



ΚΥΠΡΙΑΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΥΠΟΥΡΓΕΙΟ ΜΕΤΑΦΟΡΩΝ,  
ΕΠΙΚΟΙΝΩΝΙΩΝ ΚΑΙ ΕΡΓΩΝ

ΤΜΗΜΑ ΟΔΙΚΩΝ ΜΕΤΑΦΟΡΩΝ  
ΛΕΥΚΩΣΙΑ 1425 - ΚΥΠΡΟΣ

COMMUNICATION








concerning: <sup>(1)</sup>

APPROVAL GRANTED  
APPROVAL EXTENDED  
APPROVAL REFUSED  
APPROVAL WITHDRAWN  
PRODUCTION DEFINITELY DISCONTINUED



OF A TYPE OF ELECTRICAL/ ~~ELECTRONIC~~ SUB-ASSEMBLY <sup>(1)</sup> WITH REGARD TO REGULATION NO. 10.

Approval No: **E49\*10R06/02\*1034\*00**

1. Make (trade name of manufacturer):     
2. Type and general commercial description(s): combination heater  
Variant 1: FJH-4/1C-E, Variant 2: FJH-5/2C
3. Means of identification of type, if marked on the ~~vehicle~~/component/ ~~separate technical unit~~: <sup>(1)</sup>  
Type designation
- 3.1. Location of that marking: Label pasted on the side of combination heater
4. Category of vehicle: Not applicable
5. Name and address of manufacturer:  
Hefei Cillight Mechanical and Electrical Equipment Co., Ltd.  
Room B-1A3-14, Area 6, Hefei South China City, Economic Development Zone, Feixi county, Hefei,  
Anhui, P.R.China
6. In the case of components and separate technical units, location and method of affixing of the approval mark: Label pasted on the side of combination heater
7. Address(es) of assembly plant(s):  
Hefei Cillight Mechanical and Electrical Equipment Co., Ltd.  
Room B-1A3-14, Area 6, Hefei South China City, Economic Development Zone, Feixi county, Hefei,  
Anhui, P.R.China



8. Additional information (where applicable): See Appendix below

9. Technical Service responsible for carrying out the tests:  
CETOC Technical Service s.r.l.  
Via della Bufalotta, 374, 00139 Roma

10. Date of test report: 05.04.2023

11. No. of test report: CN-50-17-286-COM23-06195-IR

12. Remarks (if any): See Appendix below

13. Place: Nicosia, Cyprus

14. Date: 05.04.2023

15. Signature:

Iosif Miltiadous  
(Road Transport Officer)



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

(1) Strike out what does not apply.



**APPENDIX**

to type-approval communication form No. **E49\*10R06/02\*1034\*00**

concerning the type-approval of an electrical/electronic sub-assembly under Regulation No. 10.06

1. Additional information:
  - 1.1. Electrical system rated voltage: see information document, ~~pos~~/neg ground <sup>(1)</sup>
  - 1.2. This ESA can be used on any vehicle type with the following restrictions: Not applicable
    - 1.2.1. Installation conditions, if any: Not applicable
  - 1.3. This ESA can be used only on the following vehicle types: Not applicable
    - 1.3.1. Installation conditions, if any: Not applicable
  - 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):  
Bulk current injection 20 to 400 MHz  
ISO 11452-4, 4th edition 2011  
Absorber chamber 400 to 2000 MHz  
ISO 11452-2, 2nd edition 2004
  - 1.5. Laboratory accredited to ISO 17025 and recognized by the Approval Authority responsible for carrying out the tests: Not applicable
2. Remarks: None

*(1) Strike out what does not apply.*





CETOC TS

CETOC Technical Service srl  
Via della Bufalotta, 374,  
00139 Roma

Inspection Report Nr.: CN-50-17-286-COM23-06195-IR  
Manufacturer: Hefei Cillight Mechanical and Electrical  
Equipment Co., Ltd.  
Type: combination heater

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ISP N° 0184 E

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EA, IAF e ILAC

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### APPENDIX 1 - TEST REPORT HISTORY

List this report and previous reports, with extension details.

Inspection Report Number	Reason for Extension	Date of Issue
CN-50-17-286-COM23-06195-IR	N/A	05.04.2023

### APPENDIX 2 – GENERAL SPECIFICATION

1. **Worst Case Rationale** : The two variants are same, and the only difference among them is the model name. FJH-4/1C-E is selected for the tests.  
The product is a combination heater of diesel fuel heater and electric heater, and can run in three modes: diesel mode, electric mode and hybrid mode.  
All tests are performed under hybrid mode at maximum output.

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

#### 3. Summary of test results

3.1. Applicability :

	PASS	FAIL	N/A
Radiated Emissions:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radiated Immunity:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BCI Immunity:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Free Field Immunity:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
150 mm Stripline Immunity:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
800 mm Stripline Immunity:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Transient Testing:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### 4. Component Specification

Component Part Number:	FJH-4/1C-E
------------------------	------------

#### 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



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Equipment	Serial / Certificate No.	Calibration due*
ALSE ROOM	CN 2GB22052344006-0006	26/05/2025
EMI receiver	CN J202206020680A-0007	06/07/2023
L.I.S.N.	CN J202206020680A-0015	06/07/2023
L.I.S.N.	CN J202206020680A-0016	06/07/2023
Biconical antenna	CN J202206020680-02-0005	31/07/2023
Log-periodic antenna	CN J202206020680-04-0001	28/08/2023
Supply Voltage Change Simulator	CN J202206020680A-0001	06/07/2023
Load dump wave simulator	CN J202206020680A-0002	06/07/2023
Transient pulse disturbance simulator	CN J202206020680A-0003	06/07/2023
Current Injection Clamp	CN J202206020680A-0012	06/07/2023
Digital phosphor oscilloscope	CN 1GA22042037623-0002	21/04/2023

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



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**APPENDIX 3 – INSPECTION RESULTS**

