China Intelligent-connected Car Assessment Programme (C-ICAP)

(Version 1.1)

Management Rules

June 2023

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C-ICAP

Foreword

With the rapid development of intelligent connectivity technologies, the market share of intelligent connected vehicles is gradually increasing, and the "intelligence" and "connectivity" function configuration is increasingly becoming an important demand of automotive consumers during purchase of vehicles. How to guide the manufacturers to produce smarter and safer vehicles, how to generalize the intelligent consumption and how to facilitate the consumers to choose intelligent connected vehicles that are suitable for their needs from numerous models, are the issues that have been continuously concerned by the public and the industry.

With the support and guidance from the Ministry of Science and Technology of China, the Automotive Evaluation Management Center of China Automotive Technology and Research Center Co., Ltd., together with enterprises, conducted the in-depth research on the driving scenarios and technical characteristics of intelligent-connected vehicles, and developed the China Intelligent-connected Car Assessment Program (C-ICAP), so as to conduct an "independent, fair and professional" comprehensive evaluation on overall performance of intelligent-connected vehicles.

The C-ICAP (Version 1.1) is a revised version based on the C-ICAP (Version 1.0). The assisted driving evaluation unit remains unchanged, and a smart cockpit evaluation unit is added. With the continuous progress of intelligent-connected vehicle technology in the industry and the increasing expectations of consumers for better "intelligent and connected" automotive products, the C-ICAP will be continuously improved and upgraded, so as to continuously improve the users' satisfaction with intelligent-connected vehicles, lead the development of automotive technologies, and promote the intelligent-connected vehicle manufacturers to continuously enhance their innovation capabilities and cultivate their product brand influence.

As compared with the C-ICAP (Version 1.0), the C-ICAP (Version 1.1) involves the following main changes:

(1) On the basis of the assisted driving evaluation unit, a new smart cockpit unit is added to conduct the star-rating evaluation for driving assistance, parking assistance, and smart cockpit;

(2) The smart cockpit is a mandatory test item, under which there are three level-1 indicators: intelligent interaction, intelligent escort, and smart service.

The C-ICAP (Version 1.1) will be officially implemented as of July 1, 2023.

China Automotive Technology and Research Center Co., Ltd.
June 2023

C-ICAP

Chapter I General Provisions

1. Tenet

1.1 Purpose

1.1.1 The China Intelligent-connected Car Assessment Program (C-ICAP) aims to establish a high-standard, fair and objective evaluation method for automotive intelligent connectivity performance, so as to promote the development of automotive intelligent connectivity technology and pursue a higher development concept of intelligence and connection. The significance of this project lies in providing the consumers with the information on intelligent connectivity performance of newly-launched vehicles, improving the vehicles' intelligent connectivity performance and technical level, and reflecting the vehicles with excellent intelligent connectivity performance in the evaluation.

1.1.2 This evaluation method will be gradually improved based on the development of automotive technology and the in-depth research on road traffic conditions in China.

1.2 Explanation

1.2.1 The actual operating scenarios of intelligent-connected vehicles are complex and diverse, so that a comprehensive test evaluation method is needed to comprehensively reflect the vehicle's intelligent-connected performance. C-ICAP aims to reflect the intelligent-connected performance of vehicles to a certain extent based on objective test methods.

1.2.2 Regarding the intelligent-connected performance of vehicles, China is drafting a series of national standards, but these standards do not fully cover all key indicators in actual transportation scenarios in China, and they often stipulate the basic requirements for vehicle access, which cannot provide the consumers with more comprehensive information about high-quality performance. To this end, C-ICAP designs the test evaluation system by focusing on the key points of consumers' actual using experience, and introduces some advanced foreign standard test methods in addition to referencing the test methods specified in the national standard drafts. For the evaluation indicators that have not been covered by the existing domestic and foreign standards, C-ICAP has developed the new evaluation scenarios and evaluation methods by extensively collaborating with the industry, so as to meet the consumers' needs for professional evaluation information on vehicles.

1.2.3 With the implementation of C-ICAP and the deepening of natural driving scenario data research and road traffic accident investigation in China, we reserve the right to modify the test items, test methods, scoring methods and evaluation terms, so as to enable the evaluation of C-ICAP to fully reflect the driving scenarios in China, provide the consumers with as much intelligent-connected performance information as possible, and make contributions to continuously promoting the technological progress and innovative development of automotive enterprises.

