	29.00	PASS
2	299.2M	23.45	61.09	37.64	17.44	51.09	33.65	PASS
3	398.1M	24.90	62.97	38.07	18.39	52.97	34.58	PASS
4	512.7M	28.26	63.00	34.74	21.75	53.00	31.25	PASS
5	699M	30.25	63.00	32.75	23.94	53.00	29.06	PASS
6	843.15M	32.71	63.00	30.29	26.14	53.00	26.86	PASS
7	889.6M	33.61	63.00	29.39	29.12	53.00	23.88	PASS

1. Radiated Emissions Test Results (Horizontal)

1.1. Variant: RBT12100LFP-BT

1.1.2. Power Supply: DC 13.5 V; Mode: Charging

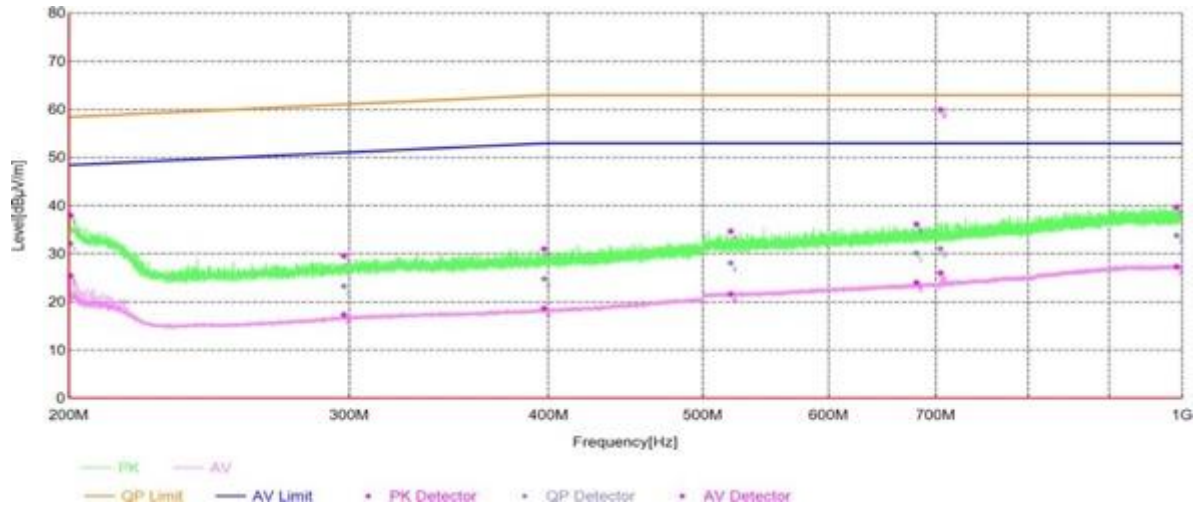


NO.	Frequency [Hz]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Verdict
1	32.85M	8.89	61.01	52.12	2.41	51.01	48.60	PASS
2	39.6M	9.27	58.97	49.70	2.80	48.97	46.17	PASS
3	58.1M	8.22	54.79	46.57	1.75	44.79	43.04	PASS
4	79.75M	9.07	52.40	43.33	3.05	42.40	39.35	PASS
5	81.85M	8.93	52.57	43.64	3.22	42.57	39.35	PASS
6	110.65M	12.92	54.56	41.64	5.66	44.56	38.90	PASS
7	153.8M	24.10	56.72	32.62	18.03	46.72	28.69	PASS
8	199.85M	28.91	58.44	29.53	22.24	48.44	26.20	PASS

1. Radiated Emissions Test Results (Horizontal)

1.1. Variant: RBT12100LFP-BT

1.1.2. Power Supply: DC 13.5 V; Mode: Charging

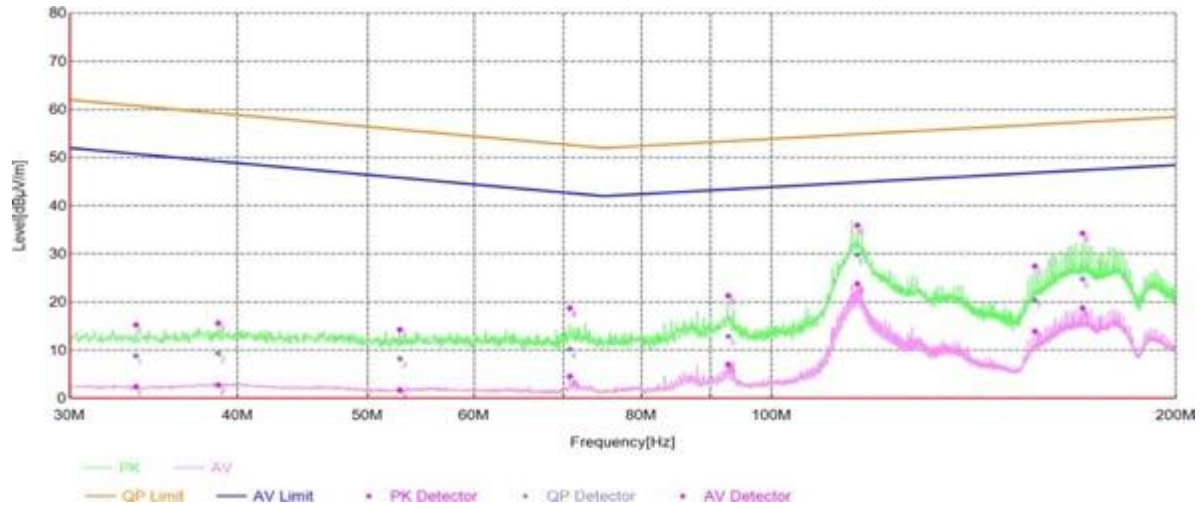


NO.	Frequency [Hz]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Verdict
1	200.5M	32.12	58.46	26.34	25.43	48.46	23.03	PASS
2	297.6M	23.31	61.06	37.75	17.37	51.06	33.69	PASS
3	397.5M	24.82	62.96	38.14	18.72	52.96	34.24	PASS
4	520.55M	28.12	63.00	34.88	21.67	53.00	31.33	PASS
5	680.95M	30.15	63.00	32.85	24.06	53.00	28.94	PASS
6	705.15M	31.08	63.00	31.92	26.04	53.00	26.96	PASS
7	991.8M	33.84	63.00	29.16	27.36	53.00	25.64	PASS

1. Radiated Emissions Test Results (Horizontal)

1.2. Variant: RBT12200LFP-BT

1.2.1. Power Supply: DC 13.5 V; Mode: FULL LOAD

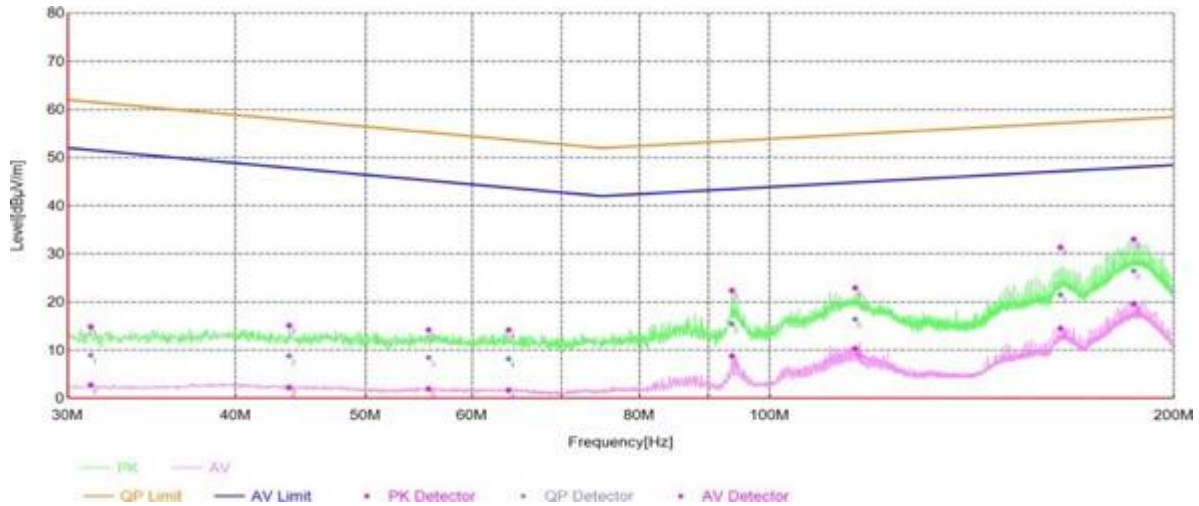


NO.	Frequency [Hz]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Verdict
1	33.6M	8.84	60.76	51.92	2.43	50.76	48.33	PASS
2	38.7M	9.32	59.22	49.90	2.77	49.22	46.45	PASS
3	52.85M	8.26	55.82	47.56	1.71	45.82	44.11	PASS
4	70.75M	10.21	52.64	42.43	4.59	42.64	38.05	PASS
5	92.85M	12.89	53.40	40.51	7.03	43.40	36.37	PASS
6	115.85M	29.80	54.86	25.06	23.77	44.86	21.09	PASS
7	157.1M	20.38	56.86	36.48	13.94	46.86	32.92	PASS
8	170.5M	24.75	57.40	32.65	18.76	47.40	28.64	PASS

1. Radiated Emissions Test Results (Horizontal)

1.2. Variant: RBT12200LFP-BT

1.2.2. Power Supply: DC 13.5 V; Mode: Charging

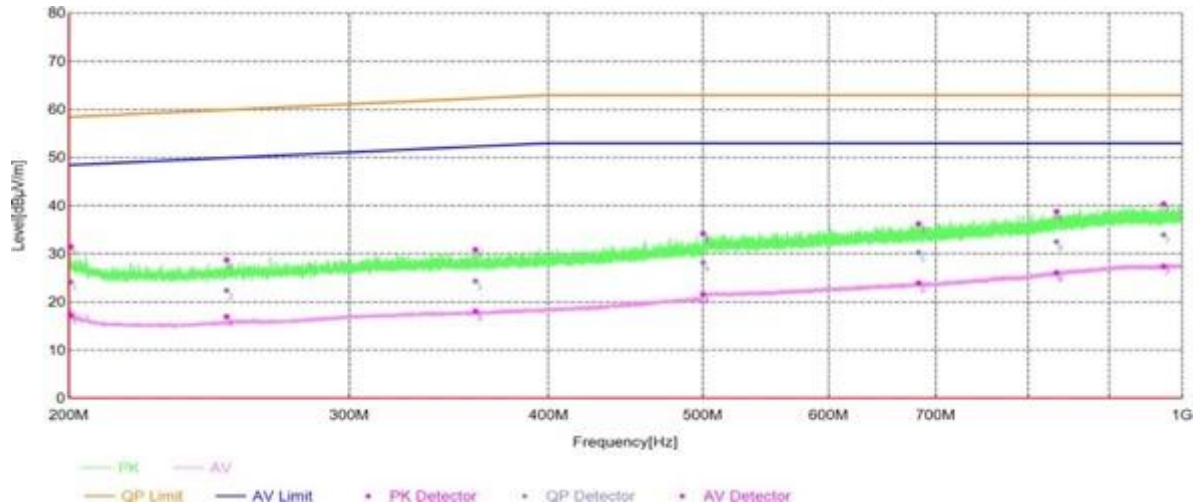


NO.	Frequency [Hz]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Verdict
1	31.2M	8.97	61.57	52.60	2.78	51.57	48.79	PASS
2	43.85M	8.82	57.86	49.04	2.26	47.86	45.60	PASS
3	55.7M	8.49	55.25	46.76	1.96	45.25	43.29	PASS
4	63.9M	8.21	53.75	45.54	1.69	43.75	42.06	PASS
5	93.75M	15.44	53.47	38.03	8.81	43.47	34.66	PASS
6	115.8M	16.42	54.85	38.43	10.37	44.85	34.48	PASS
7	164.7M	21.52	57.17	35.65	14.55	47.17	32.62	PASS
8	186.75M	26.48	57.99	31.51	19.64	47.99	28.35	PASS

