C-ITS Status in China

— **To the 8th ETSI ITS Workshop**
Sophia Antipolis, March 08, 2015

Yi Shi (Richard)
Huawei Technologies, Beijing, China
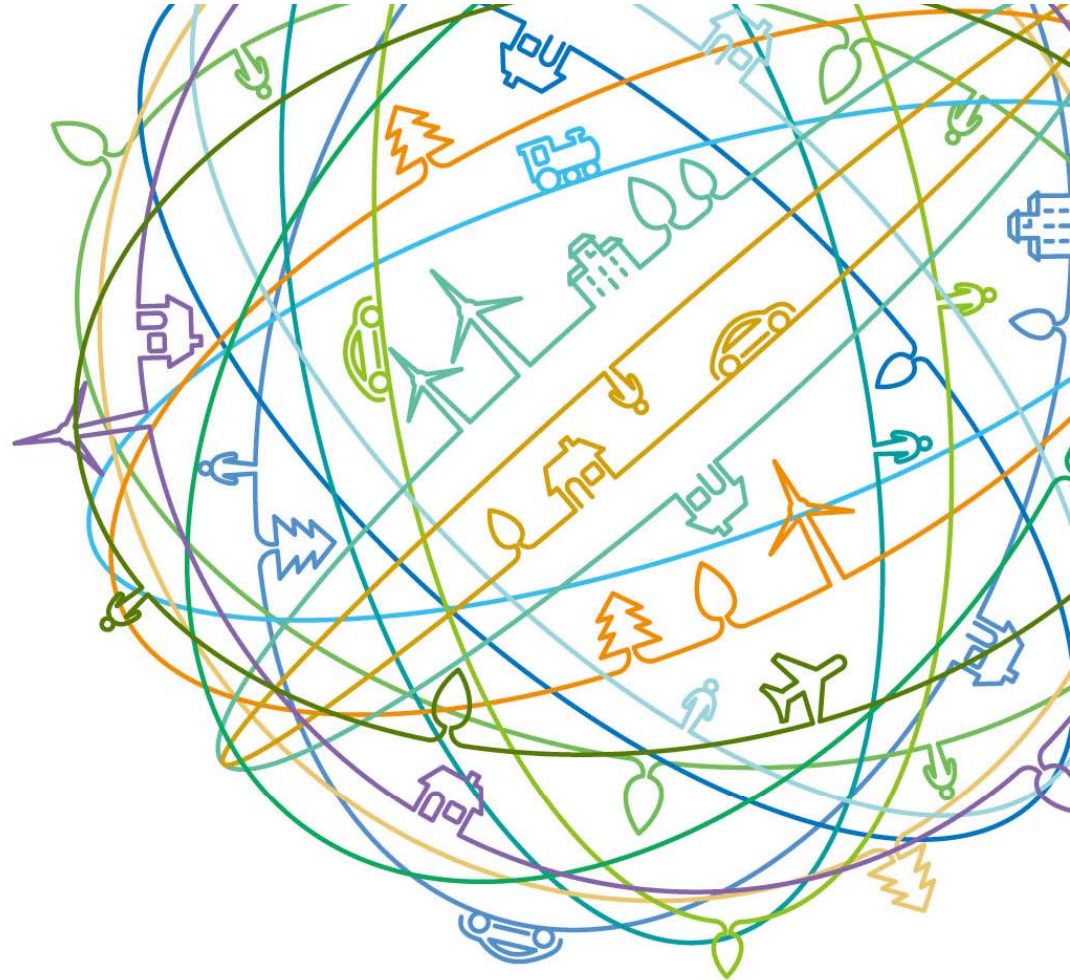
Overview

- **C-ITS Related Activities of Chinese Government**

- **C-ITS Standardization Progress in China**

- **C-ITS Projects in China**

- **C-ITS Roadmap in China**

- **Conclusions**

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C-ITS Related Activities of Chinese Government

- May, 2015: State Council released "Made in China 2025" **http://www.gov.cn/zhengce/content/2015-05/19/content_9784.htm**

- May, 2015: MIIT (ministry of industry and information technology) explains "Made in China 2025"
  http**://www.miit.gov.cn/n11293472/n11293877/n16553775/n16553822/16633916.html**
  Intelligent Connected Vehicles:
  - 2020: Possess overall technology and key technologies for intelligent driver assistance
  - 2025: Possess overall technology and key technologies for automatic driving

- September, 2015: State Council announced plan to build Intelligent Connected Vehicles Pilot Area in Shanghai
  http://www.gov.cn/zhengce/2015-09/30/content_2940909.htm

(State Council: to build Intelligent Connected Vehicles Pilot Area)

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C-ITS Standardization Progress in China (1/2)

