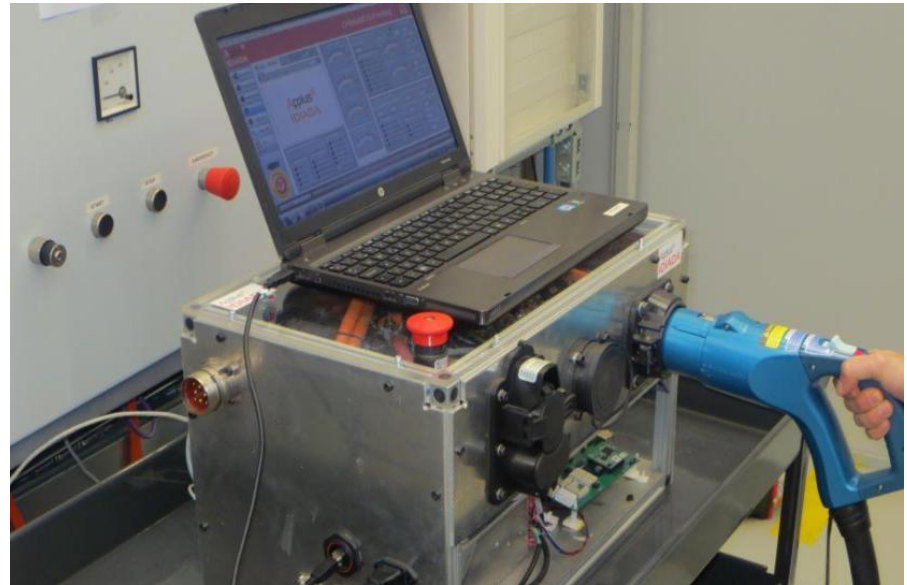


**Applus<sup>+</sup>**  
**IDIADA**

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## Third-party CHAdeMO certification updates

Klaus Kersting, Product Manager EV/HEV

23.10.2014

01\_ IDIADA short introduction

02\_ EV Charging simulator

03\_ Charger test concepts

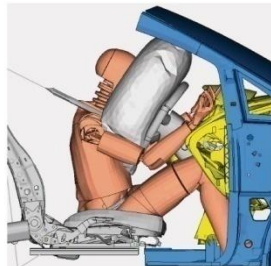
04\_ CHAdeMO certification

Total: 1.733 people

## Main Centers for Engineering, Testing and Homologation

<b>Brazil</b> 148 <ul style="list-style-type: none"><li>• São Paulo</li><li>• Curitiba</li><li>• Sete Lagoas</li><li>• Tatuí</li></ul>	<b>China</b> 197 <ul style="list-style-type: none"><li>• Shanghai</li><li>• Beijing</li><li>• Chongqing</li><li>• Changchun</li><li>• Guangzhou</li><li>• Liuzhou</li><li>• Shenzhen</li></ul>	<b>Czech Republic</b> 153 <ul style="list-style-type: none"><li>• Hradec Králové</li><li>• Liberec</li><li>• Mlada Boleslav</li></ul>	<b>Germany</b> 80 <ul style="list-style-type: none"><li>• Ingolstadt</li><li>• Munich</li><li>• Wolfsburg</li></ul>	<b>India</b> 119 <ul style="list-style-type: none"><li>• Pune</li><li>• New Delhi</li><li>• Chennai</li><li>• Bangalore</li></ul>	<b>Spain</b> 938 <ul style="list-style-type: none"><li>• <b>Barcelona</b> - Headquarters &amp; Main Technical Centre</li><li>• Madrid</li><li>• Granada</li><li>• Mojácar</li><li>• Vigo</li></ul>
<b>Other offices</b> 98 <ul style="list-style-type: none"><li>• Bangkok</li><li>• Brussels</li><li>• Detroit</li></ul>	<ul style="list-style-type: none"><li>• Hinckley</li><li>• Istanbul</li><li>• Jakarta</li></ul>	<ul style="list-style-type: none"><li>• Kuala Lumpur</li><li>• Lu Kang</li><li>• Nizhny Novgorod</li></ul>	<ul style="list-style-type: none"><li>• Paris</li><li>• Poznan</li><li>• Pretoria</li></ul>	<ul style="list-style-type: none"><li>• Puebla</li><li>• Riyadh</li><li>• Seoul</li></ul>	<ul style="list-style-type: none"><li>• Togliatti</li><li>• Tokyo</li><li>• Turin</li></ul>