		PASS	FAIL	N/A
<b>Radiated Emissions</b>				
CISPR25, 4.5.	Measuring equipment complies with CISPR 16-1-4 (2010).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Test Location</b>				
Ann 7, 3.1. Ann 7, 3.3.	Test performed in: - A.L.S.E (Absorber-lined Shielded Enclosure)* <del>- O.A.T.S (Open Area Test Site)*</del> <i>*Strikethrough, as appropriate.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Ann 7, 3.3.	Measuring equipment is outside 15 m minimum radius circle.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Ann 7, 3.4.	Ambient noise is at least 6 dB below reference limits, in either case.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Test Arrangements</b>				
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CISPR25, 6.1.1.	Ground plane is 900 ± 50 mm high and made from 0.5 mm thick copper, brass or galvanised steel.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CISPR25, 6.1.1.	Ground plane is at least 2,000 mm length x 1,000 mm width.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CISPR25, 6.4.2.3.	ESA and harness are supported at 50 ± 5 mm above the ground plane on low relative permittivity material.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CISPR25, 6.4.2.3.	Face of the ESA is within 200 mm ± 10 mm from the edge of the ground plane.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CISPR25, 6.1.2.	Power supply is Artificial Network (AN) rated at 5 Ω/50 μH.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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* <del>- Locally grounded (vehicle power return line 200 mm or shorter): one artificial network is required for the positive supply*</del> <i>*Strikethrough, as appropriate.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CISPR25, 6.1.2.	Case of the ESA is: <del>- Grounded, simulating actual vehicle configuration*</del> - Not grounded, simulating actual vehicle configuration* <i>*Strikethrough, as appropriate.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CISPR25, 6.1.2.	AN is electrically bonded to the ground plane.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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**Antenna**

<i>CISPR25, 6.4.2.6.</i>	Height of the phase centre is 100 ± 10 mm above the ground plane.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>CISPR25, 6.4.2.6.</i>	No part of any antenna radiating element is closer than 250 mm to the floor.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>CISPR25, 6.4.2.6.</i>	Phase centre (for biconical) or tip (for log-periodic) is 1,000 ± 50 mm from the harness.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>CISPR25, 6.4.2.6.</i>	Antenna calibrated for this distance to correct measuring point (phase centre or tip).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ann 7, Ann 8, 4.3.</i>	Pre-test sweep supplied to show compliance throughout frequency range 30 to 1,000 MHz.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ann 7, Ann 8, 4.3.</i>	Test frequencies chosen from pre-test data.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Narrowband Test Results**

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

**Broadband Test Results**

<i>Ann 7, 2.</i>	Operational mode of ESA: Normal operation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ann 7, 4.2.</i>	Detector used and bandwidth: Quasi peak, 120kHz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>6.5.2.</i>	ESA meets broadband emissions limits, with both vertical and horizontal polarisations.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Radiated Immunity**

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

<i>ISO11452-4</i>	BCI frequency range between 20 and 400 MHz:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>ISO11452-2</i>	Free field frequency range between 400 and 2,000 MHz:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>ISO11452-3</i>	TEM cell frequency range between 20 and 200 MHz:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<i>ISO11452-5</i>	150 mm stripline frequency range between 20 and 400 MHz:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<i>ISO11452-5</i>	800 mm stripline frequency range between 20 and 2,000 MHz:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>





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

### BCI Immunity

ISO11452-4, 5.	Shielded area used: Yes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-4, 8.3.2.1.	Forward power used to achieve specified current.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### Installation of ESA under Test

Ann 9, 4.3.2.	Current probe located $150 \pm 10$ mm from ESA connectors.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ann 9, 4.3.2.	ESA installed: <del>In a vehicle, as per ISO 11451-4*</del> - On a ground plane, as per ISO 11452-4* <i>*Strikethrough, as appropriate.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-4, 7.1.	Ground plane is made from at least 0.5 mm thick copper, brass or galvanised steel.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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ISO11452-4, 7.1.	Height of the ground plane is 900 ± 100 mm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-4, 7.1.	Ground plane is bonded to the shielded enclosure, with the straps at a distance no greater than 300 mm apart.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-4, 7.2.	<ul style="list-style-type: none"> <li>- 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)*</li> <li>- <del>ESA locally grounded (vehicle power return line 200 mm or shorter): one artificial network is required, for the positive supply*</del></li> </ul> <p><i>*Strikethrough, as appropriate.</i></p>			
ISO11452-4, 7.2.	Power supply is Artificial Network (AN) rated at 50 Ω/5 μH.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-4, 7.3.	ESA and harness supported 50 ± 5 mm above ground plane, on low relative permittivity material.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-4, 7.3.	Face of the ESA within 100 mm from the edge of the ground plane.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-4, 7.4.	Length of test harness is 1,700 + 300 mm, unless specified.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**BCI Test Results**

6.8.2.1.	No malfunction at 60 mA.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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**Free Field Immunity**

ISO11452-2, 8.3.1.	<p>Test field defined by:</p> <ul style="list-style-type: none"> <li>- Forward power*</li> <li>- <del>Another parameter, directly related*</del></li> </ul> <p><i>*Strikethrough, as appropriate.</i></p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-2, 8.3.2.	Antenna is at a distance of 1,000 ± 10 mm from the reference point.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-2, 8.3.2.	Reference point is 150 ± 10 mm above the ground plane.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-2, 8.3.2.	Reference point is 100 ± 10mm from the edge of the ground plane.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-2, 8.3.2.	For frequencies from 80 - 1,000 MHz, the reference point is in the centre of the harness.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-2, 8.3.2.	For frequencies from 1,000 - 2,000 MHz, the reference point is in line with the ESA.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Test Arrangements**

ISO11452-2, 7.1.	Ground plane is made from at least 0.5 mm thick copper, brass or galvanised steel.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-2, 7.1.	Minimum width of the ground plane is 1,000 mm and the minimum length is 2,000 mm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-2, 7.1.	Height of the ground plane is 900 ± 100 mm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# CETOC TS

