CAICT
中国信息通信研究院
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The Status of LTE-V in 3GPP

2015.7

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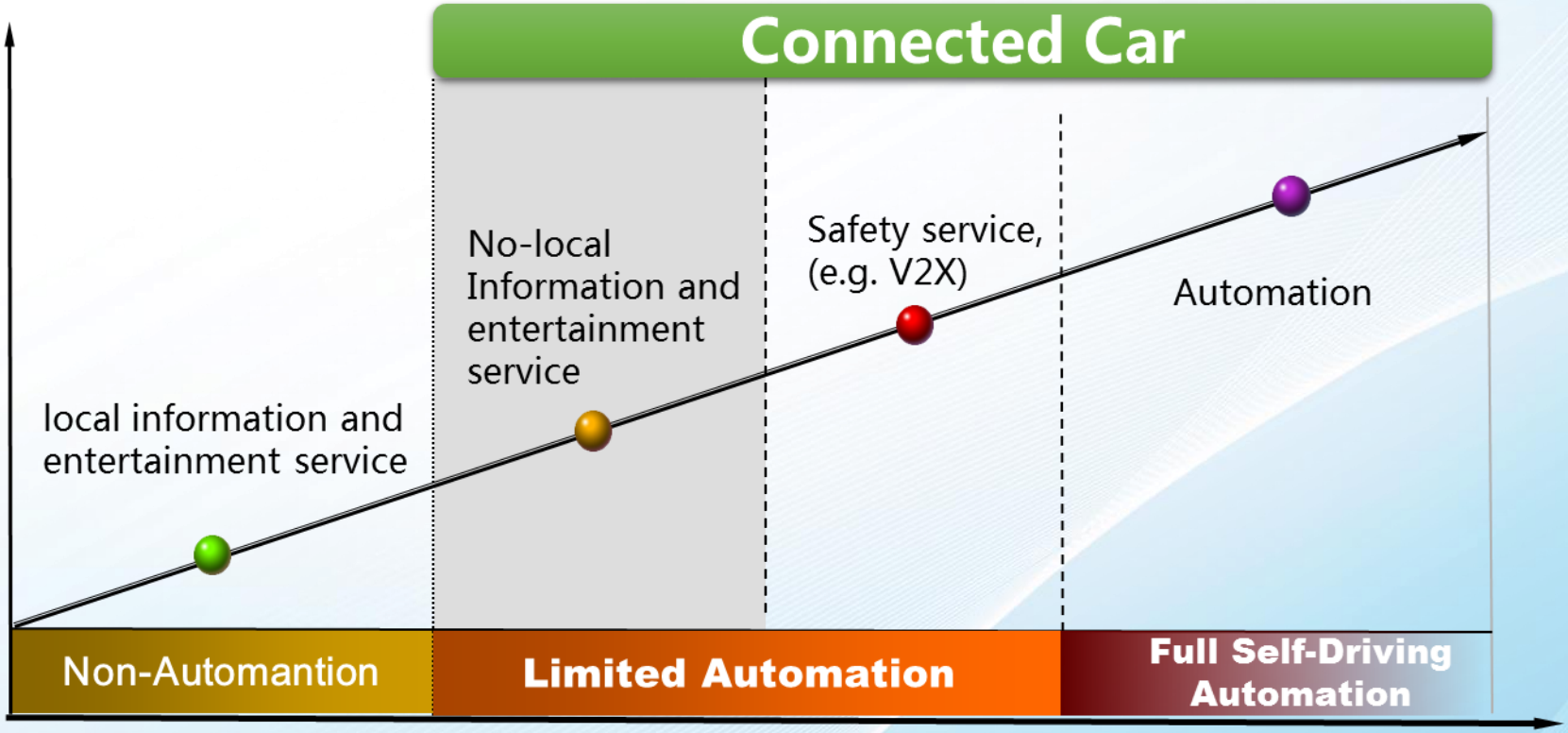
Outline

Background of LTE-v

The progress of LTE-v in 3GPP

The stage of connected car



- The connected car can be divided into 3 stages
- LTE is used in cars to supply internet service e.g. real time navigation
- Active safety will be the next important feature of connected car
- LTE-V is the technology to support V2X service in limited Automation stage

The safety mode will be changed

- Active safety will become more important in connected car
- Sensors have been used in car for active safety, but the distance is limited
- LTE-v will supply more information than sensors, e.g. the long distance route and cars information

Outline

Background of LTE-v

The progress of LTE-v in 3GPP

The progress of LTE-v in 3GPP

2014.9 LG submits RP-141381"Consideration of LTE-based V2X communication" in 3GPP

2014.12 Ericsson submits RP-142027 "Enhanced LTE Device to Device Proximity Services" in 3GPP.
The Conclusion of discussion is that the scenarios and requirement should be study in SA1