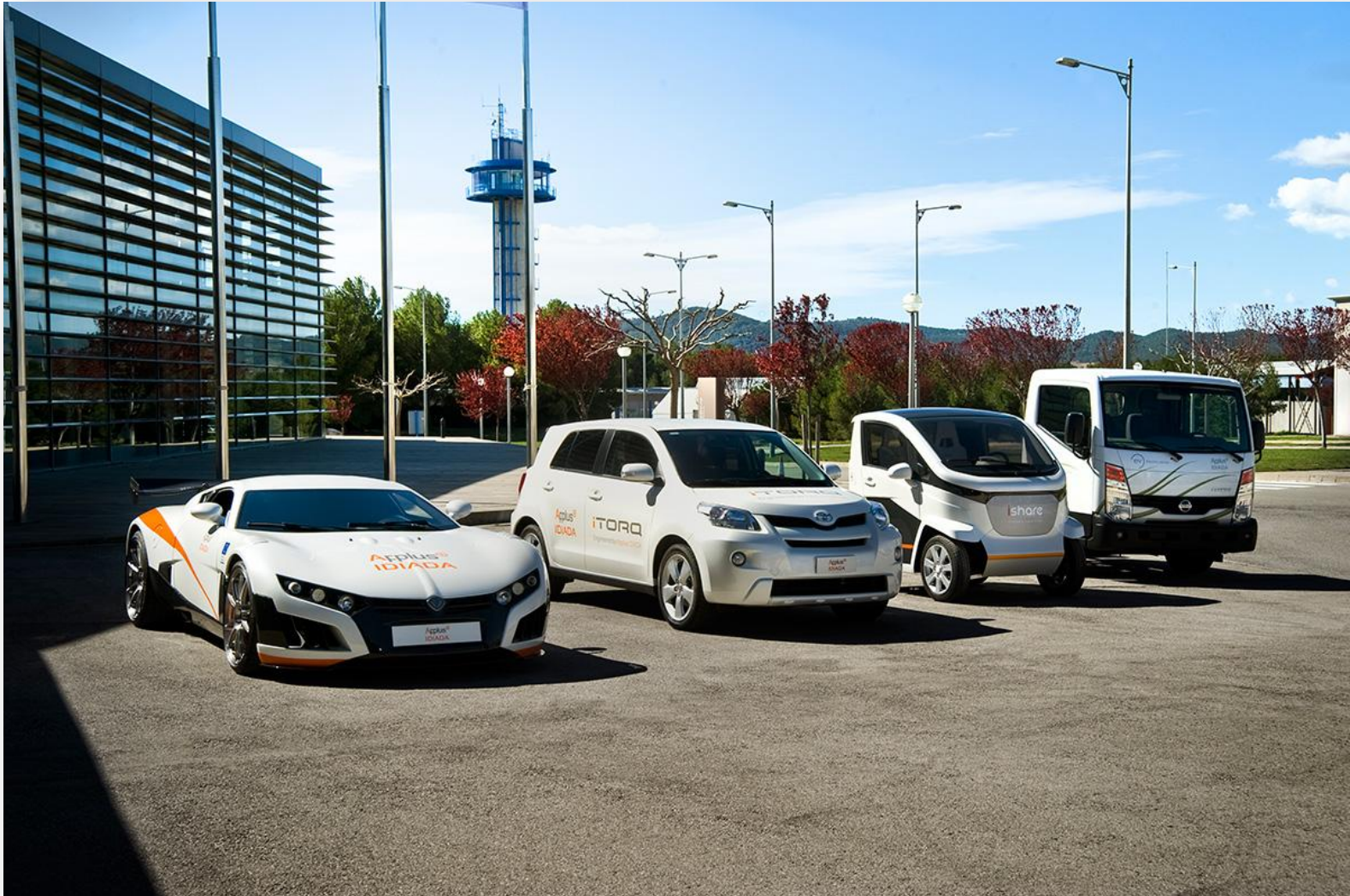
- ⊕ Engineering
- ⊕ Homologation
- ⊕ Proving ground and laboratory testing
- ⊕ Testing facility design