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ISO11452-2, 7.1.	Bonding straps are at a distance no greater than 300 mm apart.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-2, 7.2.	Power supply is Artificial Network (AN) rated at 50 Ω/5 μH.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-2, 7.2.	- 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)* - <del>ESA locally grounded (vehicle power return line 200 mm or shorter): one artificial network is required, for the positive supply.*</del> *Strikethrough, as appropriate.			
ISO11452-2, 7.3.	AN mounted directly on the ground plane and cases bonded to the ground plane.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-2, 7.3.	ESA and harness supported 50 ± 5 mm above table, on low relative permittivity material.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-2, 7.3.	Face of the ESA located 200 ± 10 mm from the edge of the ground plane.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-2, 7.4.	Test harness parallel to the front edge of the ground plane.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-2, 7.4.	Total length of harness does not exceed 2,000 mm.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-2, 7.4.	Actual wiring harness length: <input type="text" value="N/A"/> m or Length is 1,500 ± 75 mm between ECU and AN.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ISO11452-2, 7.4.	Harness is at a distance of 100 ± 10 mm from the edge of the ground plane.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-2, Fig 1	Front face of ESA is at least 1.0 m from all other conductive structures.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-2, Fig 1	ESA harness is at least 2.0 m forward from the chamber wall.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### Antenna Type(s) and Frequency Range(s)

Ann 9, 4.1.2.	Antenna is vertically polarised.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-2, 7.6.	Antenna is in the same position as the calibration.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ISO11452-2, 7.6.	Phase centre is 100 ± 10 mm above the ground plane.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### Free Field Immunity Test Results

6.8.2.	No malfunction at 30 V/m.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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### 150 mm Stripline Immunity

ISO11452-5, 5.3.1.	Stripline housed in a shielded room.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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**CETOC TS**

CETOC Technical Service srl  
Via della Bufalotta, 374,  
00139 Roma

Inspection Report Nr.: CN-50-17-286-COM23-06195-IR  
Manufacturer: Hefei Cillight Mechanical and Electrical  
Equipment Co., Ltd.  
Type: combination heater

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ISO11452-5, 6.2.2.	Test field defined by:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	- Forward power*			
	- Another parameter, directly related*			
	*Strikethrough, as appropriate.			
ISO11452-5, 6.2.3.	Field probe in the centre of stripline.			
<b>Installation of ESA under Test</b>				
ISO11452-5, 5.3.1.	ESA is 200 + 20 - 0 mm from the edge of the active conductor.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ISO11452-5, 5.3.1.	Peripherals are a minimum of 200 mm from the edge of the active conductor.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ISO11452-5, 5.3.1.	Harness supported 50 mm above the ground plane and is placed in the centre of the stripline.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ISO11452-5, 5.3.1.	Actual wiring harness length: <span style="border: 1px solid black; padding: 2px;">N/A</span> m	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	or			
	Minimum length under stripline is 1,000 mm.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ISO11452-5, 5.3.1.	All wires in the harness are terminated or open, according to the vehicle application.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ISO11452-5, 5.3.1.	Device and peripherals connected to the ground plane, as specified by the vehicle installation.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ISO11452-5, 5.3.1.	Power supply is Artificial Network (AN) rated at 50 Ω/5 μH.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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)*			
	<del>- ESA locally grounded (vehicle power return line 200 mm or shorter): one artificial network is required, for the positive supply*</del>			
	*Strikethrough, as appropriate.			
<b>150 mm Stripline Test Results</b>				
6.8.2.	No malfunction at 50 V/m.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>800 mm Stripline Immunity</b>				
Ann 9, 4.5.2.1.	Stripline housed in a screened room.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Ann 9, 4.5.2.1.	Stripline positioned a minimum of 2,000 mm from the walls or metallic enclosure.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Ann 9, 4.5.2.1.	Stripline placed on non-conducting supports at least 400 mm above the floor.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Ann 9, 4.5.2.2.	Test field defined by:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	- Forward power*			
	- Another parameter, directly related*			
	*Strikethrough, as appropriate.			



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Equipment Co., Ltd.  
Type: combination heater

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**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)	
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A

- 6.8.2. No malfunction at 12.5 V/m.

**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).
- Ann 10, 2. Supply lines and other lines, which may be connected to supply lines, are tested.
- 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	D	5000 pulses
2a	III	B	D	5000 pulses
2b	III	C	D	10 pulses
3a	III	A	D	1 hour
3b	III	A	D	1 hour
4	III	B (for ESA, which must be operational during engine start, or C, for other ESA)	D	1 pulse

- ESA operational after the tests, according to the above classification.



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**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 systems
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.