1. Radiated Emissions Test Results (Horizontal)

1.2. Variant: RBT12200LFP-BT

1.2.2. Power Supply: DC 13.5 V; Mode: Charging

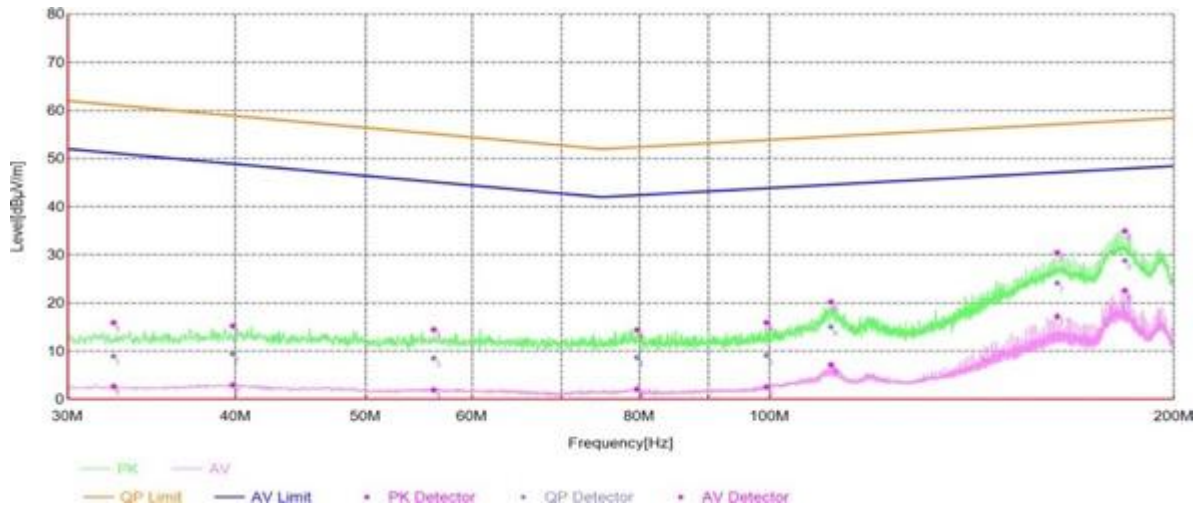


NO.	Frequency [Hz]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Verdict
1	200.55M	24.16	58.46	34.30	17.27	48.46	31.19	PASS
2	251.2M	22.42	59.94	37.52	16.98	49.94	32.96	PASS
3	359.95M	24.36	62.31	37.95	18.10	52.31	34.21	PASS
4	500.25M	28.20	63.00	34.80	21.62	53.00	31.38	PASS
5	683.1M	30.24	63.00	32.76	23.94	53.00	29.06	PASS
6	833.85M	32.51	63.00	30.49	26.08	53.00	26.92	PASS
7	973.45M	33.97	63.00	29.03	27.43	53.00	25.57	PASS

2. Radiated Emissions Test Results (Vertical)

2.1. Variant: RBT12100LFP-BT

2.1.1. Power Supply: DC 13.5 V; Mode: FULL LOAD

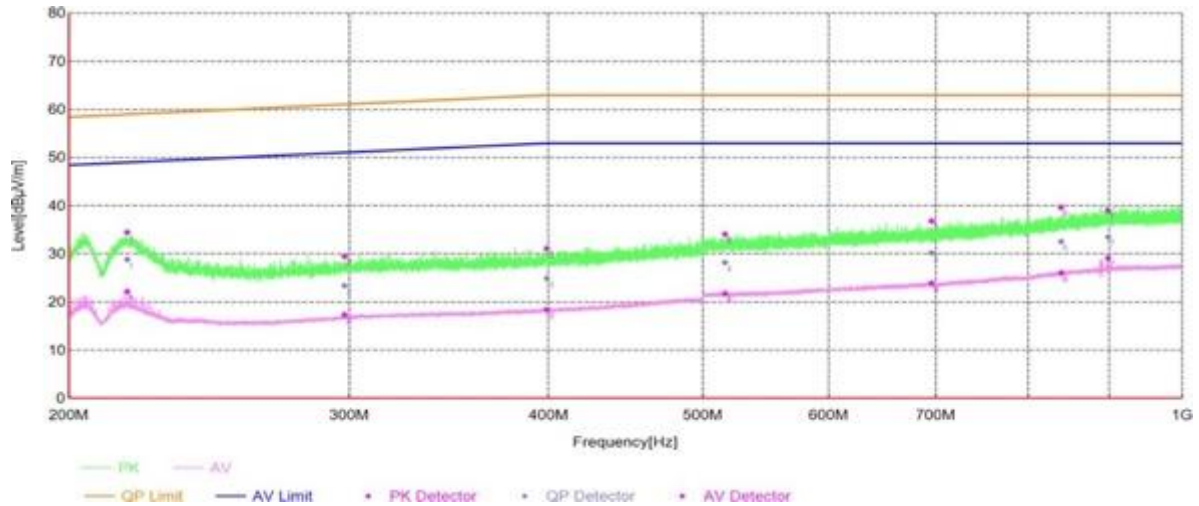


NO.	Frequency [Hz]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Verdict
1	32.45M	8.95	61.14	52.19	2.70	51.14	48.44	PASS
2	39.8M	9.44	58.92	49.48	2.97	48.92	45.95	PASS
3	56.2M	8.54	55.15	46.61	1.94	45.15	43.21	PASS
4	79.65M	8.69	52.40	43.71	2.13	42.40	40.27	PASS
5	99.45M	9.13	53.85	44.72	2.57	43.85	41.28	PASS
6	111.1M	15.06	54.58	39.52	7.19	44.58	37.39	PASS
7	163.8M	24.15	57.13	32.98	17.23	47.13	29.90	PASS
8	183.95M	28.79	57.90	29.11	22.60	47.90	25.30	PASS

2. Radiated Emissions Test Results (Vertical)

2.1. Variant: RBT12100LFP-BT

2.1.1. Power Supply: DC 13.5 V; Mode: FULL LOAD

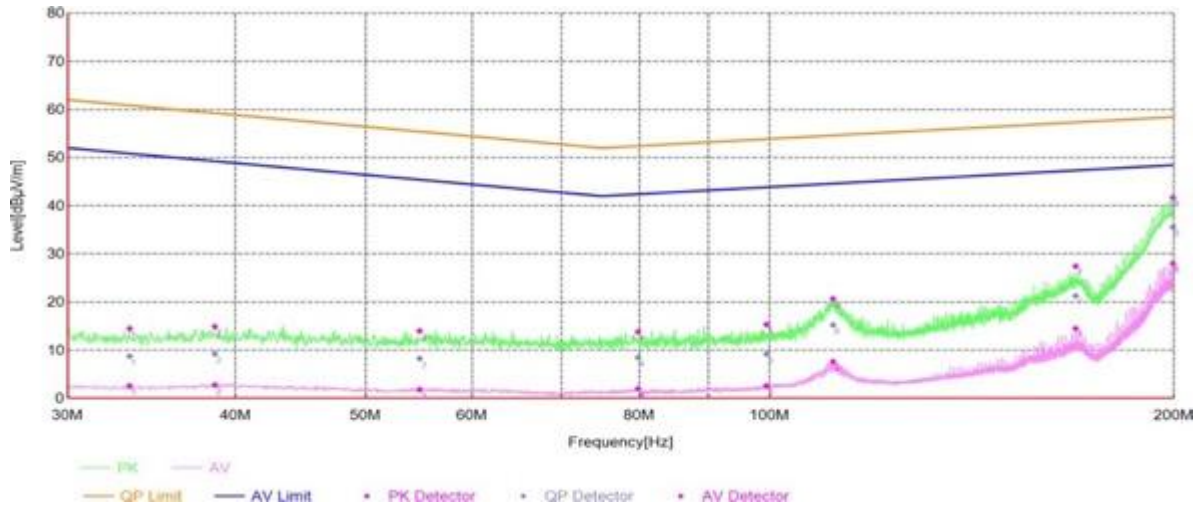


NO.	Frequency [Hz]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Verdict
1	217.6M	28.84	59.00	30.16	22.17	49.00	26.83	PASS
2	297.9M	23.40	61.06	37.66	17.38	51.06	33.68	PASS
3	399.05M	24.91	62.98	38.07	18.40	52.98	34.58	PASS
4	516.35M	28.22	63.00	34.78	21.78	53.00	31.22	PASS
5	695.95M	30.22	63.00	32.78	23.91	53.00	29.09	PASS
6	839.35M	32.56	63.00	30.44	26.06	53.00	26.94	PASS
7	898.35M	33.49	63.00	29.51	29.13	53.00	23.87	PASS

2. Radiated Emissions Test Results (Vertical)

2.1. Variant: RBT12100LFP-BT

2.1.2. Power Supply: DC 13.5 V; Mode: Charging

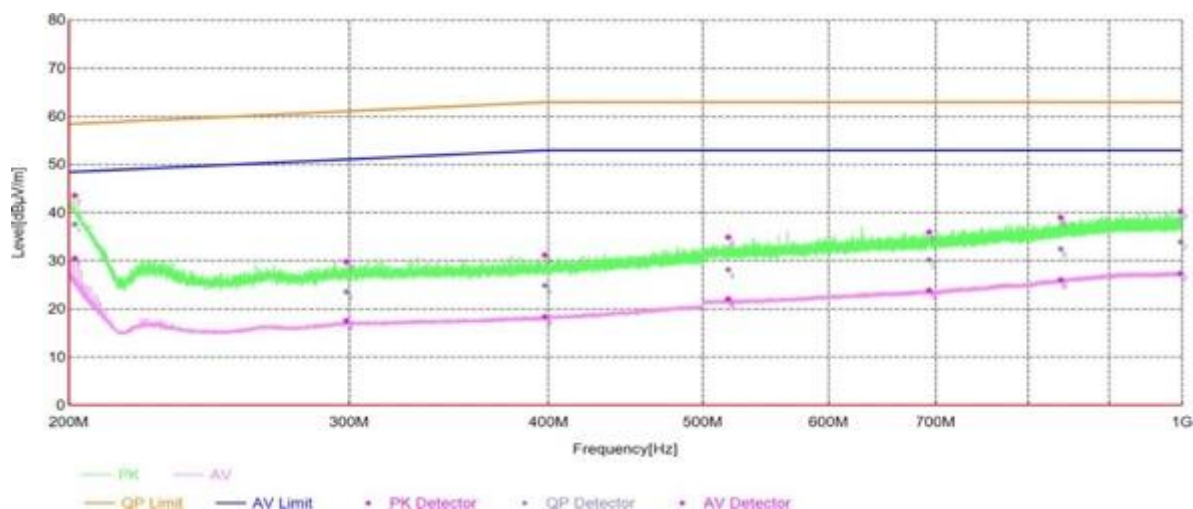


NO.	Frequency [Hz]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Verdict
1	33.35M	8.75	60.84	52.09	2.58	50.84	48.26	PASS
2	38.6M	9.24	59.25	50.01	2.77	49.25	46.48	PASS
3	54.85M	8.29	55.41	47.12	1.82	45.41	43.59	PASS
4	79.8M	8.49	52.41	43.92	1.99	42.41	40.42	PASS
5	99.45M	9.19	53.85	44.66	2.57	43.85	41.28	PASS
6	111.5M	15.24	54.61	39.37	7.65	44.61	36.96	PASS
7	169.05M	21.29	57.34	36.05	14.52	47.34	32.82	PASS
8	199.75M	35.58	58.44	22.86	28.03	48.44	20.41	PASS

2. Radiated Emissions Test Results (Vertical)

2.1. Variant: RBT12100LFP-BT

2.1.2. Power Supply: DC 13.5 V; Mode: Charging

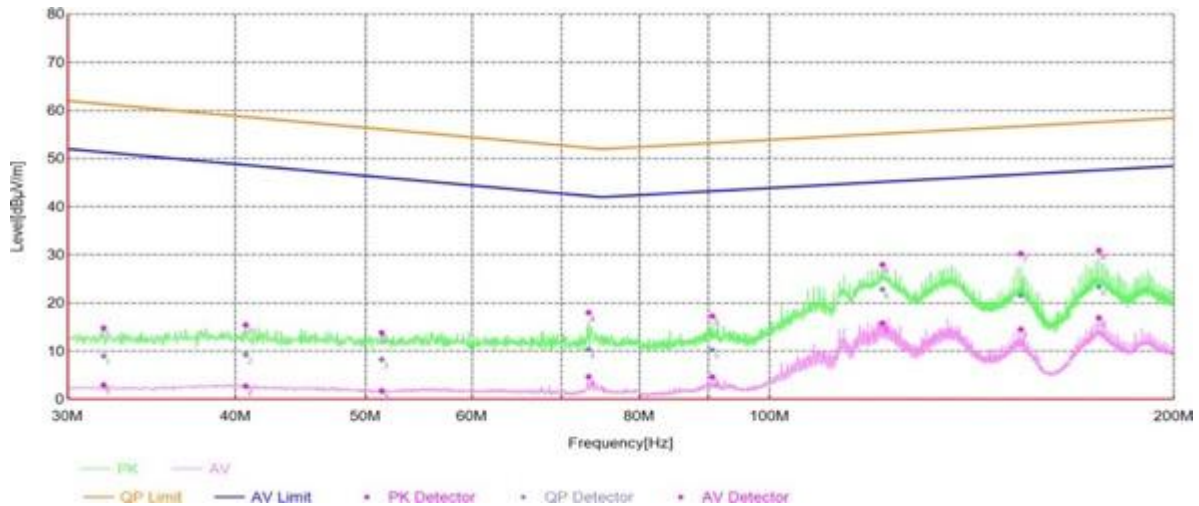


NO.	Frequency [Hz]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Verdict
1	201.7M	37.61	58.50	20.89	30.50	48.50	18.00	PASS
2	298.6M	23.58	61.08	37.50	17.56	51.08	33.52	PASS
3	397.9M	24.90	62.97	38.07	18.39	52.97	34.58	PASS
4	518.75M	28.18	63.00	34.82	22.09	53.00	30.91	PASS
5	693.6M	30.20	63.00	32.80	23.89	53.00	29.11	PASS
6	838.85M	32.48	63.00	30.52	26.05	53.00	26.95	PASS
7	997.8M	33.94	63.00	29.06	27.39	53.00	25.61	PASS