The most comprehensive independent proving ground



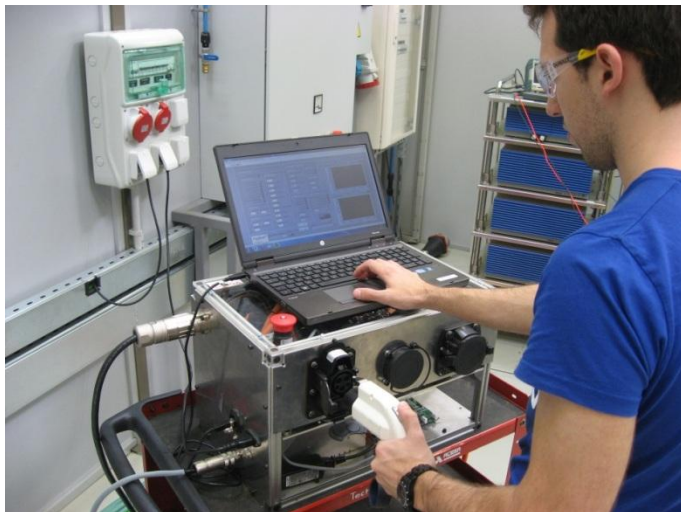
IDIADA has developed EV prototype vehicle demonstrators