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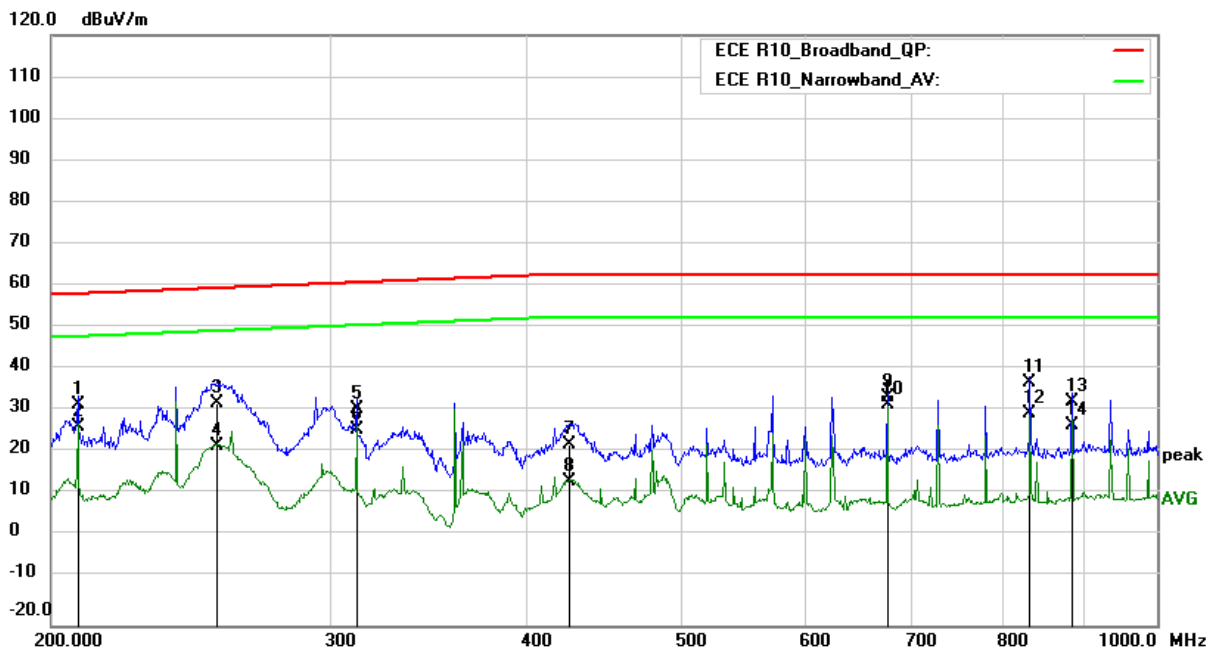
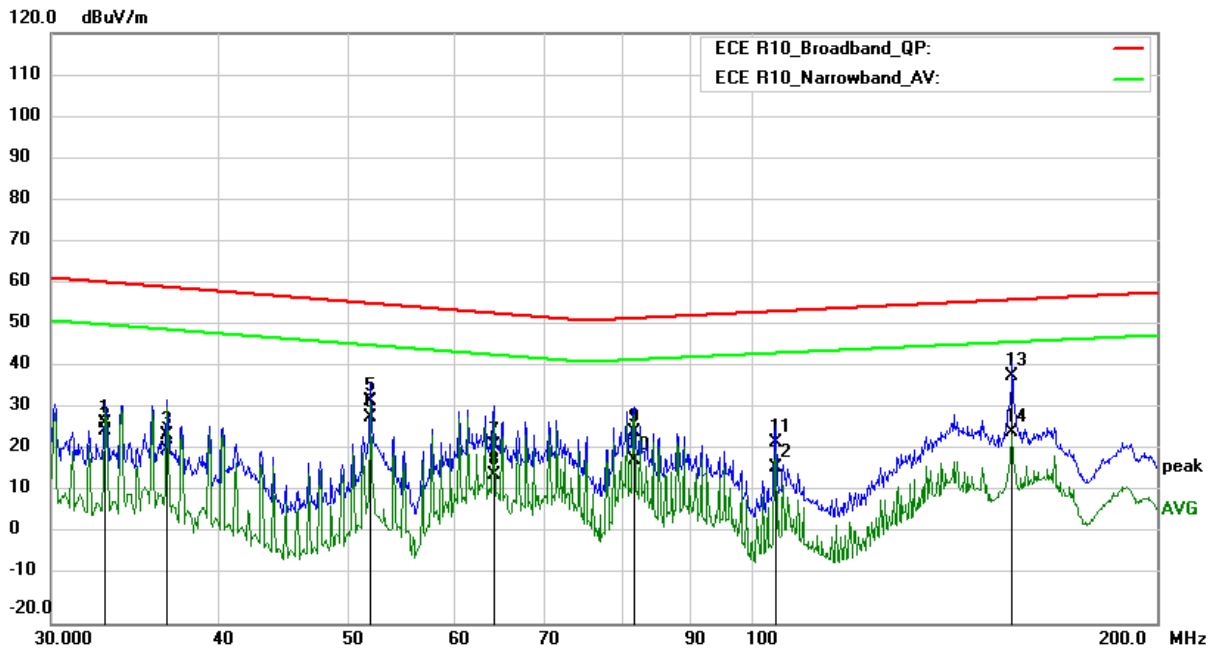
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### APPENDIX 4 – TEST RESULTS

#### APPENDIX 4.1 Radiated Emissions

Vehicles with 12V systems

Horizontal Polarisation  
30MHz to 1GHz





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Type: combination heater



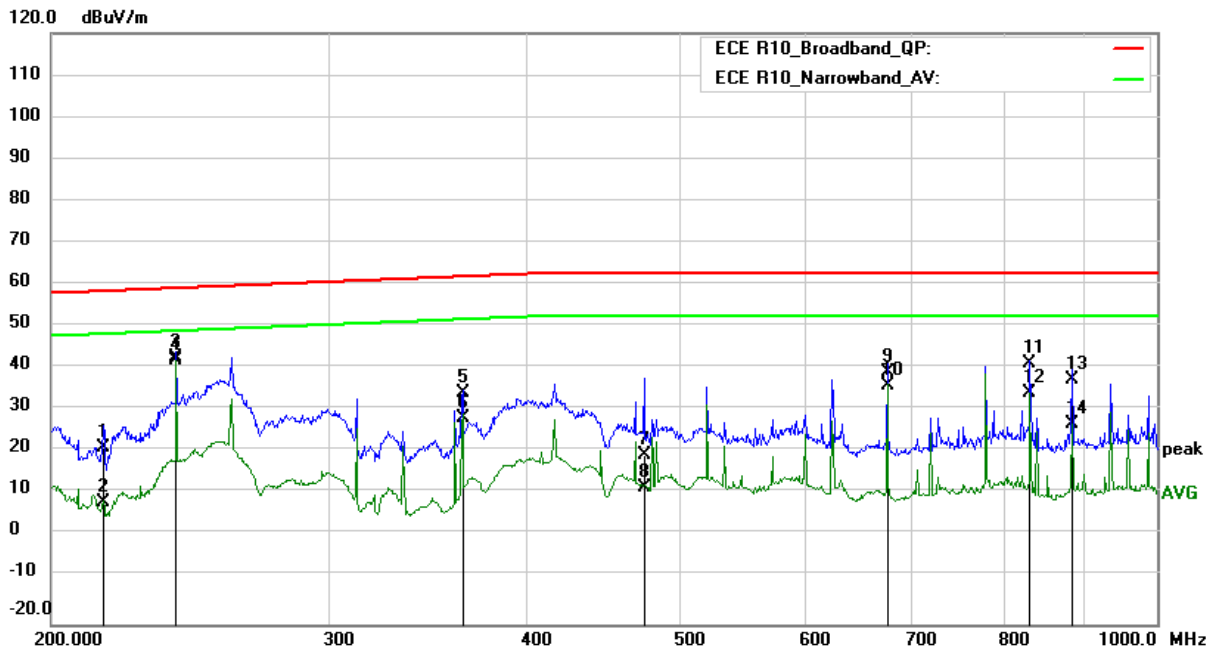
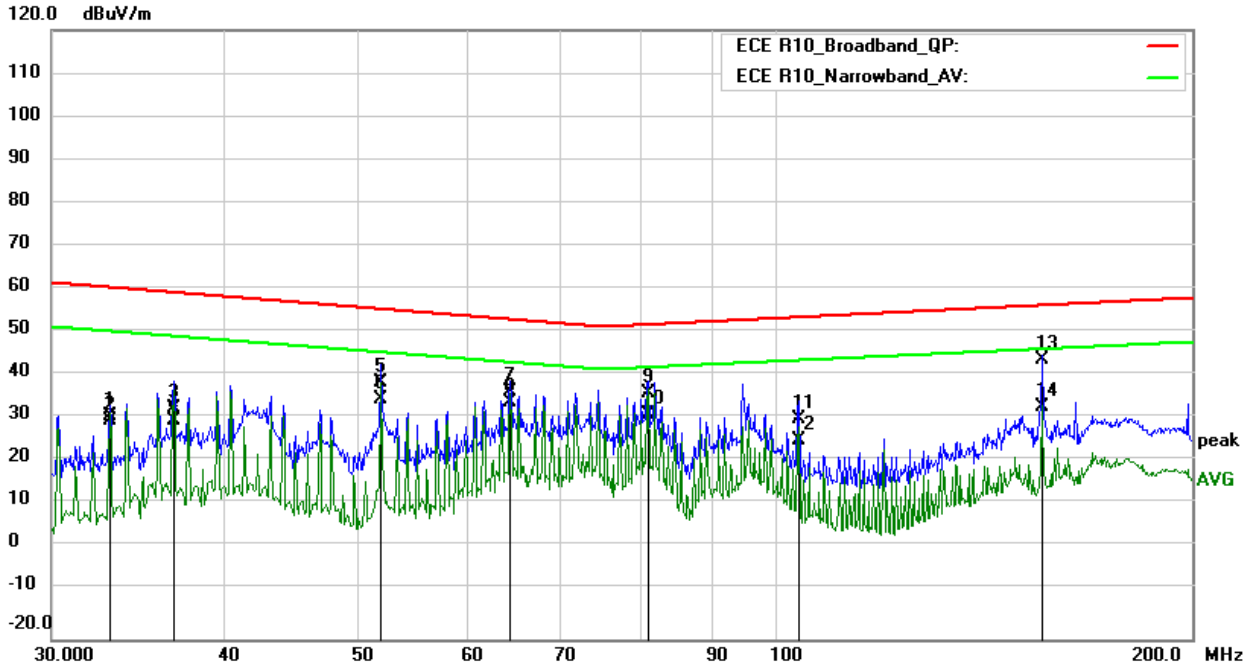
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Vertical Polarisation  
30MHz to 1GHz