- In CCSA, TC5 (Wireless communications) is very active in ITS-related aspects:
  - In WG3: WLAN and Wireless Access WG
    - Dec. 2014 ~ Dec. 2015, work item on "General technical requirements of communication based on LTE for vehicle application", lead by CAICT, CATT, Huawei
    - This study will address requirements and system architecture for LTE-V2X, taking inputs from 3GPP SA1 and SA2, as well as unique traffic characteristics in China.
    - Mar. 2016, a work item on LTE-based V2X air interface standard will be discussed and potentially approved.
  - In WG8: Frequency Workgroup
    - Mar. 2015 ~ Dec. 2016, "Study on frequency requirement and coexistence study on intelligent transportation system V2V/V2I active safety application", lead by CMCC, CAICT, etc.
    - The study includes : application scenario study, spectrum requirement study, identification of candidate spectrum band, coexistence study
    - Currently, the application scenario study is done, spectrum requirement discussion is ongoing

- In TIAA (Telematics Industry Application Alliance)
  - V2V/V2I communication WG
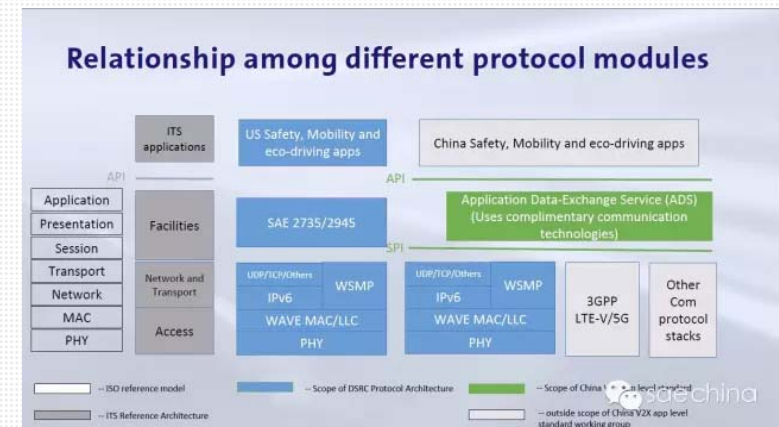   - Apr. 2014 ~ Sept. 2014, a white paper on "V2V/V2I communication industry white paper" was published.
  - Wireless spectrum and EMC WG
    - May 2015 ~ Oct. 2016, TIAA started spectrum related study, this work item has the similar scopes as CCSA
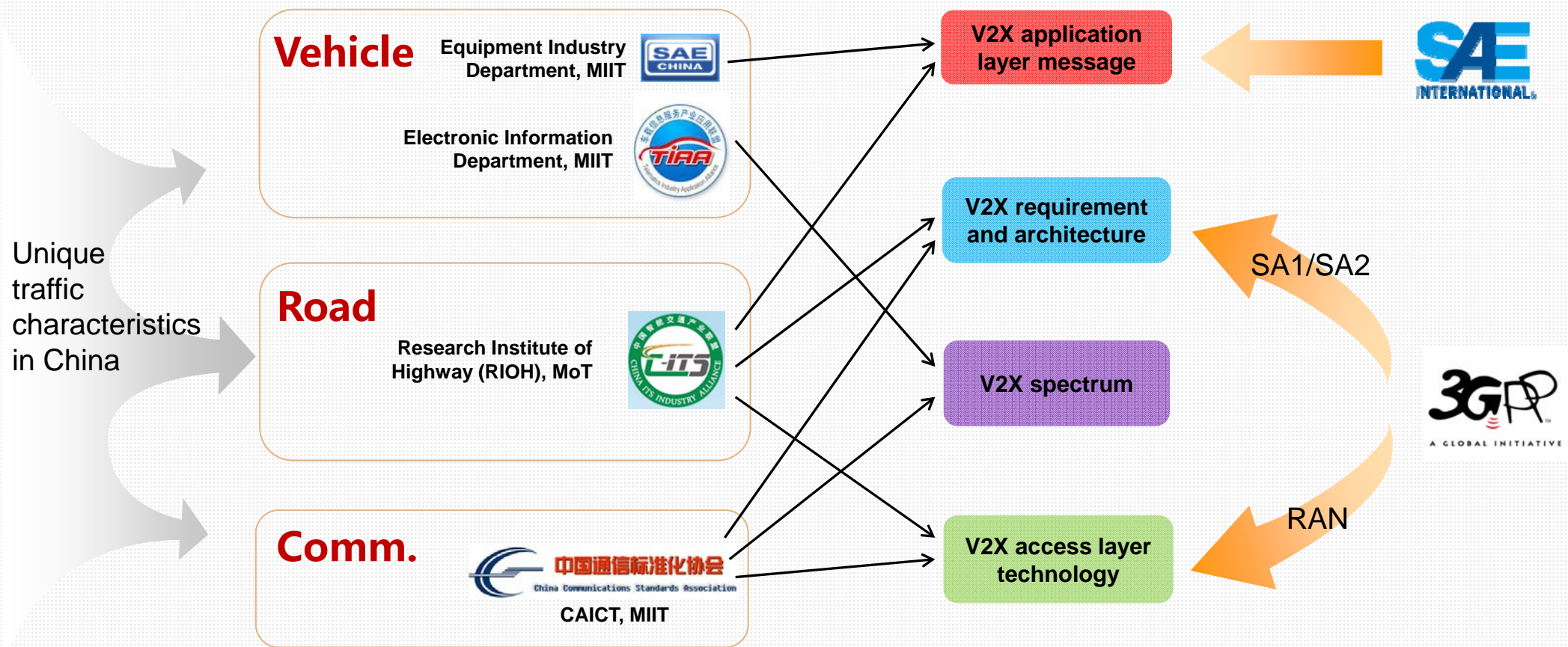
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C-ITS Standardization Progress in China (2/2)