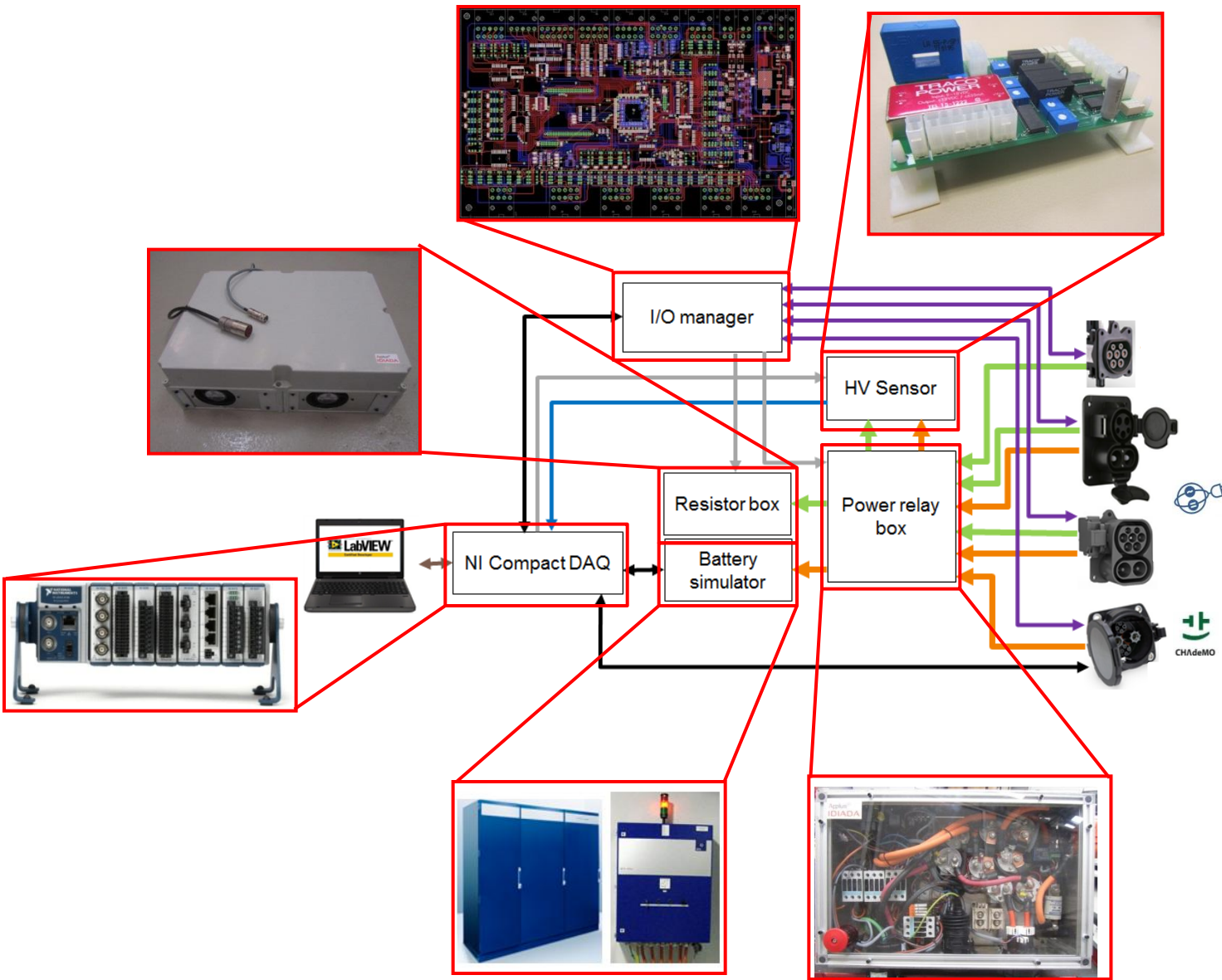


Specialized charger test workshop

160kW battery simulator



- EV Charging Simulator for
- CHAdeMO certification
  - CCS validation
  - Mode 3 validation



CAN buses
DC power
AC power
Analog & PLC communication
Analog signals
Digital signals
USB

- Prepared for:
- AC mode 3
  - CHAdeMO
  - CCS

Certified by  
CHAdeMO!!!



## AC Charging

## DC Charging

Vehicle



### Interoperability / compatibility tests:

IDIADA performs charger test on a regular basis for different vehicle manufacturers in order to assure safety and compatibility. More than 120 AC and DC charger tests have been performed so far.