2. Management Body

The Automotive Evaluation Management Center of China Automotive Technology and Research Center Co., Ltd. is the management organization of C-ICAP (hereinafter referred to as "Management Center"), responsible for organizing the implementation of C-ICAP related matters, including determining the annual plan, selecting the tested models, reviewing the evaluation results, settling the disputes and difficult issues, and deciding the temporary matters.

A technical committee has been established to provide the opinions and suggestions on the technical requirements and operation of C-ICAP. The technical committee includes the experts and scholars from automotive companies, universities and research institutes, as well as the representatives from competent government authorities, their affiliated institutions, consumer organizations and media.

3. Test Items

C-ICAP (Version 1.1) conducts the test evaluation of assisted driving unit (driving assistance and parking assistance) and smart cockpit unit. As the technologies corresponding to other units become increasingly mature, they will be released one by one.

Table 1 Names of C-ICAP Units and Items

Name of Evaluated Unit	Name of Evaluated Item	Score of Evaluated Item
Assisted driving	Driving assistance	Basic driving assistance (mandatory item)
		Pilot driving assistance (additional item)
	Parking assistance	Basic parking assistance (mandatory item)
		Memory parking assistance (additional item)
Smart cockpit	Smart cockpit	Intelligent interaction (mandatory item)
		Intelligent escort (mandatory item)
		Smart service (mandatory item)

3.1 Assisted Driving Test Items

The assisted driving includes basic driving assistance and pilot driving assistance.

Among them, the basic driving assistance is a mandatory test item, including the contents in four aspects: following ability, combined control ability, emergency avoidance ability, and driver interaction; the pilot driving assistance is an additional test item, including the contents in two aspects: active lane changing ability and continuous operation ability. The detailed test rules are given in Appendix A.1-A.2.

3.2 Parking Assistance Test Items

The parking assistance includes basic parking assistance and valet parking assistance.

Among them, the basic parking assistance is a mandatory test item, including the contents in two

aspects: parking ability in front of parking space and remote-control parking ability in front of parking space; the memory parking assistance is an additional test item, including the contents in two aspects: one-key calling ability and one-key parking ability. The detailed test rules are given in Appendix B.1-B.2.

3.3 Smart Cockpit Test Items

The smart cockpit includes three level-1 indicators, namely intelligent interaction, intelligent escort and smart service, all of which are mandatory testing items.

Among them, the intelligent interaction includes touch interaction, voice interaction and wireless interaction; the intelligent escort includes intelligent vision expansion and vision anti-interference; the smart service includes welcoming scenario, driving scenario and seeing off scenario. The detailed test rules are given in Appendix C.1.

4. Evaluation Results

4.1 Score Calculation

C-ICAP calculates the comprehensive scoring rate of each evaluation item and gives the star rating. The comprehensive scoring rate of each item is calculated by weighting the following indicators.

4.2 Star Rating

C-ICAP (Version 1.1) gives the star rating for three items: driving assistance, parking assistance, and smart cockpit.

For driving assistance and parking assistance, the star rating will be ultimately given to the tested vehicle based on the scoring rate of mandatory test items and additional test items, as shown in Table 2. When the scoring rate of mandatory test items exceeds 81% and the scoring rate of additional test items is ≥85%, the "☆" in star rating may be increased.

Table 2 Star Rating Corresponding to Scoring Rate of Driving Assistance and Parking Assistance

Scoring Rate of Mandatory Test Item	**Scoring Rate of Additional Test Item**	**Star Rating**
Scoring rate ≥92%	Scoring rate ≥85%*	5+ (★★★★★☆)
Scoring rate ≥92%	Scoring rate <85%	5 (★★★★★)
81%≤ Scoring rate ＜92%	Scoring rate ≥85%*	4+ (★★★★☆)
81%≤ Scoring rate ＜92%	Scoring rate <85%	4 (★★★★)
70%≤ Scoring rate ＜81%	——	3 (★★★)
60%≤ Scoring rate ＜70%	——	2 (★★)
Scoring rate ＜60%	——	1 (★)
* The star rating for driving assistance may be increased by 1 star only when the full score is obtained for system prompts and hands off detection in the basic driving assistance.		