2. Radiated Emissions Test Results (Vertical)

2.2. Variant: RBT12200LFP-BT

2.2.1. Power Supply: DC 13.5 V; Mode: FULL LOAD

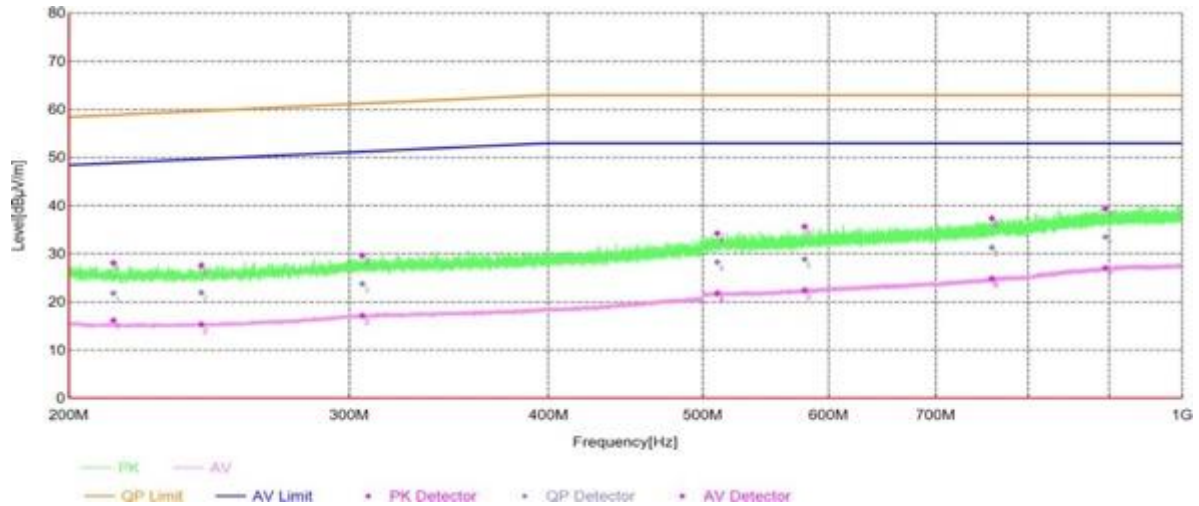


NO.	Frequency [Hz]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Verdict
1	31.9M	9.00	61.33	52.33	2.98	51.33	48.35	PASS
2	40.7M	9.29	58.67	49.38	2.74	48.67	45.93	PASS
3	51.4M	8.30	56.12	47.82	1.75	46.12	44.37	PASS
4	73.3M	10.41	52.25	41.84	4.69	42.25	37.56	PASS
5	90.65M	10.26	53.25	42.99	4.67	43.25	38.58	PASS
6	121.35M	22.82	55.16	32.34	15.85	45.16	29.31	PASS
7	153.9M	21.57	56.72	35.15	14.55	46.72	32.17	PASS
8	175.95M	23.40	57.60	34.20	16.94	47.60	30.66	PASS

2. Radiated Emissions Test Results (Vertical)

2.2. Variant: RBT12200LFP-BT

2.2.1. Power Supply: DC 13.5 V; Mode: FULL LOAD

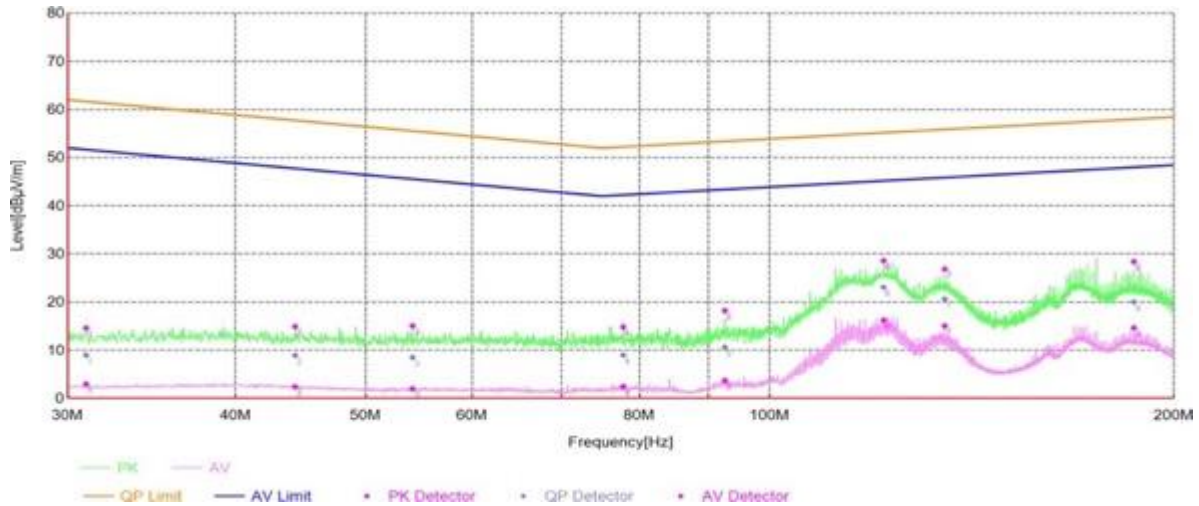


NO.	Frequency [Hz]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Verdict
1	213.3M	21.84	58.87	37.03	16.20	48.87	32.67	PASS
2	242.2M	21.95	59.70	37.75	15.36	49.70	34.34	PASS
3	305.6M	23.79	61.23	37.44	17.20	51.23	34.03	PASS
4	510.6M	28.30	63.00	34.70	21.86	53.00	31.14	PASS
5	579.3M	28.89	63.00	34.11	22.44	53.00	30.56	PASS
6	759.4M	31.32	63.00	31.68	24.88	53.00	28.12	PASS
7	894.9M	33.51	63.00	29.49	27.03	53.00	25.97	PASS

2. Radiated Emissions Test Results (Vertical)

2.2. Variant: RBT12200LFP-BT

2.2.2. Power Supply: DC 13.5 V; Mode: Charging

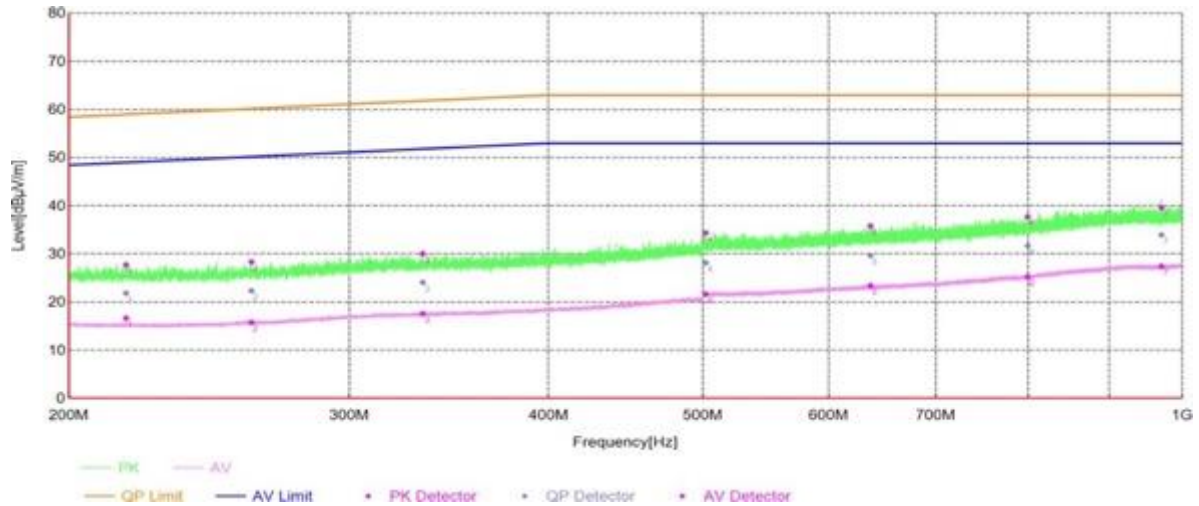


NO.	Frequency [Hz]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Verdict
1	30.95M	8.97	61.66	52.69	2.95	51.66	48.71	PASS
2	44.3M	8.93	57.75	48.82	2.38	47.75	45.37	PASS
3	54.2M	8.51	55.54	47.03	1.98	45.54	43.56	PASS
4	77.8M	8.99	52.24	43.25	2.46	42.24	39.78	PASS
5	92.6M	10.63	53.39	42.76	3.71	43.39	39.68	PASS
6	121.6M	23.06	55.18	32.12	16.26	45.18	28.92	PASS
7	135.05M	20.64	55.86	35.22	15.06	45.86	30.80	PASS
8	186.8M	20.04	58.00	37.96	14.64	48.00	33.36	PASS

2. Radiated Emissions Test Results (Vertical)

2.2. Variant: RBT12200LFP-BT

2.2.2. Power Supply: DC 13.5 V; Mode: Charging



NO.	Frequency [Hz]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Verdict
1	217.2M	21.85	58.99	37.14	16.65	48.99	32.34	PASS
2	260.4M	22.35	60.18	37.83	15.76	50.18	34.42	PASS
3	333.55M	24.09	61.81	37.72	17.58	51.81	34.23	PASS
4	502.15M	28.15	63.00	34.85	21.64	53.00	31.36	PASS
5	637.15M	29.66	63.00	33.34	23.43	53.00	29.57	PASS
6	799.75M	31.68	63.00	31.32	25.25	53.00	27.75	PASS
7	970.35M	33.97	63.00	29.03	27.43	53.00	25.57	PASS

3. Radiated Immunity Test results (bulk current injection method)

EUT: <u>RBT12200LFP-BT</u>						
Ambient Condition: <u>25 °C 54 %RH 101.5 kPa</u>						
Variant: <u>RBT12100LFP-BT</u>						
Operation Mode: <u>FULL LOAD&Charging</u>						
Power Supply(V)	Frequency (MHz)	Test Level (mA)	Modulation	Dwell Time (s)	Probe Position (mm)	Result Status
DC 13.5V	20-200	60	CW, AM 80%	2	150	Pass
DC 13.5V	200-400	60	CW, AM 80%	2	150	Pass
Variant: <u>RBT12200LFP-BT</u>						
Operation Mode: <u>FULL LOAD&Charging</u>						
Power Supply(V)	Frequency (MHz)	Test Level (mA)	Modulation	Dwell Time (s)	Probe Position (mm)	Result Status
DC 13.5V	20-200	60	CW, AM 80%	2	150	Pass
DC 13.5V	200-400	60	CW, AM 80%	2	150	Pass

4. Radiated Immunity Test results (free field method)

EUT: <u>RBT12200LFP-BT</u>				
Ambient Condition: <u>25 °C 54 %RH 101.5 kPa</u>				
Variant: <u>RBT12100LFP-BT</u>				
Operation Mode: <u>FULL LOAD&Charging</u>				
Power Supply: <u>DC 13.5 V</u>				
Frequency (MHz)	Level (V/m)	Modulation	Phenomenon	Result Status
400-800	30	CW, AM 80%	☒ Normal ☐ Abnormal:	Pass
800-1000	30	CW, PM	☒ Normal ☐ Abnormal:	Pass
1000-2000	30	CW, PM	☒ Normal ☐ Abnormal:	Pass
Variant: <u>RBT12200LFP-BT</u>				
Operation Mode: <u>FULL LOAD&Charging</u>				
Power Supply: <u>DC 13.5 V</u>				
Frequency (MHz)	Level (V/m)	Modulation	Phenomenon	Result Status
400-800	30	CW, AM 80%	☒ Normal ☐ Abnormal:	Pass
800-1000	30	CW, PM	☒ Normal ☐ Abnormal:	Pass
1000-2000	30	CW, PM	☒ Normal ☐ Abnormal:	Pass

5. Conducted Transient Immunity Test Results

EUT: <u>RBT12200LFP-BT</u>						
Ambient Condition: <u>25 °C 54 %RH 101.5 kPa</u>						
Variant: <u>RBT12100LFP-BT</u>						
Operation Mode: <u>Charging</u>						
Power Supply: <u>DC 13.5 V</u>						
Pulse	Level (V)	Number/Time	Repetition Time	Acceptance status	Phenomenon	Result Status
1	-75	5000 pulses	0.5s	C	C	PASS
2a	+37	5000 pulses	0.2s	B	A	PASS
2b	+10	10 pulses	0.5s	C	C	PASS
3a	-112	1 h	90ms	A	A	PASS
3b	+75	1 h	90ms	A	A	PASS
4	-6	1pulses	N/A	C	C	PASS
Variant: <u>RBT12200LFP-BT</u>						
Operation Mode: <u>Charging</u>						
Power Supply: <u>DC 13.5 V</u>						
Pulse	Level (V)	Number/Time	Repetition Time	Acceptance status	Phenomenon	Result Status
1	-75	5000 pulses	0.5s	C	C	PASS
2a	+37	5000 pulses	0.2s	B	A	PASS
2b	+10	10 pulses	0.5s	C	C	PASS
3a	-112	1 h	90ms	A	A	PASS
3b	+75	1 h	90ms	A	A	PASS
4	-6	1pulses	N/A	C	C	PASS
<p>Comment:</p> <p>Class A: all functions of a device/system perform as designed during and after exposure to disturbance.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>						