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#### APPENDIX 4.2 Radiated Immunity

Frequency (MHz)	Level (V/m)	Modulation	Polarity	Accept Status	Test Result	
					Vehicles with 12V systems	<del>Vehicles with 24V systems</del>
400-800	30	AM (1kHz,80%)	V	I	A	NA
800-1000	30	PM	V	I	A	NA
1000-2000	30	PM	V	I	A	NA

#### APPENDIX 4.3 BCI Immunity

Frequency (MHz)	Level (mA)	Modulation	Injection place	Test Result	
				Vehicles with 12V systems	<del>Vehicles with 24V systems</del>
20-400	60	AM (1kHz,80%)	150mm	A	NA

#### APPENDIX 4.4 Transient Immunity

Test Pulse	Immunity Test Level	Functional Status for Systems		Test results	
		Related to Immunity-related Functions	<del>Not Related to Immunity-related Functions</del>	Vehicles with 12V systems	<del>Vehicles with 24V systems</del>
1	III	C	<del>D</del>	C	NA
2a	III	B	<del>D</del>	A	NA
2b	III	C	<del>D</del>	C	NA
3a	III	A	<del>D</del>	A	NA
3b	III	A	<del>D</del>	A	NA
4	III	C	<del>D</del>	C	NA



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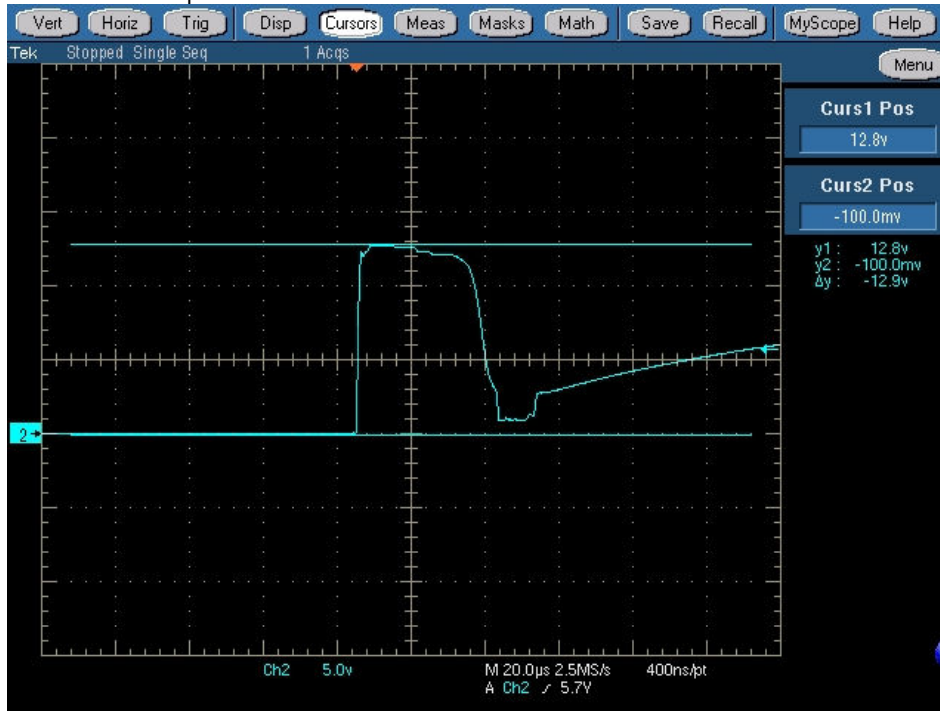
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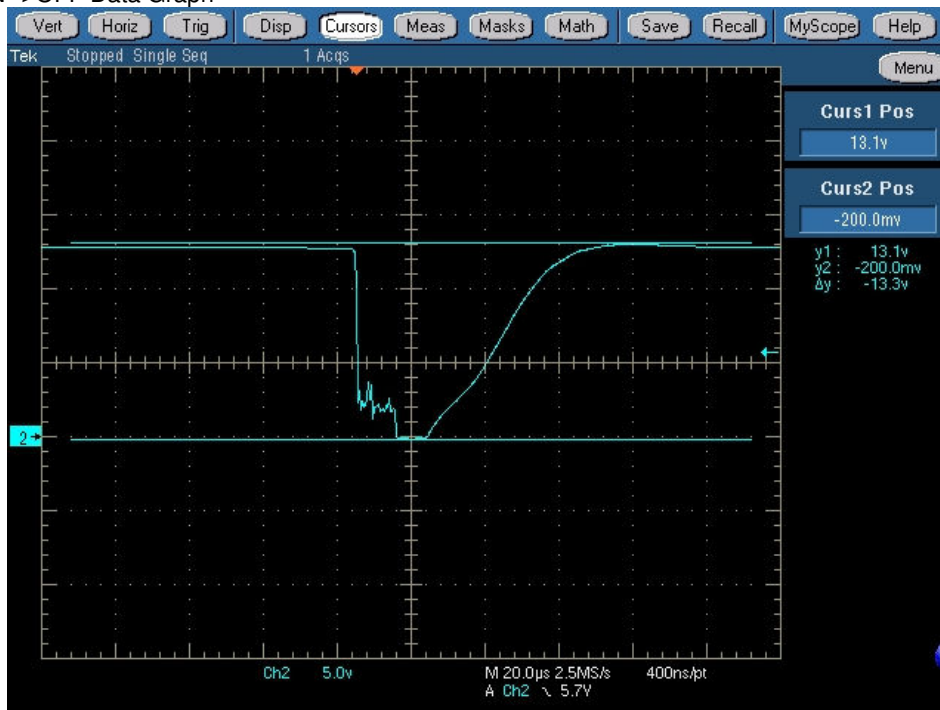
#### APPENDIX 4.5 Emission of Conducted Disturbances