With respect to smart cockpit, the star rating will be ultimately given to the tested vehicle based on the scoring rate of mandatory items, as shown in Table 3.

Table 3 Star Rating Corresponding to Scoring Rate of Smart Cockpit

Scoring Rate	Star Rating
Scoring rate ≥92%	5 (★★★★★)
81%≤ Scoring rate ＜92%	4 (★★★★)
70%≤ Scoring rate ＜81%	3 (★★★)
60%≤ Scoring rate ＜70%	2 (★★)
Scoring rate ＜60%	1 (★)

5. C-ICAP Sign

The sign of C-ICAP is as shown in Figure 1.

C-ICAP
中国智能网联汽车技术规程

Figure 1 C-ICAP Sign

6. Statement

C-ICAP is the China Intelligent-connected Car Assessment Program developed by China Automotive Technology and Research Center Co., Ltd. (CATARC). China Automotive Technology and Research Center Co., Ltd. reserves all rights to C-ICAP. Without the permission of China Automotive Technology and Research Center Co., Ltd., other institutions are not allowed to use C-ICAP for public or commercial test or evaluation of automotive products, except for technology development tests conducted by enterprises themselves.

The test results, scores and star ratings obtained from the model evaluated under C-ICAP are only valid for the purchased model and the configuration thereof. All parties using the evaluation results under C-ICAP shall be responsible for the authenticity, completeness and accuracy thereof.

Chapter II Operation Management

1. Selection of Tested Model

1.1 Selection Principle

1.1.1 The tested model shall be a passenger vehicle model (category M_1) with intelligent-connected vehicle functions (assisted driving, smart cockpit, and autonomous driving) available in the market, as selected by the Management Center based on market performance.

1.1.2 There shall be no plan to discontinue the production of the tested vehicle model in the near future.

1.2 Determination Procedure

1.2.1 The Management Center shall determine the candidate vehicle models based on the selection principle in Section 1.1.1 hereof. During the selection of candidate vehicle models, the Management Center shall confirm whether any vehicle model is in a recall state. If the recall work related to a vehicle model has not yet ended, such vehicle model shall not be selected.

1.2.2 The Management Center shall notify the manufacturers of the candidate vehicle models, and the manufacturers shall provide the relevant technical information of such vehicle models.

1.2.3 After receiving the information from the manufacturers, the Management Center shall select the vehicle model with the highest intelligence level from the candidate vehicle models.

1.2.4 After the Management Center issues a notice on evaluation of vehicle model, if a recall event related to the vehicle model occurs, the evaluation of such vehicle model shall be terminated.

2. Acquisition of Vehicle

After determining the tested vehicle model, the Management Center shall independently acquire the vehicle according to the random principle.

After acquiring the vehicle, the Management Center shall announce the tested vehicle model and the configuration thereof on its official platform, and send a notice to the vehicle manufacturer.

3. Test

3.1 Test Implementation Notice

After acquiring the tested vehicle, the Management Center shall determine the implementation date of the test., a C-ICAP test implementation notification form (see Annex 1) shall be sent to the manufacturer 10-15 working days prior to the test, stating the tested vehicle model, configuration, test contents and test time.

3.2 Test Preparation

3.2.1 After receiving the C-ICAP test implementation notice, the manufacturer shall provide the Management Center with the basic information & parameter table of the tested vehicle (see Annex

2) and a plan for software upgrade using over-the-air (OTA) technology (if any, the OTA materials filed with the corresponding regulatory body shall be provided) within 5 working days.

3.2.2 All preparatory work before the test, including preparation of tested vehicle, installation of tested equipment, and calibration of tested equipment, shall be carried out by the professional test personnel as organized by the Management Center. The manufacturer's technical personnel may observe the preparation of the test within the specified time, and confirm the necessary parameters; provided that they shall not carry out any operation on vehicle, equipment and instruments.

3.3 Test Implementation

The test and data processing shall be carried out by the professional test personnel in accordance with the operating procedures. The manufacturer’s technical personnel as well as the media, groups and institutions which wish to watch the test can apply for watching the test process.