6. Conducted Transient Emission Test Results

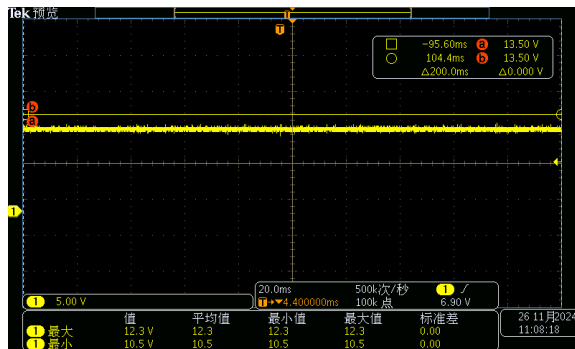
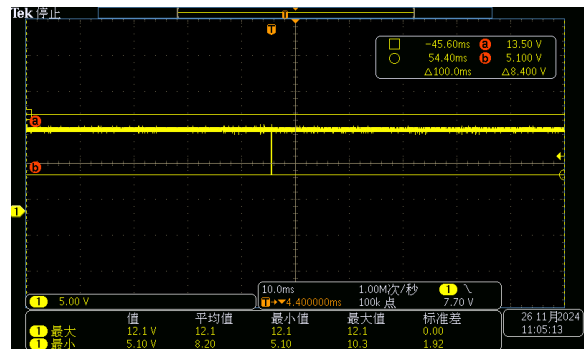
EUT: RBT12100LFP-BT

Ambient Condition: 25 °C 54 %RH 101.5 kPa

Power Supply: DC 13.5V

Mode: Charging

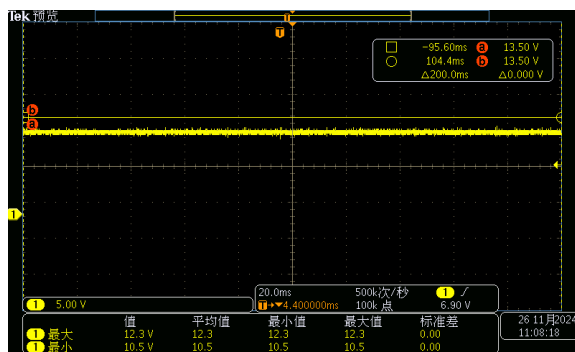
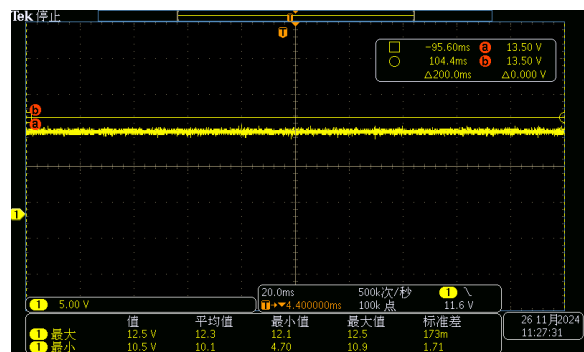
Transient	Voltage limit [V]	Maximum Amplitude [V]	Result
Fast	Positive: +75	+0.0V	Pass
	Negative: -100	-8.4V	Pass
Slow	Positive: +75	+0.0V	Pass
	Negative: -100	-0.0V	Pass



On → Off

Off → On

Wave of fast pulse



On → Off

Off → On

Wave of slow pulse

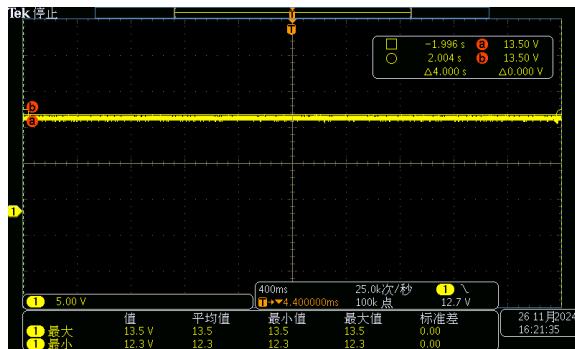
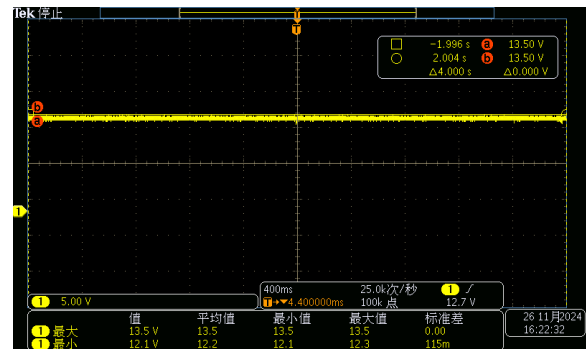
EUT: RBT12200LFP-BT

Ambient Condition: 25 °C 54 %RH 101.5 kPa

Power Supply: DC 13.5V

Mode: Charging

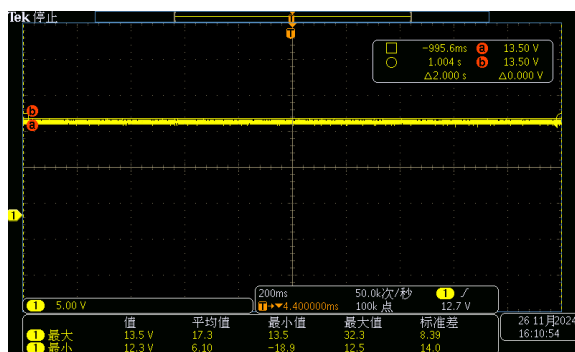
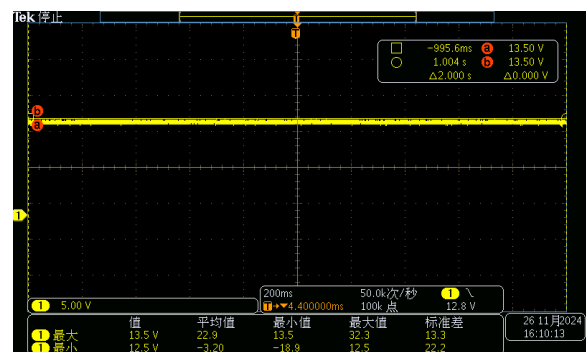
Transient	Voltage limit [V]	Maximum Amplitude [V]	Result
Fast	Positive: +75	+0.0V	Pass
	Negative: -100	-0.0V	Pass
Slow	Positive: +75	+0.0V	Pass
	Negative: -100	-0.0V	Pass



On → Off

Off → On

Wave of fast pulse

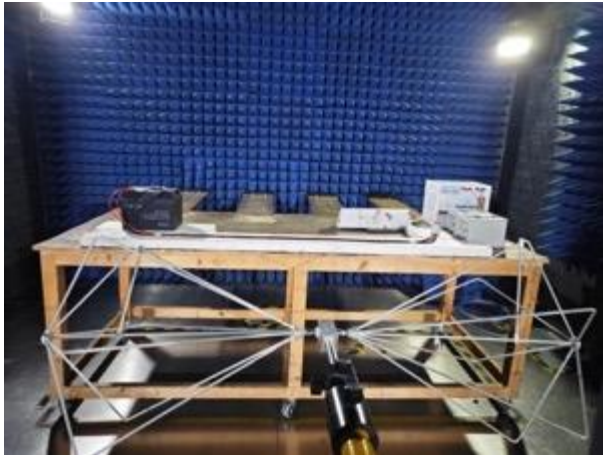


On → Off

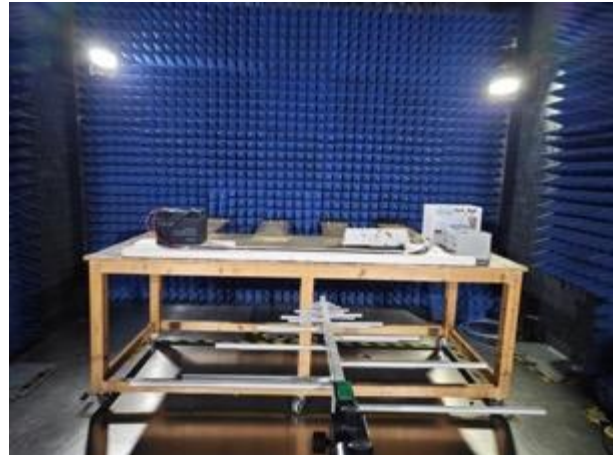
Off → On

Wave of slow pulse

Appendix 5 Photographic section



Radiated emissions
(Biconical Antenna)



Radiated emissions
(Log Periodic Antenna)



Immunity to electromagnetic radiation
(Horn Antenna)



Immunity to electromagnetic radiation
(Log Periodic Antenna)



Conducted Transient Immunity Test



Bulk current injection test

RENOGY	Type: RBT12200LFP-BT
	Information document No.: 01-IF_R10.06_Component_RBT12200LFP-BT_00
	Date: 04/12/2024
	Pages: Page 1 of 29

**APPLICATION FOR TYPE APPROVAL PURSUANT
TO UNECE Regulation 10.06, Supplement 03
RELATING TO ELECTROMAGNETIC COMPATIBILITY OF AN ESA**

Component: Smart Lithium Iron Phosphate Battery

Type: RBT12200LFP-BT

Signature of a responsible person: *Simon Liang*
Place: Taicang, China
Date: 04/12/2024

RENOGY	Type: RBT12200LFP-BT
	Information document No.: 01-IF_R10.06_Component_RBT12200LFP-BT_00
	Date: 04/12/2024
	Pages: Page 2 of 29

Confirmation

We declare hereby that the specimen ESA submitted for this approval test has been manufactured and assembled on conditions of ordinary mass production and that they are compatible with enclosed documentation.

Signature of a responsible person: *Simon Liang*
Place: Taicang, China
Date: 04/12/2024

RENOGY	Type: RBT12200LFP-BT
	Information document No.: 01-IF_R10.06_Component_RBT12200LFP-BT_00
	Date: 04/12/2024
	Pages: Page 3 of 29

1. Make (trade name of manufacturer): RENOGY
2. Type and general commercial description: Type: RBT12200LFP-BT
Smart Lithium Iron Phosphate Battery
- 2.1 Variants RBT12100LFP-BT
3. Means of identification of type, if marked on the component/separate technical unit: By digits and letters.
Sticked on the product casing by labels.
- 3.1. Location of that marking: Sticked on the product casing by labels.
The details please see the Appendix 01
4. Name and address of manufacturer: Name: RENOGY New Energy Co., Ltd.
Address: Room 624-625, Taicang German Overseas Students Pioneer Park, 66 Ningbo East Road, Taicang Economic Development Zone China
- 4.1. Name and address of authorized representative, if any: N/A
5. In the case of components and separate technical units, location and method of affixing of the approval mark: Sticked on the product casing by labels.
The details please see the Appendix 01
6. Name(s) and address (es) of assembly plant(s): Name: Enerblok Co.,Ltd
Address: 98 Huicheng Road, Changan Street,Huishan District,Wuxi City, Jiangsu Province, China
7. This ESA shall be approved as a component/~~STU~~: Component
8. Any restrictions of use and conditions for fitting: N/A
9. Electrical system rated voltage: Input:14.4V DC, negative grounding
Output: 12.8V DC

RENOGY	Type: RBT12200LFP-BT
	Information document No.: 01-IF_R10.06_Component_RBT12200LFP-BT_00
	Date: 04/12/2024
	Pages: Page 4 of 29

	APPENDIX	Pages
01	Assembly Diagram	5-8
02	PCB Layout	9-19
03	Circuit Diagram	20-24
04	List of Main Components	25-28
05	Difference Declaration	29

RENOGY	Type: RBT12200LFP-BT
	Information document No.: 01-IF_R10.06_Component_RBT12200LFP-BT_00
	Date: 04/12/2024
	Pages: Page 5 of 29

01 Assembly Diagram
(RBT12100LFP-BT)

SMART LITHIUM IRON PHOSPHATE BATTERY

RBT12100LFP-BT

Nominal Voltage:	12.8V
Rated Capacity:	100Ah
Rated Energy:	1280Wh
Maximum Charge Current:	100A
Maximum Discharge Current:	100A
Surge Discharge Current:	245A@30S
Operating Temperature:	-20°C ~ 50°C

FEATURES

- Real-time monitoring through DC-home App
- Self-heating function for stay charged in cold environments
- Active safety protection with Self-Control Fuse
- 10 years life span

renogy.com 1.909.287.7111 5050 S. Archibald Ave, Ontario, CA 91762

WARNING

- DO NOT disassemble, alter, crush, puncture, or incinerate the battery
- DO NOT place the battery near fire or heat
- DO NOT allow the connector to contact metal objects.
- DO NOT touch the exposed electrolyte or powder if the battery is damaged.

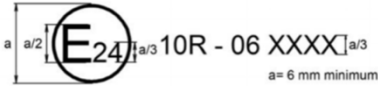
FCC ID: 2ANPB-RBT12100LFP
IC: 23590-RBT12100LFP



E24 10R - 06 XXXX

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:(1) This device may not cause harmful interference, and(2) This device must accept any interference received, including interference that may cause undesired operation.