Vehicles with 12 V systems

Slow Pulse: OFF-->ON Data Graph



Slow Pulse: ON-->OFF Data Graph





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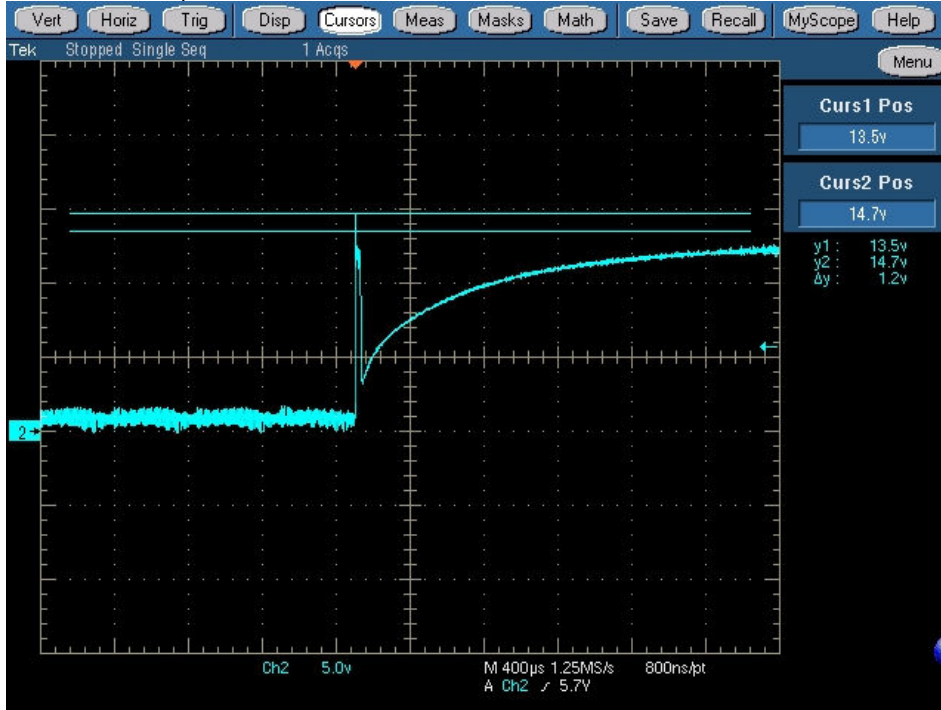


ISP N° 0184 E

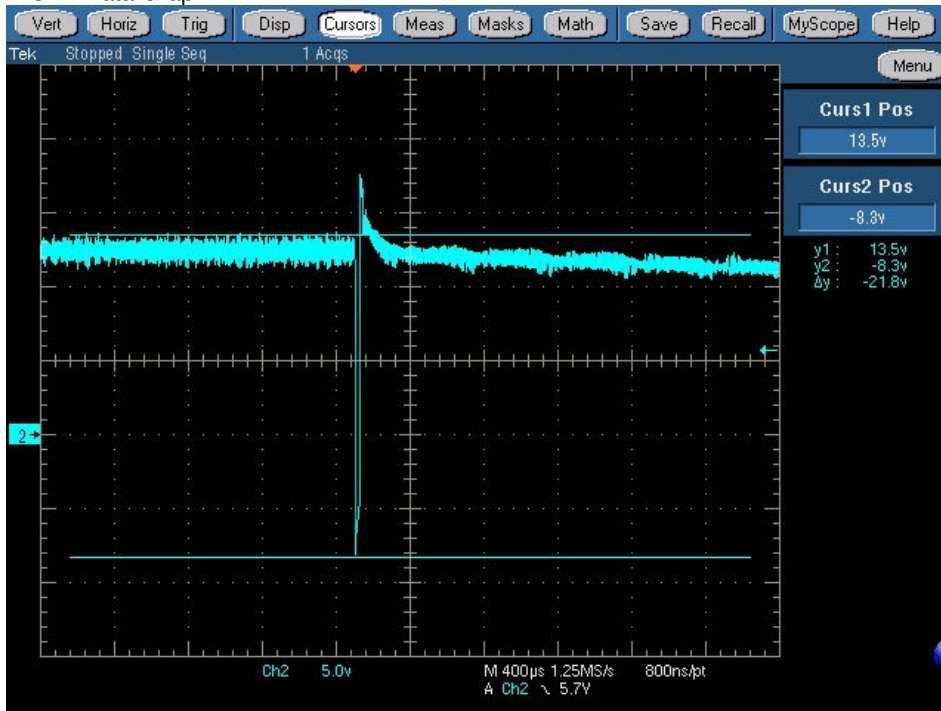
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Fast Pulse: OFF-->ON Data Graph