*Activity usually requested by vehicle OEM*

EV Simulator

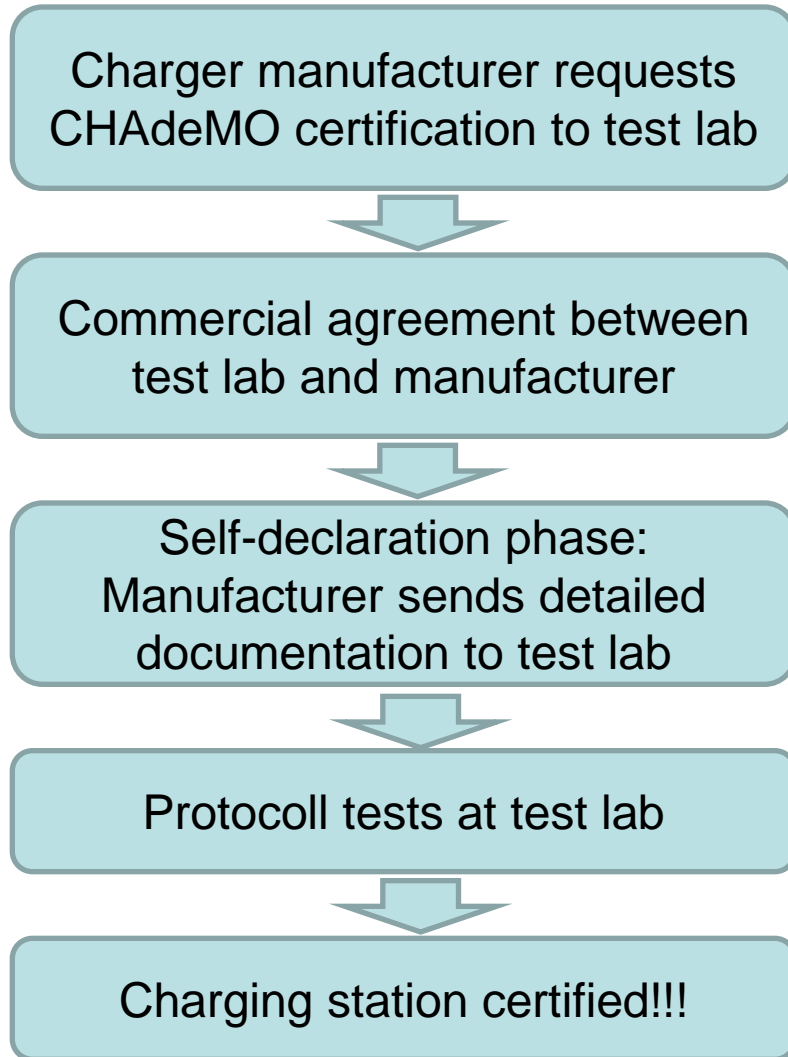


### Certification / validation tests:

IDIADA was accredited by the CHAdeMO association to perform certification tests. Following IEC and DIN standards IDIADA also performs validation tests for CCS and mode 3 charging stations.

*Activity requested by charger manufacturer*

Worldwide 5 test laboratories can perform CHAdeMO charger certifications:  
3 in Japan, 1 in Taiwan, 1 in Europe (IDIADA)



# Workflow: test requirements to test results

DIN SPEC 7172:2012-08

[D05-DC-443] After receiving a ServiceParameterDataResponse message, the SECC shall process the received information.

[D05-DC-444] The SECC shall respond with a ServiceParameterDataResponse message with ResponseCode equal to "OK" when V2G\_SECC\_Mtg\_Performance\_Time according to Table 97 if the processing of the information is successfully passed. The allowed test message shall be ContractAuthenticationReq and the V2G\_SECC\_Sequences\_Timed shall be set according to Table 97.

[D05-DC-447] The SECC shall respond with a ServiceParameterDataResponse message with ResponseCode equal to "FAILED" when V2G\_SECC\_Mtg\_Performance\_Time according to Table 97 if the processing of the information is not successful.

[D05-DC-448] After receiving a ContractAuthenticationReq message, the SECC shall process the received information.

[D05-DC-449] The SECC shall respond with a ContractAuthenticationReq message with ResponseCode equal to "OK" and EVSEPerformance equal to "Present" when V2G\_SECC\_Mtg\_Performance\_Time according to Table 97 if the processing of the information is successfully passed and the contract authentication has been set on EVSE side. The allowed test request message shall be ChargeParameterDiscoveryReq and the V2G\_SECC\_Sequences\_Timed shall be set according to Table 97.

[D05-DC-451] The SECC shall respond with a ContractAuthenticationReq message with ResponseCode equal to "OK" and EVSEPerformance equal to "Charging" when V2G\_SECC\_Mtg\_Performance\_Time according to Table 97 if the processing of the information is successfully passed and the contract authentication has not yet finished on EVSE side. The allowed test request message shall be ContractAuthenticationReq and the V2G\_SECC\_Sequences\_Timed shall be set according to Table 97.

[D05-DC-452] After receiving a ChargeParameterDiscoveryReq message, the SECC shall process the received information.

[D05-DC-453] The SECC shall respond with a ChargeParameterDiscoveryReq message with ResponseCode equal to "OK" and EVSEPerformance equal to "Stopped" when V2G\_SECC\_Mtg\_Performance\_Time according to Table 97 if the processing of the information is successfully passed and the determination of the charge parameters has finished on EVSE side. The allowed test request message shall be ContractAuthenticationReq and the V2G\_SECC\_Sequences\_Timed shall be set according to Table 97.

[D05-DC-454] The SECC shall respond with a ChargeParameterDiscoveryReq message with ResponseCode equal to "OK" and EVSEPerformance equal to "Charging" when V2G\_SECC\_Mtg\_Performance\_Time according to Table 97 if the processing of the information is successfully passed and the determination of the charge parameters has not yet finished on EVSE side. The allowed test request message shall be ChargeParameterDiscoveryReq and the V2G\_SECC\_Sequences\_Timed shall be set according to Table 97.

[D05-DC-455] The SECC shall respond with a ChargeParameterDiscoveryReq message with ResponseCode equal to "FAILED" when V2G\_SECC\_Mtg\_Performance\_Time according to Table 97 if the processing of the information is not successful.