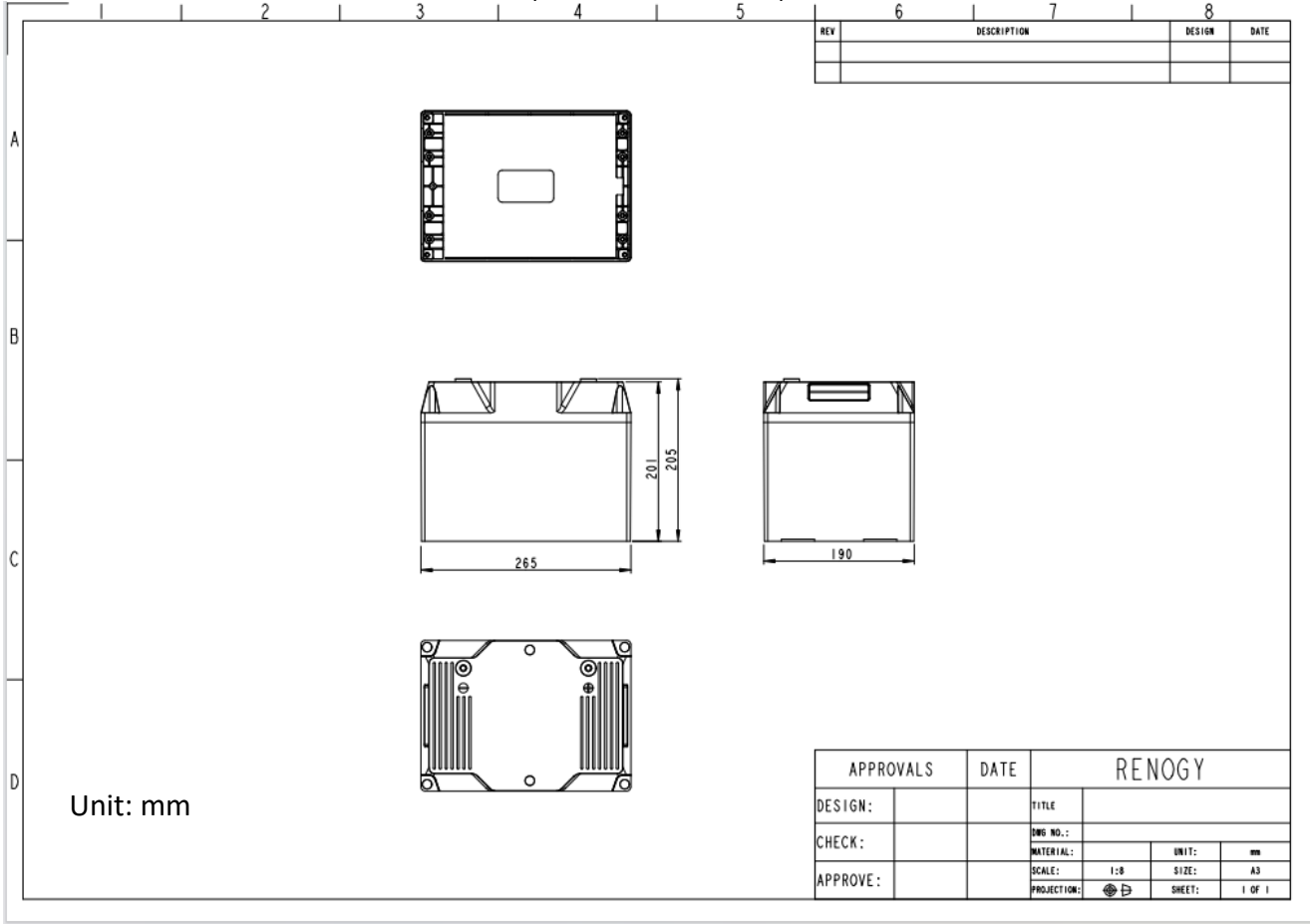
RENOGY



Example of approval mark and location of type

RENOGY	Type: RBT12200LFP-BT
	Information document No.: 01-IF_R10.06_Component_RBT12200LFP-BT_00
	Date: 04/12/2024
	Pages: Page 6 of 29

01 Assembly Diagram
(RBT12100LFP-BT)



RENOGY	Type: RBT12200LFP-BT
	Information document No.: 01-IF_R10.06_Component_RBT12200LFP-BT_00
	Date: 04/12/2024
	Pages: Page 7 of 29

01 Assembly Diagram
(RBT12200LFP-BT)

SMART LITHIUM IRON PHOSPHATE BATTERY

RBT12200LFP-BT

Nominal Voltage:	12.8V
Rated Capacity:	200Ah
Rated Energy:	2560Wh
Maximum Charge Current:	200A
Maximum Discharge Current:	200A
Surge Discharge Current:	270A@30S
Operating Temperature:	-20°C~50°C

FEATURES

Real-time monitoring through DC-home App

Self-heating function for stay charged in cold environments

Active safety protection with Self-Control Fuse

10 years life span

renogy.com

1.909.287.7111

5050 S. Archibald Ave, Ontario, CA 91762

WARNING

- DO NOT disassemble, alter, crush, puncture, or incinerate the battery
- DO NOT place the battery near fire or heat
- DO NOT allow the connector to contact metal objects.
- DO NOT touch the exposed electrolyte or powder if the battery is damaged.

FCC ID: 2ANPB-RBT12200LFP

IC: 23590-RBT12200LFP

UN38.3

E24

10R - 06 XXXX

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:(1) This device may not cause harmful interference, and(2) This device must accept any interference received, including interference that may cause undesired operation.

RENogy
Find Your Energy Freedom

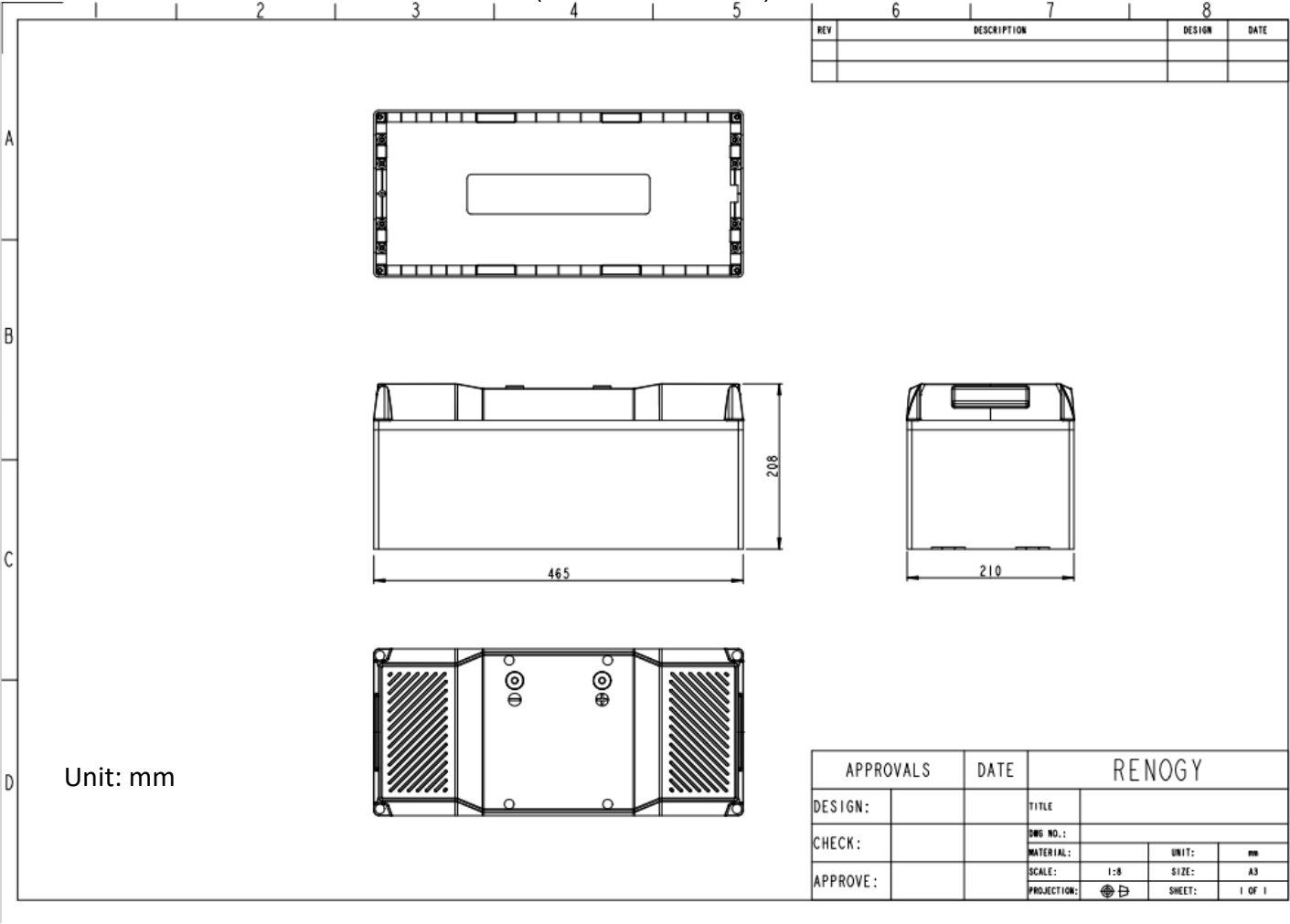
a/2 [E24] a/3 10R - 06 XXXX
a=6 mm minimum

Example of approval mark and location of type

E24*10R06/03*6830*00

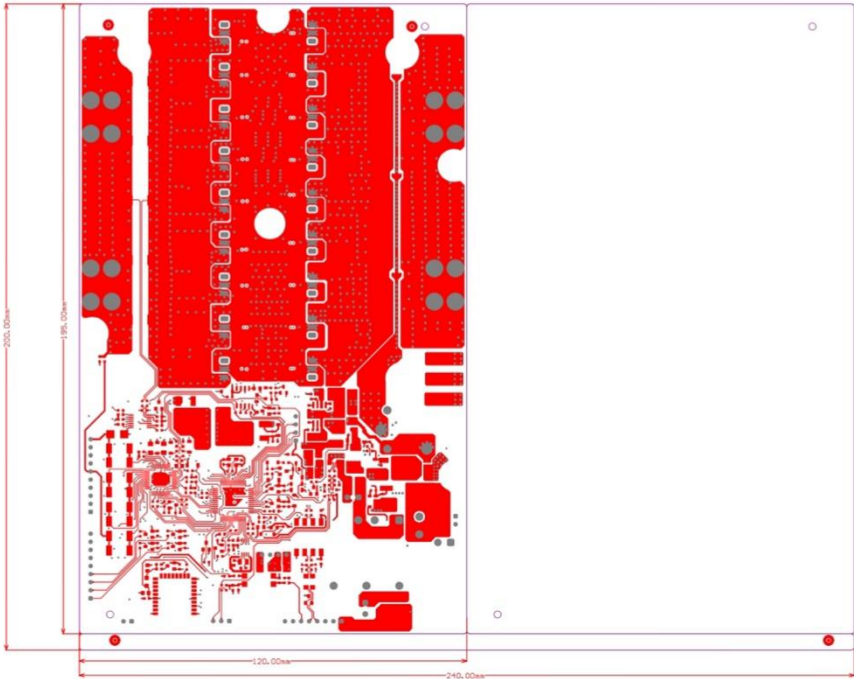
RENOGY	Type: RBT12200LFP-BT
	Information document No.: 01-IF_R10.06_Component_RBT12200LFP-BT_00
	Date: 04/12/2024
	Pages: Page 8 of 29

01 Assembly Diagram
(RBT12200LFP-BT)



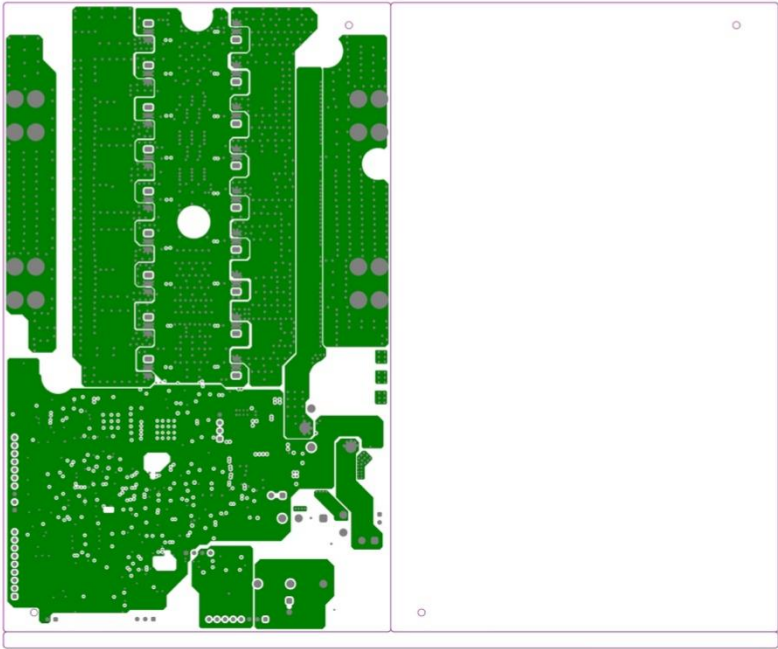
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	Information document No.: 01-IF_R10.06_Component_RBT12200LFP-BT_00
	Date: 04/12/2024
	Pages: Page 9 of 29