- C-ITS (China ITS Industry Alliance):
  - On-board Information Service and Safety WG
    - Jan. 2015 ~ Jun. 2016, work item on "General technical requirements of Communication Based on LTE for Vehicle Application", led by Huawei, CAICT, CATT.
    - Study scope similar to CCSA and cooperation with CCSA has been ongoing during the study.
  - Cooperative ITS WG
    - Jan. 2015 ~ Nov. 2015, study item on "General Security Requirements of Cooperative ITS" completed, led by CATT.

- SAE China:
  - Jan. 2016 ~ Dec. 2016 joint work item with C-ITS on "V2X application layer and application data-exchange service standard", lead by GM, Chang'an Auto, and Tsinghua university.
  - This study aims to standardize V2X message formats agnostic to lower-layer communication technology.
  - Message set dictionary similar to SAE J2735 will be taken as the basis, taking into account unique traffic characteristics in China.
  - Joint standard published in both C-ITS and SAE China.

Relationship among different protocol modules

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Relationships and Cooperation

Unique traffic characteristics in China

Vehicle

Equipment Industry Department, MIIT

SAE CHINA

Electronic Information Department, MIIT

TIAA

Road

Research Institute of Highway (RIOH), MoT

C-ITS

Comm.

中国通信标准化协会
China Communications Standards Association

CAICT, MIIT

V2X application layer message

SAE INTERNATIONAL

V2X requirement and architecture

SA1/SA2

V2X spectrum

3GPP
A GLOBAL INITIATIVE

V2X access layer technology

RAN

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C-ITS Projects in China

- **National Key Project: Standardization and prototyping for LTE-V wireless transmission technology (2016-2017)*, approved by MIIT**

    - V2V/V2I requirement, traffic model, channel model

    - Develop communication protocol for LTE-based V2V/V2I

    - Standardize LTE-V in 3GPP

    - Develop prototype for LTE-V

    - Build lab and field test environment for inter-operability test

- **Shanghai Intelligent Connected Vehicle Pilot Area, approved by MIIT, China. Initial plan released (2015-2019) ****

    - Phase 1 (2015.10-2016.6): >40 connected vehicles (802.11p and LTE-V2X)

    - Phase 2 (2016.7-2017.12): >400 connected vehicles (802.11p and LTE-V2X)

    - Phase 3 (2018.1-2019.12): >1000 connected vehicles (LTE-V2X)

* http://www.miit.gov.cn/n11293472/n11293832/n12843926/n13917072/16688014.html

** "Release of the General Scheme of Intelligent and Connected Vehicle (Shanghai) Demonstration Zone", Shanghai international automobile city, 2015 SAE-China Congress & Exhibition, October 2015

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Pilot Area for Connected Vehicles

- **Another five pilot areas for connected vehicles have started or under preparation with the lead of MIIT, considering different climate, landform, etc.**

  - Hang Zhou (started)

    http://gtog.ningbo.gov.cn/art/2015/9/12/art_10267_1214971.html

  - Beijing (started)