Fast Pulse: ON-->OFF Data Graph



**Information document no. combination heater-R10-00 relating to type-approval  
of an electronic subassembly with respect to electromagnetic compatibility  
(ECE Regulation 10.06 to Supplement 2)**

Type: combination heater

Total number of pages: 8

Date: 03/03/2023

Information document no : combination heater-R10-00  
Manufacturer : Hefei Cillight Mechanical and Electrical Equipment Co., Ltd.  
Regulation : R10.06 to Supplement 2

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## INDEX

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Location of the ECE approval mark	6
Electronic block diagram	7
List of components constituting the ESA	8

## GENERAL

1. Make (trade name of manufacturer):



2. Type: **combination heater**  
Variants: **FJH-4/1C-E; FJH-5/2C**  
**The above variants are same, and the only difference among them is the model name.**

General commercial description(s):

**Combination heater is used on vehicle to fulfill weather control function, including heating air and water.**

3. Means of identification of type, if marked on the component/separate technical unit <sup>(a)</sup>: **Type designation**

- 3.1 Location of that marking: **Label pasted on the side of combination heater**

4. Name and address of manufacturer:

**Hefei Cillight Mechanical and Electrical Equipment Co., Ltd.  
Room B-1A3-14, Area 6, Hefei South China City, Economic Development Zone, Feixi county, Hefei, Anhui, P.R.China**

Name and address of authorised representative, if any:

**VIAJA EN FURGO  
Calle Pracesa 6, Bajo, Lugo de Ilanera Asturias, Spain**

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

**Label pasted on the side of combination heater**

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

**Hefei Cillight Mechanical and Electrical Equipment Co., Ltd.  
Room B-1A3-14, Area 6, Hefei South China City, Economic Development Zone, Feixi county, Hefei, Anhui, P.R.China**

7. This ESA shall be approved as a component/STU<sup>2</sup>.

8. Any restrictions of use and conditions for fitting: **N/A**

Information document no : combination heater-R10-00  
Manufacturer : Hefei Cillight Mechanical and Electrical Equipment Co., Ltd.  
Regulation : R10.06 to Supplement 2

---

9. Electrical system rated voltage:

<b>Operating Voltage Range</b>	<b>DC10.5V~16V</b>
<b>Rated Electric Supply Voltage</b>	<b>~220V/110V</b>

**positive/negative<sup>2</sup> ground.**

Only applicable for charging systems: **N/A**

10. Charger: **N/A**

11. Charging current: **N/A**

12. Maximal nominal current (in each mode if necessary) : **N/A**

13. Nominal charging voltage: **N/A**

14. Basic ESA interface functions: **N/A**

15. Minimum  $R_{sce}$  value (see paragraph 7.11. of this Regulation): **N/A**

1. If the means of identification of type contains characters not relevant to describe the component or separate technical unit types covered by this information document, such characters shall be represented in the documentation by the symbol "?" (e.g. ABC??123??).

2. Delete where not applicable.

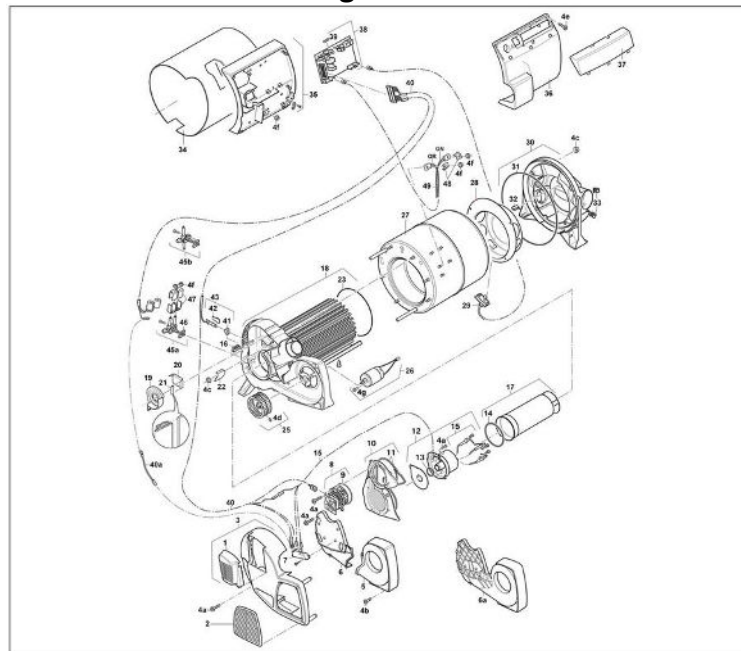
Information document no : combination heater-R10-00

Manufacturer : Hefei Cillight Mechanical and Electrical Equipment Co., Ltd.

Regulation : R10.06 to Supplement 2

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### Drawings of the ESA





Information document no : combination heater-R10-00  
 Manufacturer : Hefei Cillight Mechanical and Electrical Equipment Co., Ltd.  
 Regulation : R10.06 to Supplement 2