02 PCB Layout



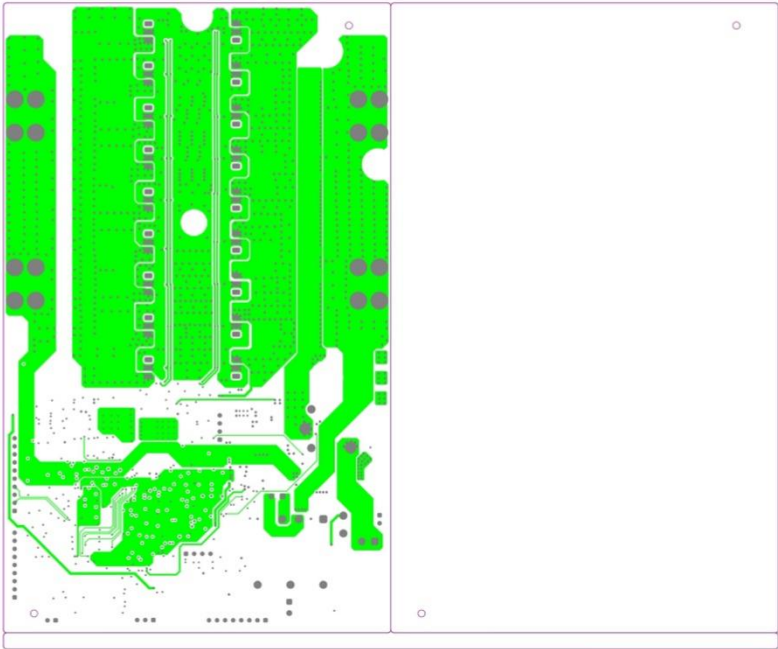
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	Date: 04/12/2024
	Pages: Page 10 of 29

02 PCB Layout



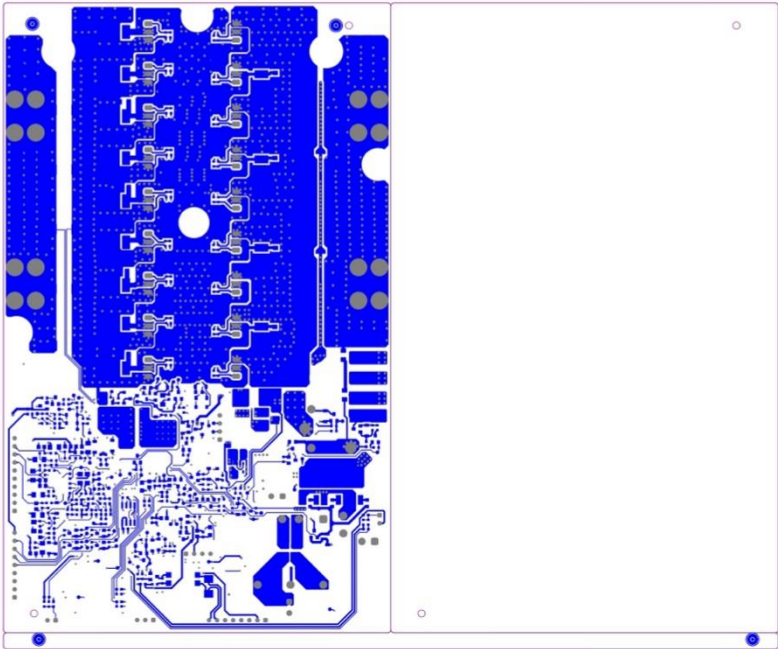
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	Date: 04/12/2024
	Pages: Page 11 of 29

02 PCB Layout



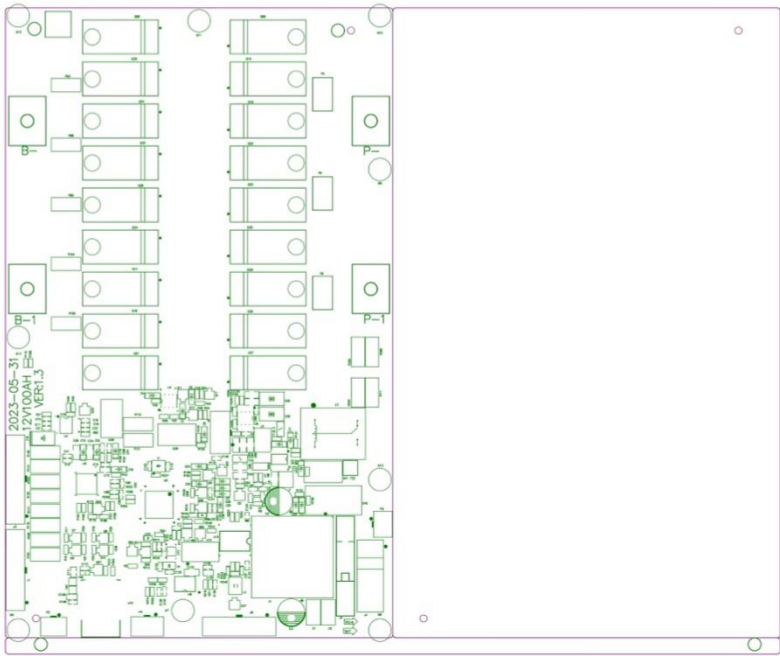
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	Date: 04/12/2024
	Pages: Page 12 of 29

02 PCB Layout



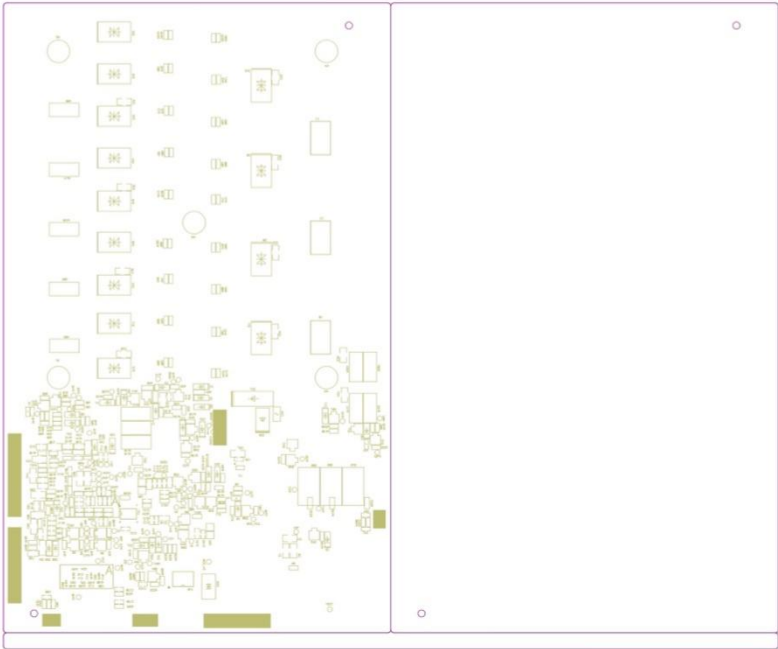
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	Date: 04/12/2024
	Pages: Page 13 of 29

02 PCB Layout



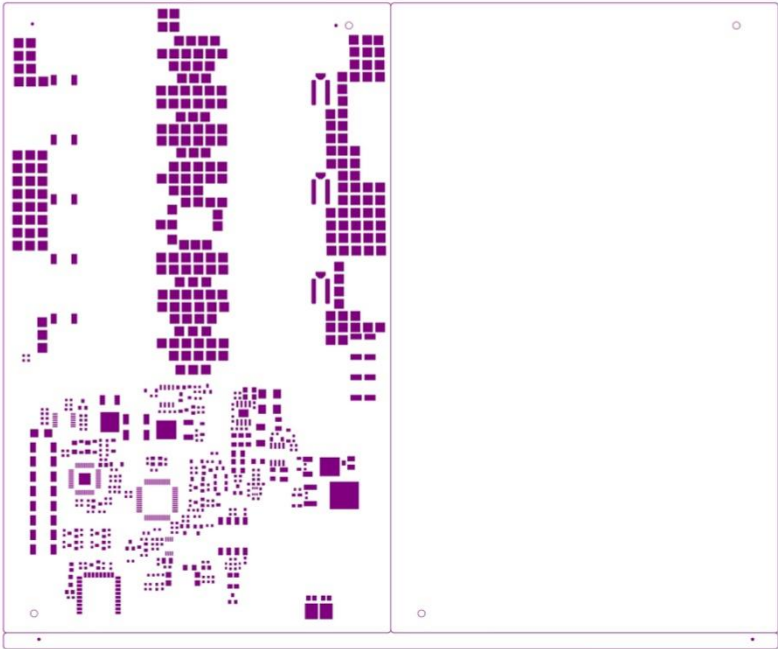
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	Date: 04/12/2024
	Pages: Page 14 of 29

02 PCB Layout



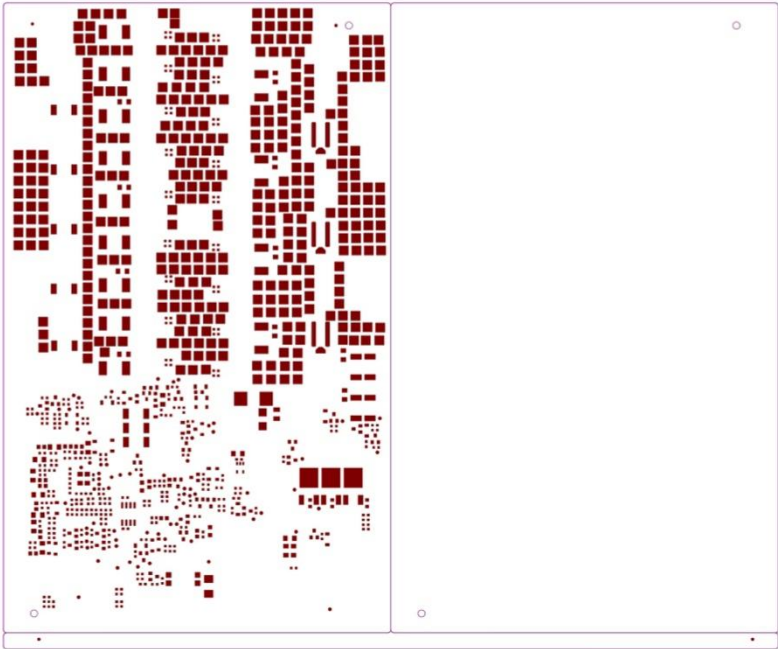
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	Date: 04/12/2024
	Pages: Page 15 of 29

02 PCB Layout



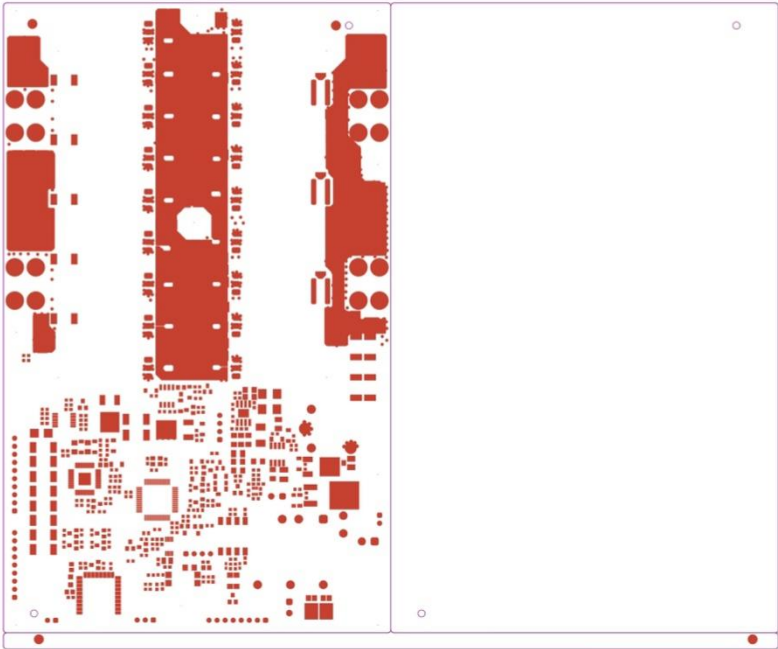
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	Date: 04/12/2024
	Pages: Page 16 of 29

02 PCB Layout



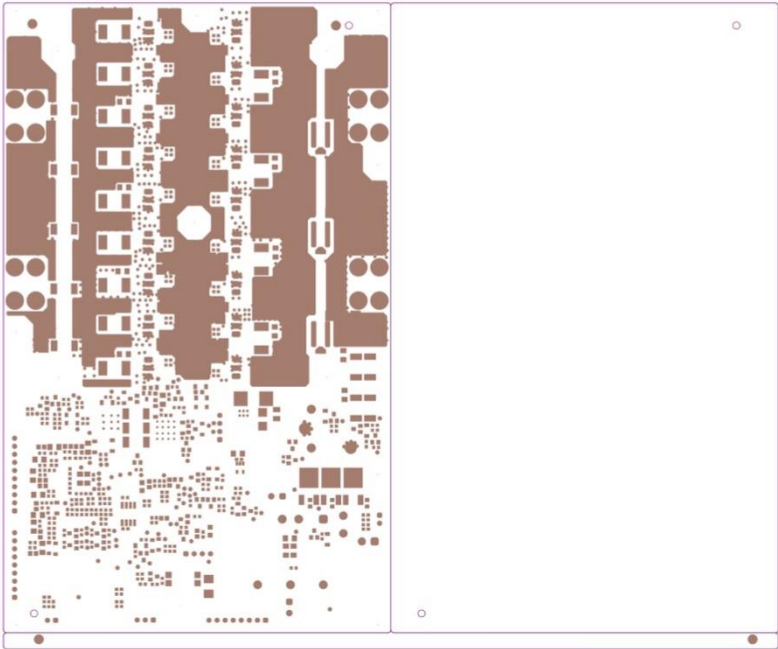
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	Information document No.: 01-IF_R10.06_Component_RBT12200LFP-BT_00
	Date: 04/12/2024
	Pages: Page 17 of 29