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Test no.	Condition	Item to validate	Test Ref. values	Result	Judgement	Regulation	Testing method	Remarks
F12-4	ServiceParameterDataReq	SECC message data	D05-DC-443	OK	OK	60232/8 / DIN70622	EV simulator	2 tests, described on EVSE service
F12-7	ContractAuthenticationReq	SECC message data	D05-DC-447	OK	OK	60232/8 / DIN70622	EV simulator	2 tests
F12-8	ChargeParameterDiscoveryReq	SECC message data	D05-DC-449	OK	OK	60232/8 / DIN70622	EV simulator	3 tests

Test no.	Condition	Item to validate	Test Ref. values	Result	Judgement	Regulation	Testing method	Remarks
F12-9	PowerDataReq	SECC message data	D05-DC-451	OK	OK	60232/8 / DIN70622	EV simulator	2 tests
F12-11	ServiceDataReq	SECC message data	D05-DC-453	OK	OK	60232/8 / DIN70622	EV simulator	3 tests
F12-12	PowerDataReq	SECC message data	D05-DC-455	OK	OK	60232/8 / DIN70622	EV simulator	3 tests

new test item added to test list

```

Combo_TestItem: Bloc de notes
Archive  Edition  Formate  Ver  Ayuda
CONF_COMBO_EV_TIMERANGE(500, 1000, 1000, 1000, 1500, 60000, 500, 10)
CONF_COMBO_EV_TOUT(11000, 1000, 3000, 3000, 35000, 15500, 10000, 15000, 40000)
CONF_COMBO_LEVEL_CORR_FACTOR(500, 1000, 1000, 1000, 20000, 5000, 4200, 6000)
CONF_COMBO_JUDG_STATE(0, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE)
CONF_COMBO_JUDG_STATE(1, TRUE, FALSE, TRUE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE)
CONF_COMBO_JUDG_STATE(2, TRUE, FALSE, TRUE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE)
CONF_COMBO_JUDG_STATE(3, TRUE, FALSE, TRUE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE)
CONF_COMBO_JUDG_STATE(4, TRUE, FALSE, TRUE, FALSE, FALSE, FALSE, FALSE, FALSE, TRUE)
CONF_COMBO_JUDG_STATE(5, TRUE, TRUE, TRUE, FALSE, FALSE, FALSE, FALSE, FALSE, TRUE)
CONF_COMBO_JUDG_STATE(6, TRUE, TRUE, TRUE, FALSE, FALSE, TRUE, FALSE, FALSE, TRUE)
CONF_COMBO_JUDG_STATE(7, TRUE, TRUE, TRUE, FALSE, FALSE, TRUE, FALSE, FALSE, TRUE)
CONF_COMBO_JUDG_STATE(8, TRUE, TRUE, TRUE, FALSE, FALSE, TRUE, FALSE, FALSE, TRUE)
CONF_COMBO_JUDG_STATE(9, TRUE, TRUE, TRUE, FALSE, FALSE, TRUE, FALSE, FALSE, TRUE)
CONF_COMBO_JUDG_STATE(10, TRUE, TRUE, TRUE, TRUE, FALSE, TRUE, FALSE, FALSE, TRUE)
CONF_COMBO_JUDG_STATE(11, TRUE, TRUE, TRUE, TRUE, FALSE, TRUE, FALSE, FALSE, TRUE)
CONF_COMBO_JUDG_STATE(12, TRUE, TRUE, TRUE, TRUE, FALSE, TRUE, FALSE, FALSE, TRUE)
CONF_COMBO_JUDG_STATE(13, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, TRUE)
CONF_COMBO_JUDG_STATE(14, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, TRUE)
CONF_COMBO_EV_ENSTOP(1, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, 0)
CONF_COMBO_EV_ENSTOP(2, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, 0)
CONF_COMBO_EV_ENSTOP(3, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, 0)
CONF_COMBO_EV_ENSTOP(4, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, FALSE, 0)
CONF_COMBO_EV_ENSTOP(5, FALSE, FALSE, FALSE, 0)
CONF_COMBO_EV_ENSTOP(6, FALSE, FALSE, FALSE, 0)
CONF_COMBO_EV_STOP(9, 30000)
    
```

new simulator test is programmed in a fast user-friendly language

requirement is identified from the specification

Logging data and automatic analysis is generated

requirement is tested with the EV Charging Simulator

Feb 24 – 28, 2014:

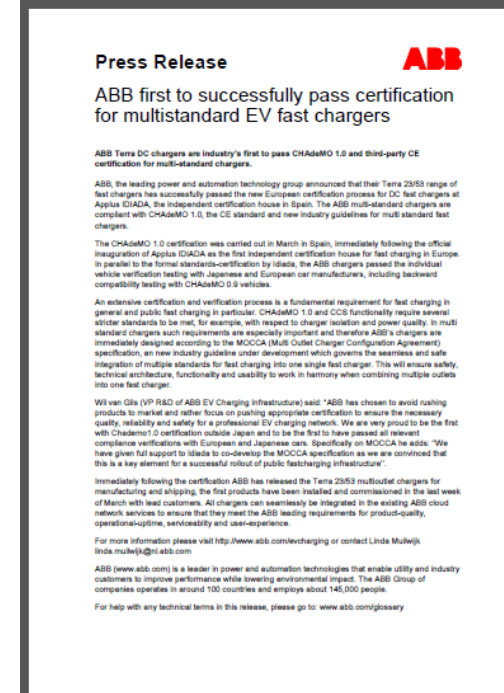
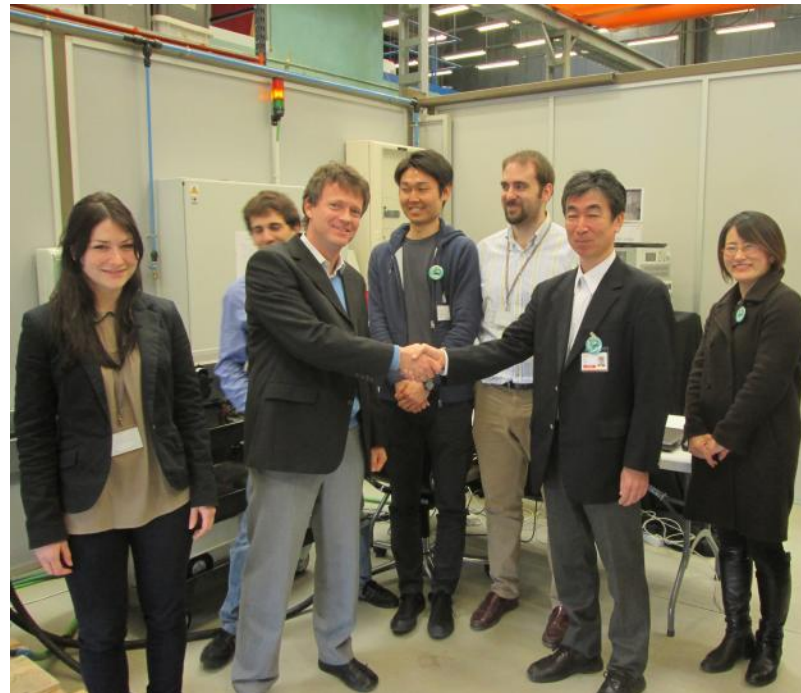
experts from CHAdeMO association visited IDIADA to audit IDIADA engineers and certify test machine

Mar 03 – 07, 2014:

first CHAdeMO 1.0 charger (Terra 53 from ABB) successfully passed the protocol tests

Apr 08, 2014:

first CHAdeMO 1.0 charger certified by IDIADA





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For further information:

### **Applus IDIADA**

Main Technical Centre

L'Albornar – PO Box 20

E-43710 Santa Oliva (Tarragona) Spain

T +34 977 166 000

F +34 977 166 007

e-mail: [idiada@idiada.com](mailto:idiada@idiada.com)

**[www.idiada.com](http://www.idiada.com)**

#### **Applus IDIADA Belgium**

T +32 2 719 02 45 (Brussels)

e-mail: [idiada\\_belgium@idiada.com](mailto:idiada_belgium@idiada.com)

#### **Applus IDIADA Brazil**

T +55 41 3373 0411 (Curitiba)

T +55 11 4330 9880 (São Paulo)

T +55 15 3205 2952 (Tatuí)

e-mail: [idiada\\_brasil@idiada.com](mailto:idiada_brasil@idiada.com)

#### **Applus IDIADA China**

T +86 10 8446 3317 (Beijing)

T +86 431 8190 9680 (Changchun)