### Location of the ECE approval mark

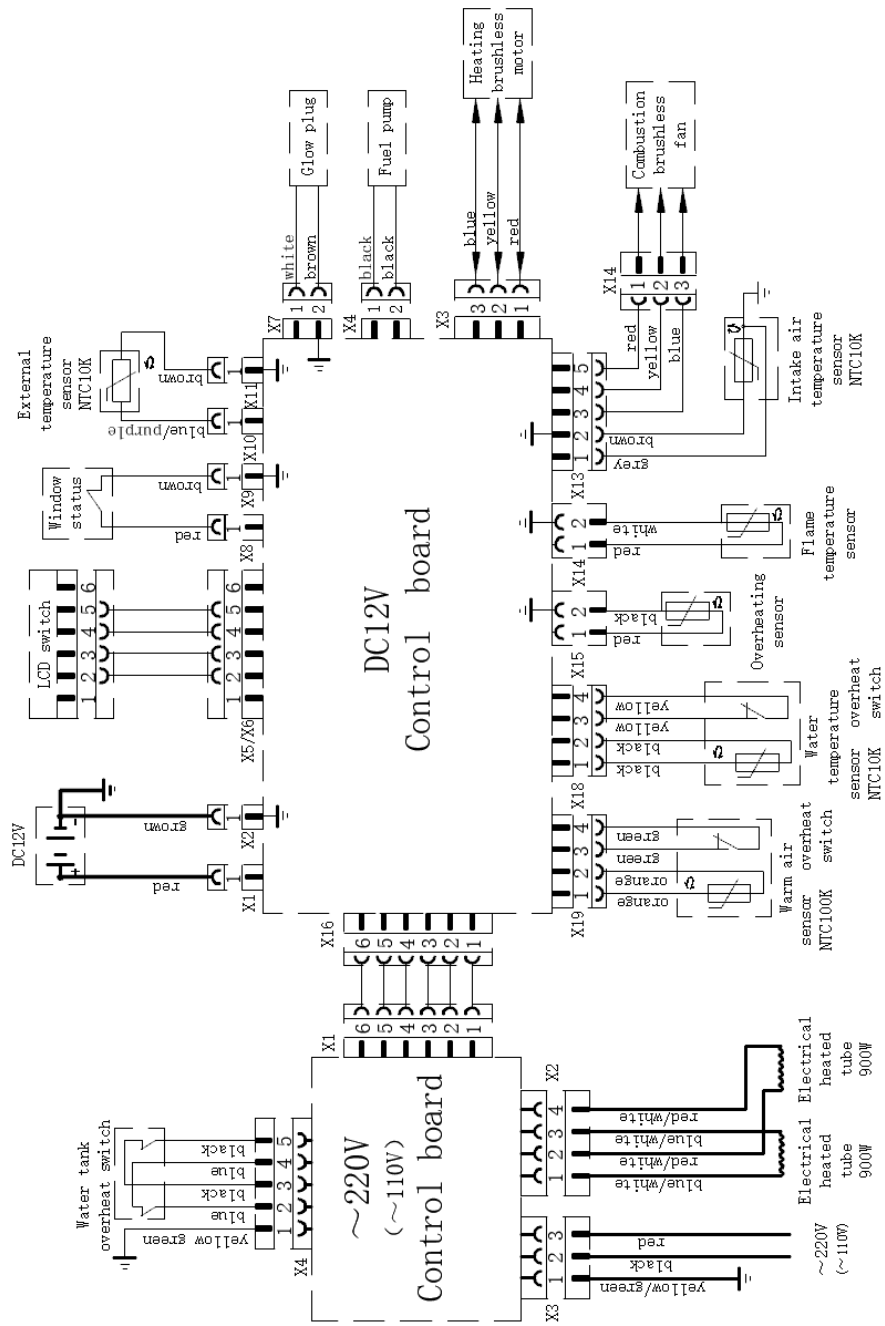


**Plateau** E 49 10R-06XXXX E 49 122R-00XXXX

<b>Name</b>	<b>Parking Heater</b>
<b>Model</b>	<b>FJH-4/1C-E</b>
<b>Gross Weight</b>	<b>21. 0Kg</b>
<b>Net Weight</b>	<b>16. 8Kg</b>
<b>Dimension</b>	<b>600×485×400</b>

  
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## Electronic Circuit Diagram



Information document no : combination heater-R10-00

Manufacturer : Hefei Cillight Mechanical and Electrical Equipment Co., Ltd.

Regulation : R10.06 to Supplement 2

### List of components constituting the ESA

Packing List				
No.	Name	Specification	Quantit	Order Code
1	Instruction book	YFY30-6E/1	1	22020202400
2	Heater	E-Gas Hot Water/Warm Air Integrated Heater	1	22020202700
3	Cross head self-tapping screw	ST5*25	5	12050016100
4	12V Power cord	4m	1	12031101600
5	External temperature sensor	NTC10K	1	31011102100
6	LCD control switch	MNB-V-FY	1	31011104400
7	LCD control switch lead wire	6m	1	12031101500
8	Controller cover	260x75x22	1	12021100900
9	Precision tube (black coating on the outside)	8.00x1.00x2500	1	13012200100
10	Ferrule	φ8 Pipe transition piece	1	12050301300
11	Fitting nut M14*1.5	φ8 Pipe transition piece	1	12050301200
12	Rubber strip clamp	φ8	8	12050200800
13	Cross pan head self-tapping screws	ST5x16	12	12050007300
14	φ8 Straight transition fitting	1C-14RN	1	12011103100
15	φ8 Elbow transition fitting	1C9-14RN	1	12011103200
16	φ10 Hose transition fitting	φ10	1	12011103000
17	Hose(water) transition fitting	20411-16-06T	2	12011103300
18	φ10 Steel (water) pipe elbow transition fitting	1C9-16RN	2	12011103400
19	Nylon cable tie	4x200	10	21990000000
20	Intake and exhaust combine cowl	φ110x108	1	12011101900
21	Intake and exhaust combine cover	φ110x34	1	12021102000
22	Sealing rubber spacer	φ104.5xφ73x2.4	1	12041101800
23	(Exhaust pipe) clamp	φ55	2	31011102700
24	German type clamp	70-90	2	12050200700
25	Intake pipe mounting clamp	φ80	1	12021102700
26	Cross pan head tapping screw	ST3.5x25	9	12050015600
27	Exhaust pipe	φ55/φ50x950	1	12060007700
28	Air intake pipe	φ80/φ76x1000	1	12060007800
29	Air Outlet	CFK-φ60-III Elastic adjustable	5	31011104700
30	T-fitting	ST-φ60-II with screw	1	12021102500
31	connecting pipe	φ60 ZT-φ60-I	1	12020002900
32	Elbow fitting	φ60 WT-φ60-I	1	12020003100
33	German type clamp	φ50-φ70	4	12010005100
34	Bellows buckle	φ60	4	12021102600