02 PCB Layout



RENOGY	Type: RBT12200LFP-BT
	Information document No.: 01-IF_R10.06_Component_RBT12200LFP-BT_00
	Date: 04/12/2024
	Pages: Page 18 of 29

02 PCB Layout



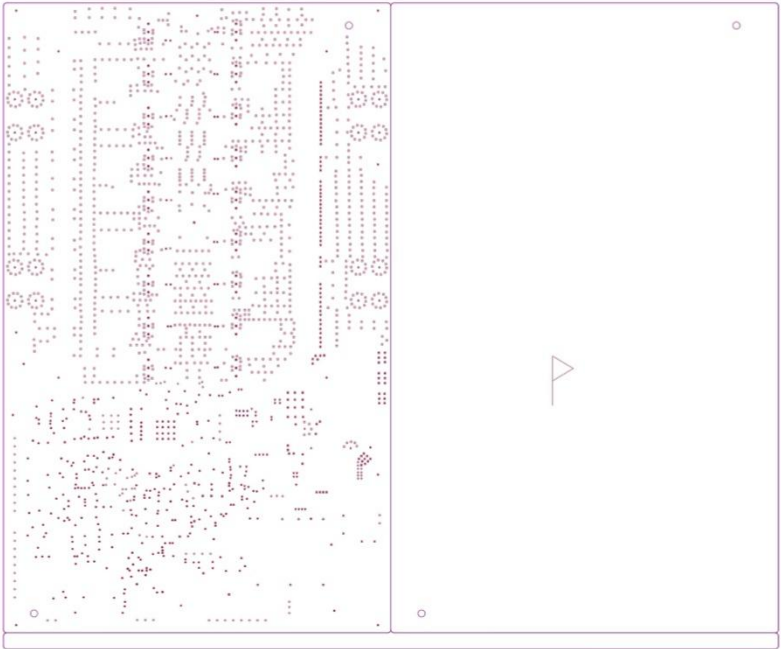
RENOGY

Type: RBT12200LFP-BT
Information document No.: 01-IF_R10.06_Component_RBT12200LFP-BT_00
Date: 04/12/2024
Pages: Page 19 of 29

02 PCB Layout

Symbol	Count	Hole Size	Plated	Hole Type	Drill Layer Pair	Uia/Pad	Pad Shape	Template	Description	Hole Tolerance (+)	Hole Tolerance (-)	Hole Length	Routed Path Length
■	1	3,200mm (125,58mm)	PTH	Round	Top Layer - Bottom Layer	Pad	Rounded	c0h320				-	-
▽	2	0,600mm (23,62mm)	NPTH	Round	Top Layer - Bottom Layer	Pad	Rounded	c0h60				-	-
■	4	1,700mm (66,93mm)	PTH	Round	Top Layer - Bottom Layer	Pad	(Fixed)	(Fixed)				-	-
■	4	1,400mm (55,91mm)	PTH	Round	Top Layer - Bottom Layer	Pad	Rounded	(Fixed)				-	-
○	6	1,500mm (59,06mm)	PTH	Round	Top Layer - Bottom Layer	Pad	(Fixed)	(Fixed)				-	-
○	13	3,500mm (137,78mm)	PTH	Round	Top Layer - Bottom Layer	Pad	Rounded	c0h360				-	-
■	16	0,254mm (10,00mm)	PTH	Round	Top Layer - Bottom Layer	Via	Rounded	v5h254d1				-	-
○	16	3,300mm (129,92mm)	PTH	Round	Top Layer - Bottom Layer	Pad	Rounded	c590h330				-	-
○	44	0,305mm (12,01mm)	PTH	Round	Top Layer - Bottom Layer	Via	Rounded	v6h305d0x0(2)				-	-
○	46	1,000mm (39,37mm)	PTH	Round	Top Layer - Bottom Layer	Pad	(Fixed)	(Fixed)				-	-
▽	91	0,400mm (15,75mm)	PTH	Round	Top Layer - Bottom Layer	Via	Rounded	v76h400d0				-	-
■	94	1,200mm (47,24mm)	PTH	Slot	Top Layer - Bottom Layer	Pad	(Fixed)	(Fixed)				1,600mm (62,99mm)	0,400mm (15,75mm)
○	96	0,300mm (11,81mm)	PTH	Round	Top Layer - Bottom Layer	Via	Rounded	(Fixed)				-	-
■	134	0,400mm (15,75mm)	PTH	Round	Top Layer - Bottom Layer	Via	Rounded	v76h400d0				-	-
●	285	0,305mm (12,00mm)	PTH	Round	Top Layer - Bottom Layer	Via	Rounded	(Fixed)				-	-
□	1323	0,500mm (19,69mm)	PTH	Round	Top Layer - Bottom Layer	(Fixed)	Rounded	(Fixed)				-	-
2299 Total													

Slot definitions : Routed Path Length = Calculated from tool start centre position to tool end centre position.
Hole Length = Routed Path Length + Tool Size + Slot length as defined in the PCB layout