For any model with the highest intelligence level that does not contain or only partially contains intelligent-connected functions, after the test is completed, the manufacturer may apply for the installation of a complete optional intelligent-connected function package (which is available in the market) and the implementation of supplementary test after functional upgrade.

During the formal test, the manufacturer is not allowed to conduct any specialized performance enhancement for the tested vehicle through remote control or hinder the test of the tested vehicle by any means such as limitation of function. If the above situation occurs, the test shall be terminated and the relevant situation shall be made public.

3.4 Review of Evaluation Results

The Management Center shall review and summarize the results of C-ICAP test, and determine the information to be released.

4. Release of Evaluation Results

4.1 Form of Results Released

The score and star rating of each item of the tested vehicle shall be released, and the score of each indicator under each item shall also be released.

If the tested vehicle is equipped with an optional package, the results of the tested vehicle equipped with such optional package shall be released at the same time when the results of the basic model are released.

In the C-ICAP results released, in addition to the star rating of each item of the tested vehicle and the score composition of each indicator, the brand, model, price segment and basic parameters of the tested vehicle shall also be described, and the configuration of the intelligent-connected function of the tested vehicle shall be described, including the list of intelligent-connected functions and the version number of software on the tested vehicle.

4.2 Result-releasing Method

The C-ICAP test results and star ratings shall be released through official channels (such as C-NCAP official website and WeChat account).

5. Funds

China Automotive Technology and Research Center Co., Ltd. sets up a special fund budget every year for covering the costs arising from purchase of vehicles, implementation of tests and management, so as to ensure the long-term operation of C-ICAP.

6. Management of External Personnel and Relevant Affairs During Test

6.1 Management of Personnel Watching the Test Process

6.1.1 The specific test time for each test item of the evaluated vehicle model shall be notified to the vehicle manufacturer in advance and announced on the official website.

6.1.2 The vehicle manufacturer shall submit a list of personnel who will watch the test to the Management Center three days before the test implementation date.

6.1.3 The personnel of the vehicle manufacturer may watch the test process at the specified time during the preparation process and from half an hour before to half an hour after the test. The personnel of vehicle manufacturer must wear the corporate watching card when entering the test chamber.

6.1.4 Due to the complex process, long cycle and limited venue of the intelligent-connected function test, those media, groups and institutions which intend to watch the test shall apply to the Management Center one week prior to the test implementation date. They shall wear the watching card and comply with the relevant regulations of the Management Center when entering and staying in the test site.

6.2 Management of Test-related Affairs of Manufacturer's Personnel

6.2.1 The vehicle manufacturer's personnel may confirm the status of the tested vehicle before various tests. If any problem is found, they shall promptly communicate and ultimately reach a consensus with the responsible personnel of the Management Center.

6.2.2 When confirming the test conditions, the vehicle manufacturer's personnel shall separately record any content that may have a significant impact on the test results in the record form made by the Management Center while making confirmation with the responsible personnel of the Management Center.

6.2.3 The vehicle manufacturer's personnel shall not perform any operation on the tested vehicle and test components during confirmation. However, when any special need is confirmed and approved by the responsible person of the Management Center, the relevant operation may be carried out by the relevant personnel from the Management Center.

6.2.4 The time for confirmation by the vehicle manufacturer's personnel shall not exceed sixty minutes. If there are appropriate reasons and the permission is obtained from the responsible person of the

Management Center, the time can be extended appropriately. In such case, if there are appropriate reasons, the opinions may be summarized, and the changes to the test conditions may be made with the permission of the Management Center.

6.2.5 The manufacturer's personnel may take photos and videos of the test before and during the test only after obtain the permission from the responsible person of the Management Center.

7. Appeal and Handling of Objections to Evaluation Results

If the manufacturer has any objection to the evaluation results, it may submit an appeal form (see Annex 4) to the Management Center within 10 days after the results are released. The Management Center shall provide a reply within one month after receiving the appeal form the manufacturer. When there is still a dispute, the Management Center may arrange a meeting for discussion at the request of the manufacturer.

If there are significant deviations in the evaluation results due to failure to follow the procedures during the test, the evaluation may be conducted again, and the explanation may be given when the results are released. The expenses of re-evaluation shall be borne by the Management Center.

8. Post-disposal of Vehicle

The vehicle with no objection to evaluation results shall be disposed of by the Management Center according to its internal management documents.