T+ 86 23 6756 8060 (Chongqing)

T +86 20 2282 9202 (Guangzhou)

T +86 (21) 6210 0894 (Shanghai)

T +86 (772) 3166 619 (Liuzhou)

e-mail: [idiada\\_china@idiada.com](mailto:idiada_china@idiada.com)

#### **Applus IDIADA Czech Republic**

T +420 493 654 811 (Hradec Králové)

T +420 482 424 243 (Liberec)

T +420 326 736 860 (Mladá Boleslav)

e-mail: [info@idiada.cz](mailto:info@idiada.cz)

#### **Applus IDIADA France**

T +33 (0) 141 146 085 (Sèvres CEDEX)

e-mail: [idiada\\_france@idiada.com](mailto:idiada_france@idiada.com)

#### **Applus IDIADA Germany**

T +49 (0) 173 610 2083 (Ilsfeld)

T +49 (0) 841 885 38-0 (Ingolstadt)

T +49 (0) 893 090 560 (Munich)

T +49 (0) 537 155 555 (Wolfsburg)

e-mail: [idiada\\_germany@idiada.com](mailto:idiada_germany@idiada.com)

#### **Applus IDIADA India**

T +91 986 009 8659 (Bangalore)

T +91 994 0679 933 (Chennai)

T +91 124 4028 888 (New Delhi)

T +91 203 0556 900 (Pune)

e-mail: [idiada\\_india@idiada.com](mailto:idiada_india@idiada.com)

#### **Applus IDIADA Italy**

T +39 011 3997 764 (Turin)

e-mail: [idiada\\_italia@idiada.com](mailto:idiada_italia@idiada.com)

#### **Applus IDIADA Japan**

T +81 (0) 42 512 8982 (Tokyo)

e-mail: [idiada\\_japan@idiada.com](mailto:idiada_japan@idiada.com)

#### **Applus IDIADA South Korea**

T +82 31 478 1821 (Seoul)

e-mail: [idiada@idiada.co.kr](mailto:idiada@idiada.co.kr)

#### **Applus IDIADA Madrid**

T +34 915 095 795 (Madrid)

e-mail: [idiada\\_madrid@idiada.com](mailto:idiada_madrid@idiada.com)

#### **Applus IDIADA Malaysia**

T +603 9207 7018 (Kuala Lumpur)

e-mail: [idiada\\_malaysia@idiada.com](mailto:idiada_malaysia@idiada.com)

#### **Applus IDIADA Poland**

T +48 61 6226 905 (Poznan)

e-mail: [idiada\\_polska@idiada.com](mailto:idiada_polska@idiada.com)

#### **Applus IDIADA Russia**

T +7 (831) 297 94 32 (Nizhny Novgorod)

e-mail: [idiada\\_russia@idiada.com](mailto:idiada_russia@idiada.com)

#### **Applus IDIADA Saudi Arabia**

T +966 53 4147 301 (Riyadh)

e-mail: [idiada\\_GCC@idiada.com](mailto:idiada_GCC@idiada.com)

#### **Applus IDIADA Taiwan**

T +886 47 810 702 (Lu-Kang)

e-mail: [idiada\\_taiwan@idiada.com](mailto:idiada_taiwan@idiada.com)

#### **Applus IDIADA Thailand**

T +66 86 7917 071 (Bangkok)

e-mail: [idiada\\_thailand@idiada.com](mailto:idiada_thailand@idiada.com)

#### **Applus IDIADA Turkey**

T +90 216 250 6050 (Istanbul)

e-mail: [idiada\\_turkey@idiada.com](mailto:idiada_turkey@idiada.com)

#### **Applus IDIADA UK**

T +44 (0) 7 979 691 631 (Hinckley)

e-mail: [idiada\\_uk@idiada.com](mailto:idiada_uk@idiada.com)

#### **Applus IDIADA USA**

T +1 248 656 3469 (Detroit)

e-mail: [idiada\\_USA@idiada.com](mailto:idiada_USA@idiada.com)

#### **CTAG IDIADA**

T +34 986 900 300 (Pontevedra)

e-mail: [ctag\\_idiada@idiada.com](mailto:ctag_idiada@idiada.com)