RENOGY

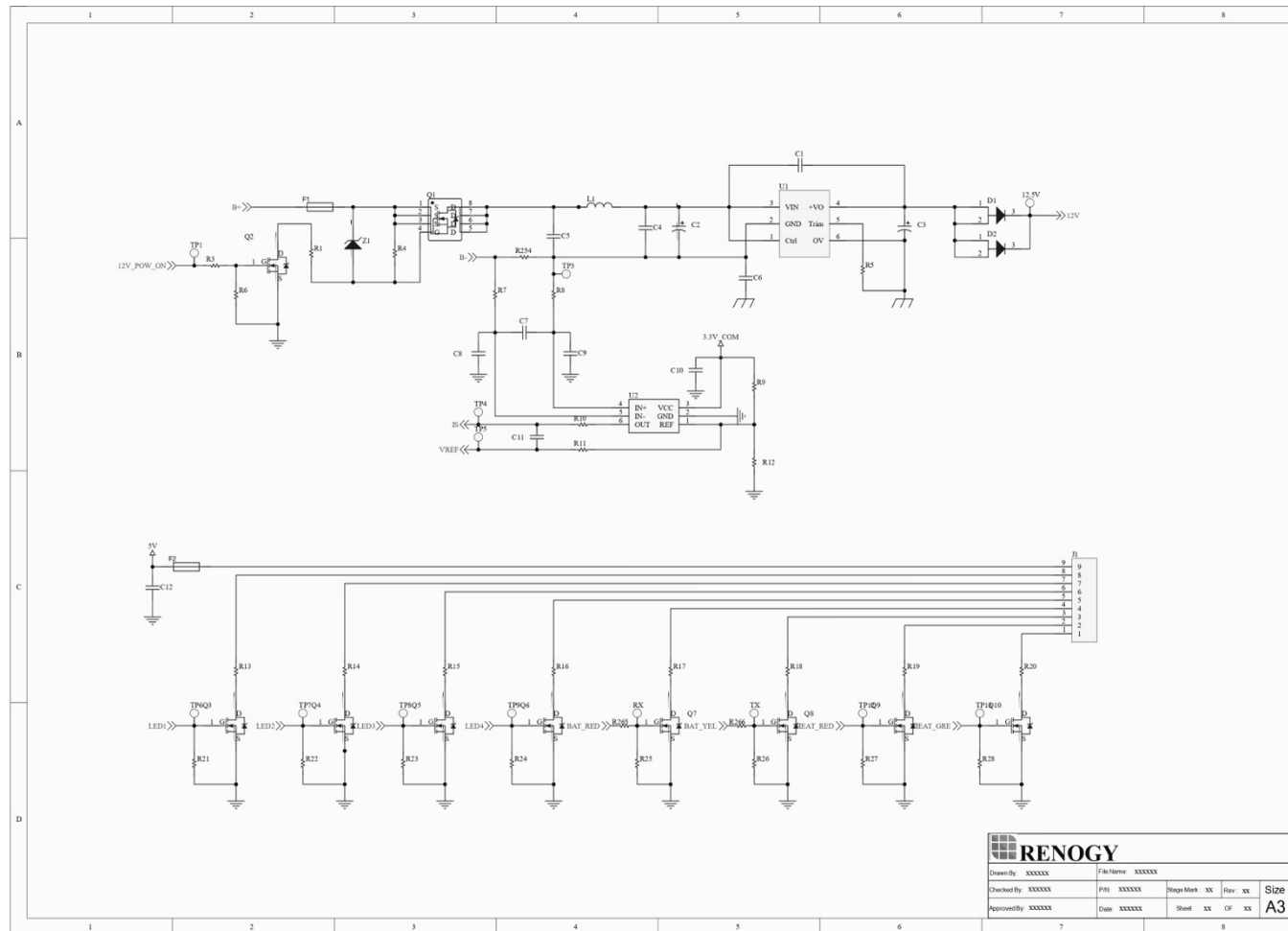
Type: RBT12200LFP-BT

Information document No.: 01-IF_R10.06_Component_RBT12200LFP-BT_00

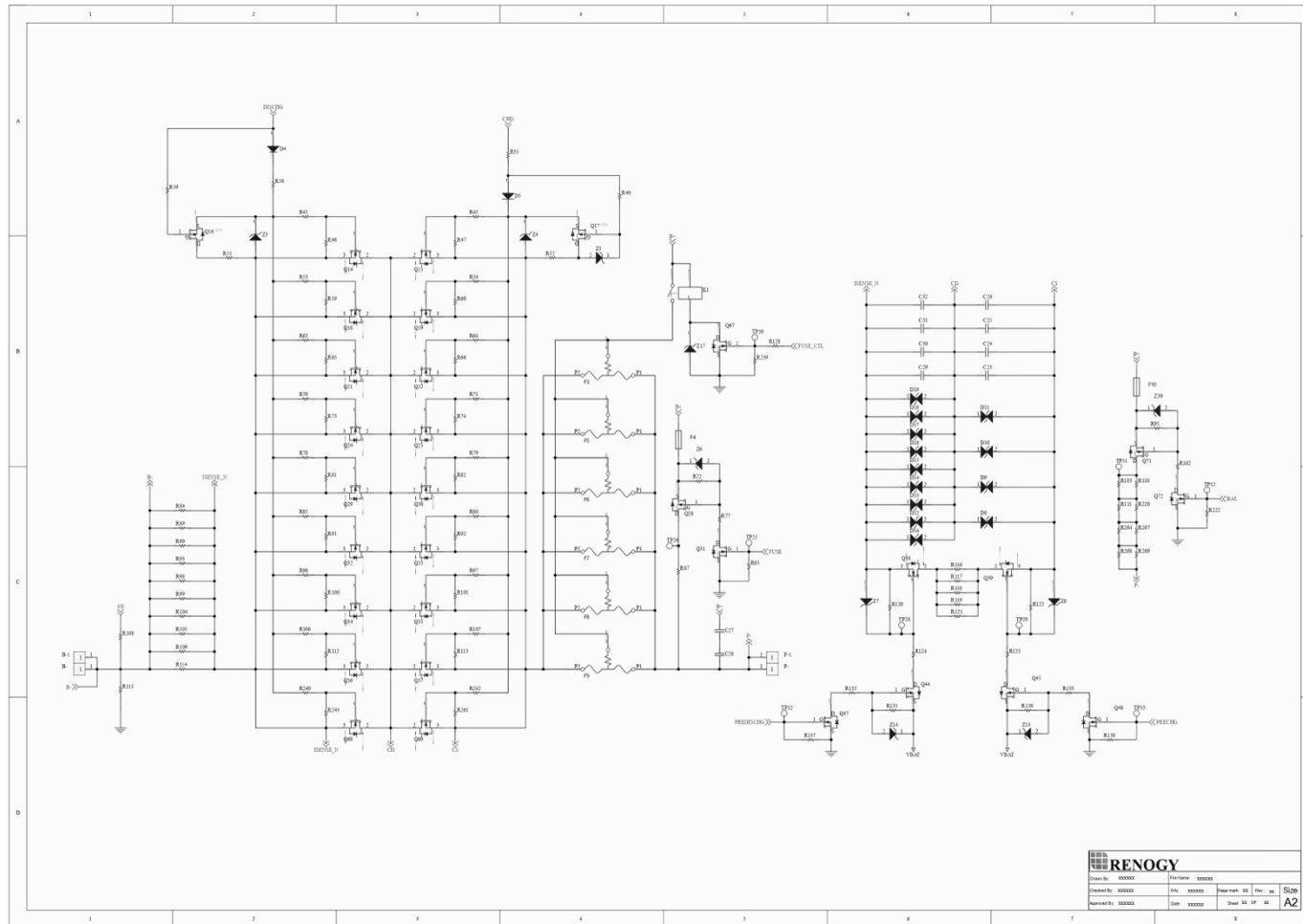
Date: 04/12/2024

Pages: Page 20 of 29

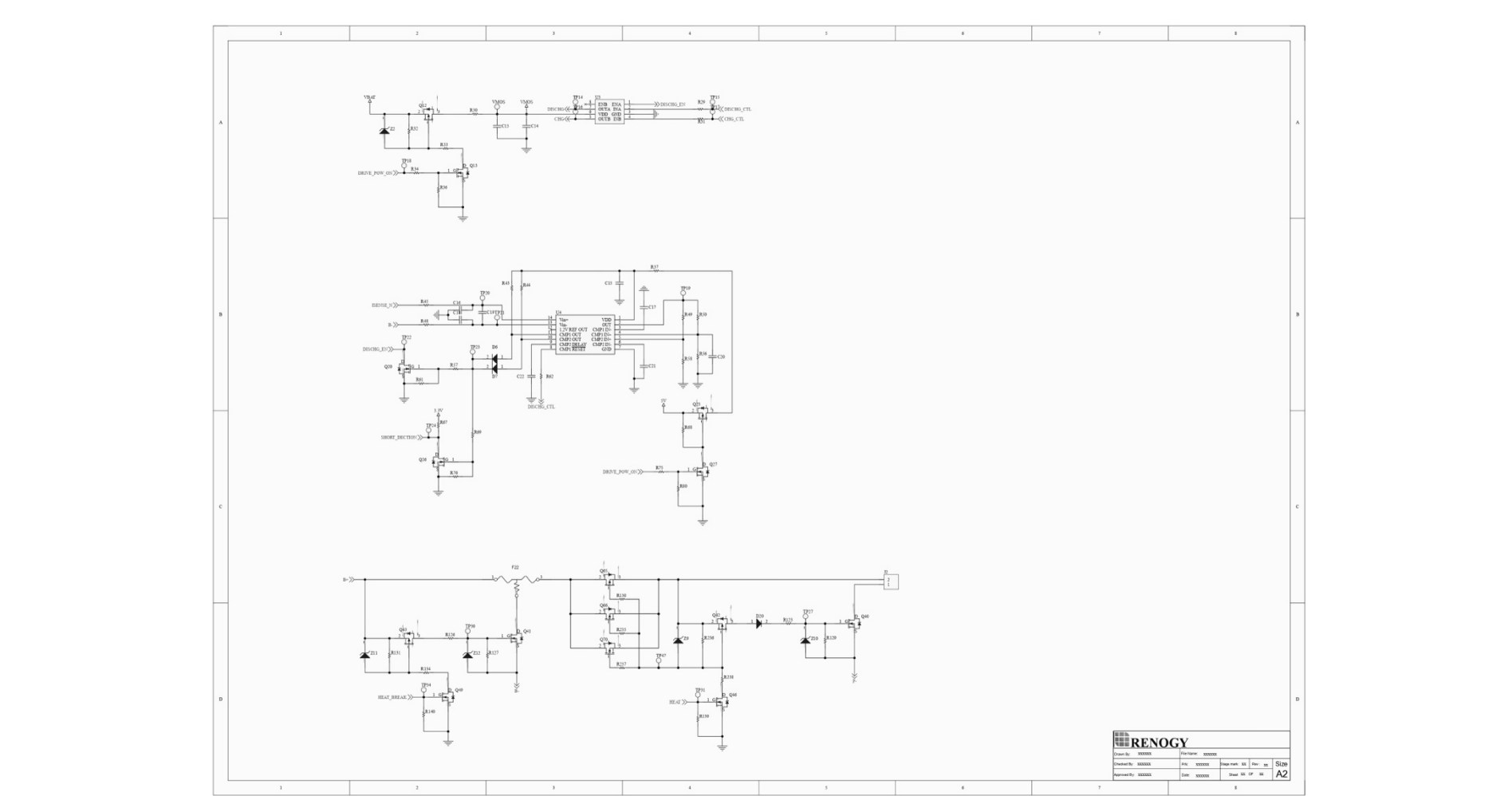
03 Circuit Diagram



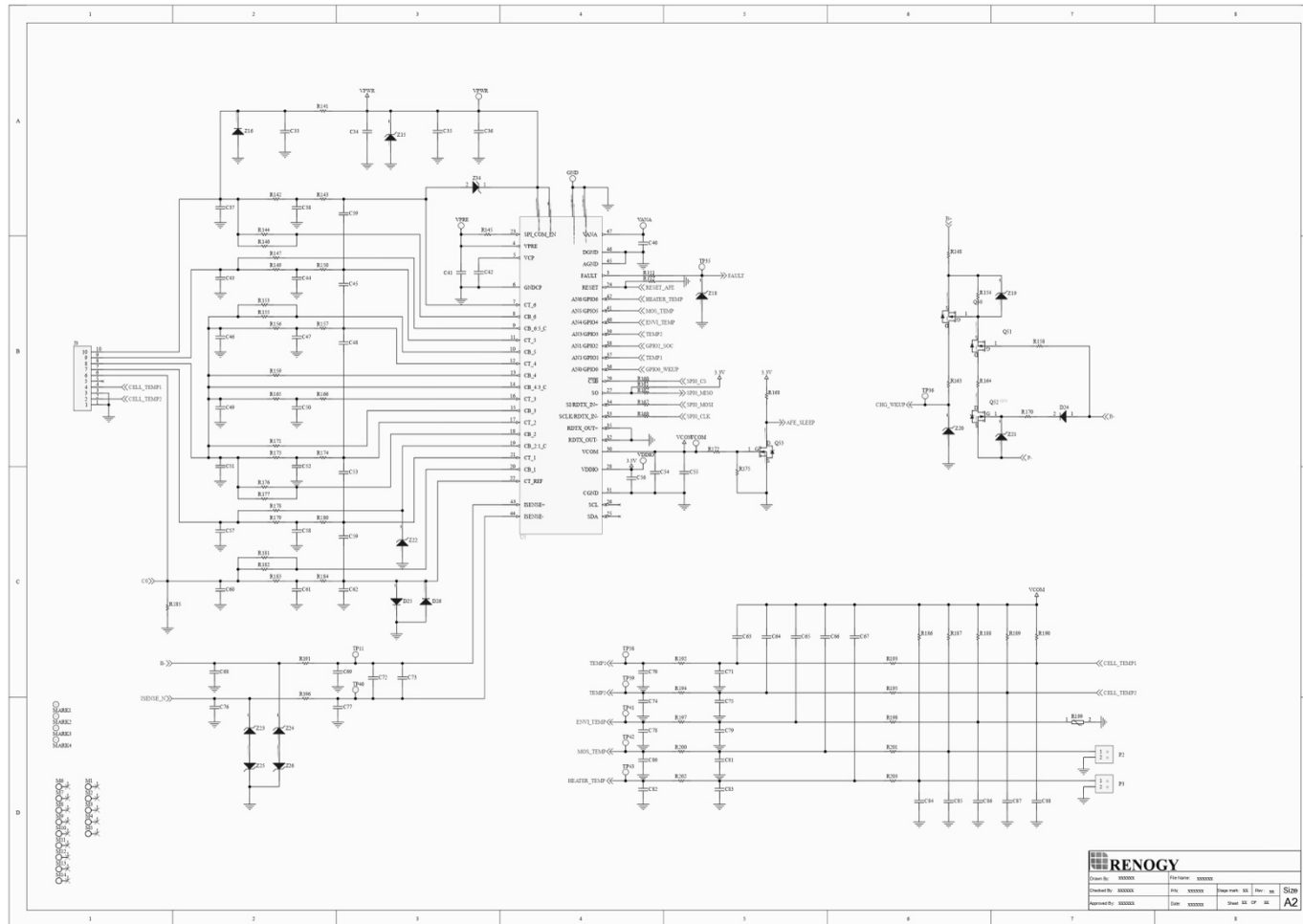
03 Circuit Diagram



03 Circuit Diagram



03 Circuit Diagram



RENOGY	Type: RBT12200LFP-BT
	Information document No.: 01-IF_R10.06_Component_RBT12200LFP-BT_00
	Date: 04/12/2024
	Pages: Page 25 of 29

04 List of Main Components

Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
Enclosure	ORIZONE international(HongKong) Co.,LTD	PC+ABS C3100F	Thickness 2.8mm UL94 V-0	UL 94	UL E521665
Insulation sheet	RisEast Technology Corporation	SSTCP-030A	Thickness 1.0mm 150°C UL94 V-0	UL 94	E352845
Spacer/Holder	Carbon steel		Zinc plated 2-5um		
Insulation paper	Shenzhen Teesun Technology Co.,LTD	PC TS-FR370F	Thickness 0.25mm UL94 V-0	UL94	UL E329660
Internal wiring	Dongguan Haoquan wire&cable Co.,LTD	3512	Silicon 7AWG 200°C	UL 758	UL E527035
Tubing/ Sleeving	Shenzhen Woer Heat- Shrinkable Material Co., Ltd		WOER RSFR(H), 600V, - 55°C~125°C, VW-1		UL E203950
Cell inter-connection Busbar		Aluminium sheetmetal AL1060	Thickness 3.0mm		
Internal Plastic	ORIZONE international(HongKong) Co.,LTD	PC+ABS C3100F	Thickness 2.8mm UL94 V-0	UL 94	UL E521665
Printed Wiring Board	SHENGYITECHNOLOGY GY CO LTD	S-1000	1.6mm, V-0, 150° C	UL/94	E109769

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Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
Heat-sink		Aluminium AL 6063			
Fuse(No: F3/F5/F6/F7/F8/F9)	Xiamen SET Electronics Co., Ltd.	SGP-1445	45A 100V	UL 248	E345932
NTC(No: J3/P2)	Nanjing Shiheng Electronics Co.,Ltd.	CWF4B 103F3950(A)26 L0140Y	10K 1% B25/50:3950K	--	Test with appliance
Control IC(No: U9)	NXP Semiconductors	FS32K144HFT0 MLHT	Automotive 32-bit MCU M4F 512K -40°C~125°C LQFP64	--	Test with appliance
MOSFET(No: Q14/Q15/Q18/Q19/Q21/ Q22/Q24/Q25/Q29/Q30/ Q32/Q33/Q34/Q35/Q36/ Q37/Q68/Q69)	China Resources Microelectronics Limited	CRST024N10N 4Z	100V 180A 2.1m Ω	--	Test with appliance
Current sensing resistor	EVER OHMS TECHNOLOGY Co.,Ltd.	MA251230FR0 03MZ	3m Ω 1% 3W	--	Test with appliance

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Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
Heater	Shenzhen Qianhai Zhanwang Amperex Technology Co., Ltd	JW- RGX23090801	14.4V 55W	--	Test with appliance
Rating Label	3M	7872			UL MH16411
Cells	Jiangsu Hige Energy Co., LTD	LFP48173150E- 100Ah	3.2V, 100Ah, 320Wh	IEC 62619	Tested with appliance
- Case	Suzhou Henglitong Energy Technology CO.,LTD	48173	Material: Al Thickness: 1.5mm(bottom), 0.8mm(side)	IEC 62619	Tested with appliance
- Cell Lid	Changshu Zhonghong New Energy Technology Co., Ltd	48173	Material: PP Thickness:1.2mm Temperature:160°C	IEC 62619	Tested with appliance
- Electrolyte	Jiujiang Tinci Materials Technology Co., Ltd	TC-E8087	Composition: EMC, EC, PC, LiPF6 Conductivity 9.0±1.0mS/cm	IEC 62619	Tested with appliance
- Separator	WUHAN ZHONGXING INNOVATIVE MATERIAL TECHNOLOGIES CO., LTD	16PP	Material: PP Dimension: L*W*T 11330*127*0.016 mm Temperature: 160°C	IEC 62619	Tested with appliance

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Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity¹⁾
- Anode	Inner Mongolia SiNuo New Material Technology Co., Ltd	SN-H04	L*W*T:10887*121*0. 125mm Material: graphite Substrate: copper foil	IEC 62619	Tested with appliance
- Cathode	Shenzhen Dynanonic Co., Ltd.	DY-9	L*W*T: 10516*116*0.167 mm Material: LiFePO4 Substrate: luminium foil	IEC 62619	Tested with appliance
- Vent or pressure release mechanism	Changshu Zhonghong New Energy Technology Co., Ltd	16x25	Pressure: 0.6±0.2MPa	IEC 62619	Tested with appliance

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05 Difference Declaration

Here by Manufacture: RENOGY New Energy Co., Ltd.
Product: Smart Lithium Iron Phosphate Battery
Type: RBT12200LFP-BT
Variant: RBT12100LFP-BT

We declare that our products with models are same in:

1. Circuitry design
2. PCB layout
3. Electronic components used
4. Internal wiring and functions

The only difference is in the name and battery capacity, because the sales areas are different and the packaging is also different.

Our company promises that the product has named and battery capacity differences and no other changes. Any losses caused by other changes will be borne by our company.

Signature of a responsible person: *Simon Liang*
Place: Taicang, China
Date: 04/12/2024