9. Use of C-ICAP Evaluation Results and Relevant Signs

The results released by C-ICAP and the relevant signs may be used by relevant parties for free; provided that, when they are used for commercial purposes, the user must apply to the Management Center in advance, explaining the place and form of use of such signs. The Management Center has the right to impose the restrictions on use.

10. Technical Exchange

The management center holds the C-ICAP thematic seminars and technical exchange activities every year, which may also be combined with the evaluation results release activities. The manufacturers and relevant institutions may engage in various forms of communication and technical cooperation with the Management Center.

11. Communication and Public Promotion Activities

The Management Center may participate in public promotion activities such as car shows or tours as needed, and carry out various forms of communication with all concerned parties, so as to popularize the knowledge about automotive intelligent connectivity.

Annex 1

C-ICAP Test Implementation Notification Form

<table>
<tr><td>Vehicle manufacturer</td><td colspan="5"></td></tr>
<tr><td>Vehicle model</td><td colspan="5"></td></tr>
<tr><td>Configuration</td><td colspan="5"></td></tr>
<tr><td rowspan="2">Test contents and test implementation date</td><td colspan="2">Assisted driving</td><td colspan="3">From to</td></tr>
<tr><td colspan="2">Smart cockpit</td><td colspan="3">From to</td></tr>
<tr><td>Matters needing attention</td><td colspan="5"></td></tr>
<tr><td>Contact person</td><td></td><td>Tel</td><td></td><td>Fax</td><td></td></tr>
<tr><td>Official seal</td><td colspan="5">Date:</td></tr>
</table>

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Annex 2

Feedback Form of Information about Vehicle Model To Be Evaluated under C-ICAP

Completed by:_____ Date of Completion:_____

Vehicle model	
VIN	
Production date of sample vehicle	
Vehicle category	M_1
Number of axles	
Curb weight (kg)	
Maximum design total mass (kg)	
Maximum speed (km/h)	
Overall dimension: length × width × height (mm)	
Wheelbase (mm)	
Track width (front/rear) (mm)	
Front and rear suspension (mm)	
Minimum fuel designation (if any)	
Number of tyres/manufacturer	
Specifications and air pressure of tyres (kPa)	
Type of service brake system	
Driving mode of service brake system	
Booster type of service brake system	
Brake type of service brake system	
Braking force adjustment mode of service brake system	
Control mode of ABS system	
Number, model and manufacturer of laser radars	
Number, model and manufacturer of millimeter wave radars	
Number, model and manufacturer of other radars	
Number, model and manufacturer of cameras	
Number, model and manufacturer of infrared sensors	
Model and manufacturer of head up display	

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Feedback Form of Information about Vehicle Model To Be Evaluated under C-ICAP

Completed by:_____ Date of Completion: _____

Unlocking mode of vehicle	□ Application-based remote unlocking □ physical remote-control key □ NFC card key □ mobile Bluetooth key □ mobile NFC key □ face recognition unlocking □ Keyless entry (□ physical remote-control key □ mobile Bluetooth key)
Version number of vehicle software (if any)	
Version number of assisted driving system software	
Version number of head up display software	
Version number of around view monitoring software	
Version number of on-board computer software (if any)	
Version number of voice interaction system software	
Name and version number of pre-installed music application in on-board computer	
Name and version number of pre-installed video application in on-board computer	
Name and version number of pre-installed navigation application in on-board computer	
Name and version number of pre-installed mobile vehicle control application in on-board computer	

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Annex 3

C-ICAP Evaluation Objection Appeal Form

Manufacturer(Official Seal)	Date:
Vehicle model	
Evaluation time	
Evaluation item for which the appeal is lodged	
Reasons for appeal	
Time of re-evaluation applied for	
Handling opinions (Official Seal)	Date:

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Appendix A.1: Detailed Rules for Assessment of Basic Driving Assistance (attached separately)

Appendix A.2: Detailed Rules for Assessment of Pilot Driving Assistance (attached separately)

Appendix B.1: Detailed Rules for Assessment of Basic Parking Assistance (attached separately)

Appendix B.2: Detailed Rules for Assessment of Memory Parking Assistance (attached separately)

Appendix C: Detailed Rules for Assessment of Smart Cockpit(attached separately)

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