    http://www.etiri.com.cn/article_002006_1299.html
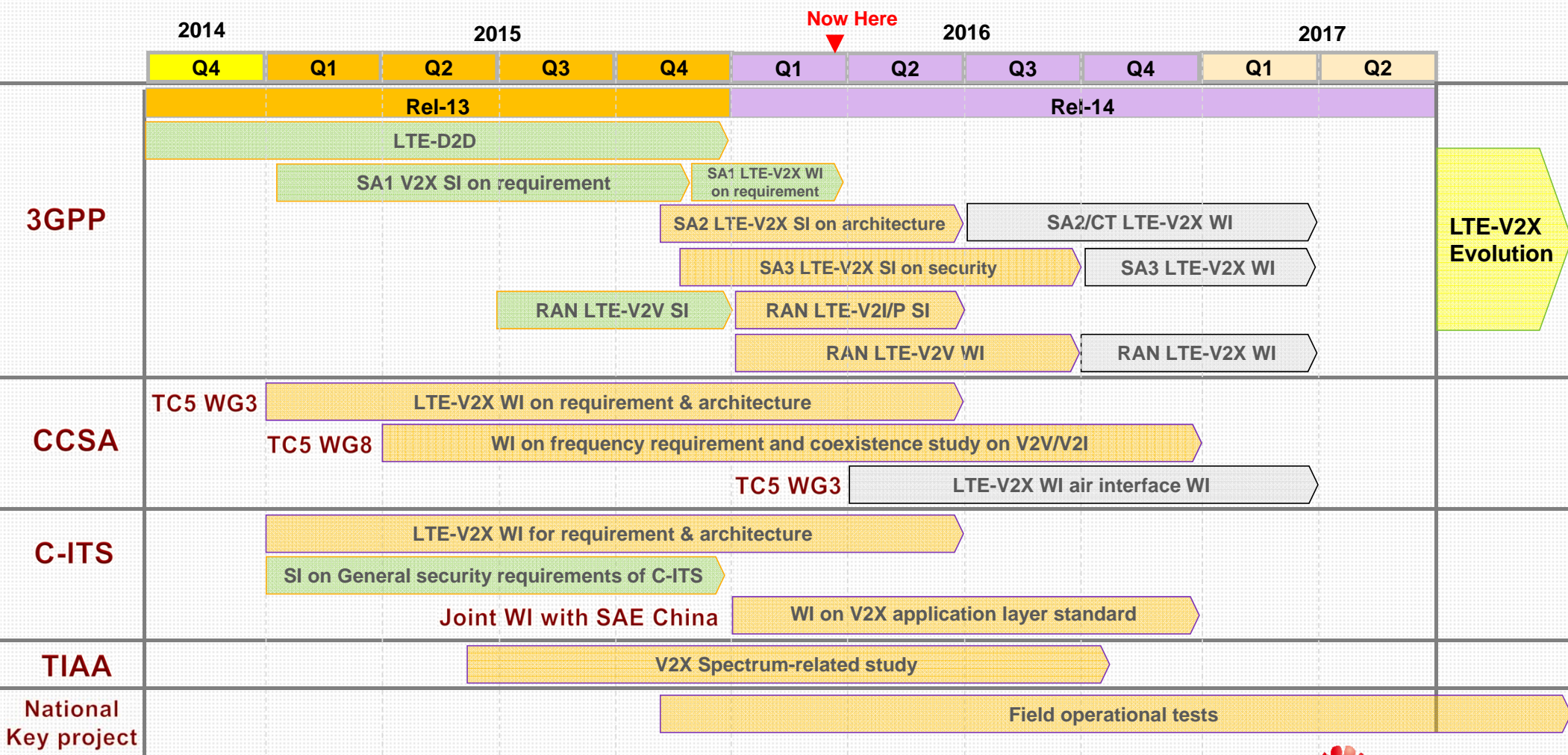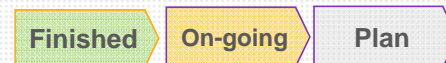
  - Chongqing (started)

    http://www.miit.gov.cn/n1146285/n1146352/n3054355/n3057643/n3057652/c4626544/content.html

  - Changchun (planning)

  - Shenzhen (planning)

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C-ITS Roadmap in China

Finished | On-going | Plan

	2014	2015				Now Here 2016				2017	
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2

3GPP

Rel-13 | Rel-14

- LTE-D2D
- SA1 V2X SI on requirement
- SA1 LTE-V2X WI on requirement
- SA2 LTE-V2X SI on architecture | SA2/CT LTE-V2X WI
- SA3 LTE-V2X SI on security | SA3 LTE-V2X WI
- RAN LTE-V2V SI
- RAN LTE-V2I/P SI
- RAN LTE-V2V WI | RAN LTE-V2X WI

LTE-V2X Evolution

CCSA

- TC5 WG3 — LTE-V2X WI on requirement & architecture
- TC5 WG8 — WI on frequency requirement and coexistence study on V2V/V2I
- TC5 WG3 — LTE-V2X WI air interface WI

C-ITS

- LTE-V2X WI for requirement & architecture
- SI on General security requirements of C-ITS
- Joint WI with SAE China — WI on V2X application layer standard

TIAA

- V2X Spectrum-related study

National Key project

- Field operational tests

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Conclusions

- **A plethora of C-ITS activities are ongoing in China, across standardization bodies, industry alliances, and national pilots projects.**

- **Close coordination and cooperation exist among CCSA, C-ITS, TIAA and SAE China.**

- **Clear links between China C-ITS standards and 3GPP LTE-V2X.**

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Thank you

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