2015.2 SA1 sets up the SI "Study On LTE Support For V2X Services(V2XLTE)"

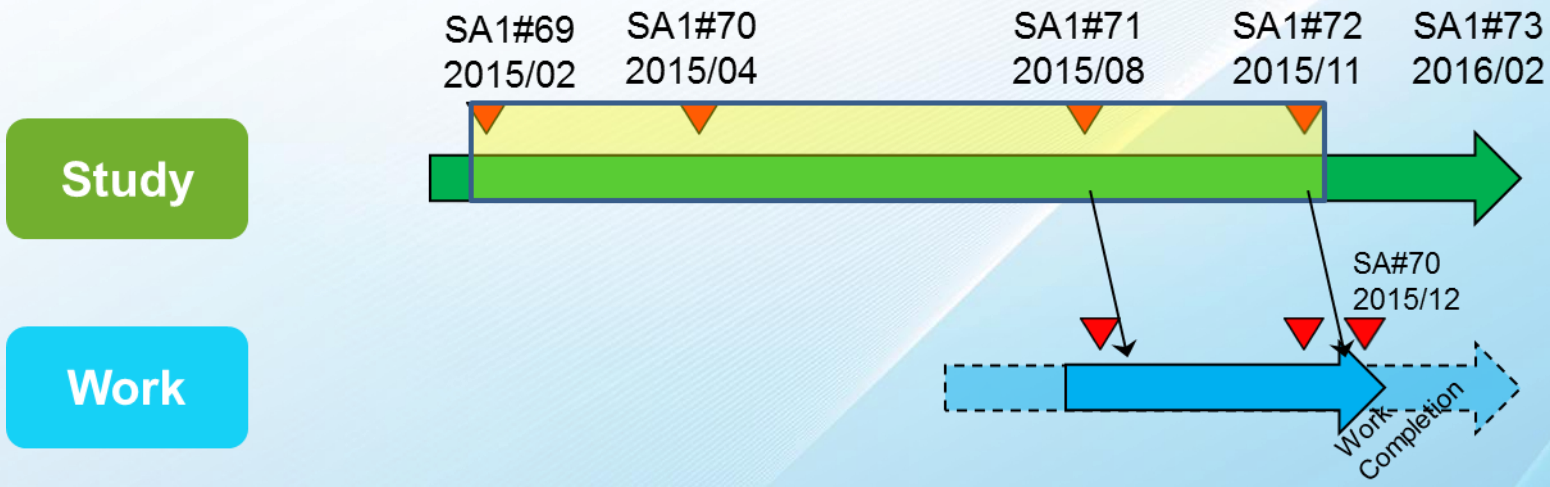

3GPP TR 22.885 V0.2.0 (2015-04)
Technical Report

3rd Generation Partnership Project;
Technical Specification Group Services and System Aspects;
Study on LTE Support for V2X Services
(Release 14)

2015.6 RAN1 sets up SI "Feasibility Study on LTE-based V2X Services", starts LTE-V technology study

V2X work plan of SA1

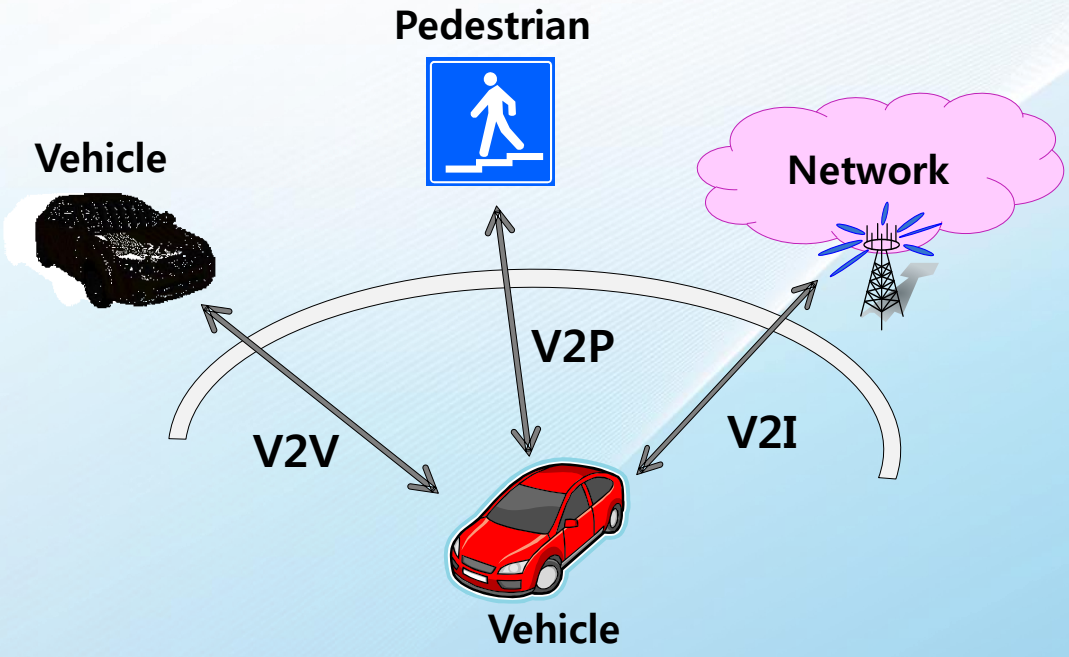
- SI Starts at 02/2015, end in 12/2015, targeting completion in time for Rel-14
- Use cases for V2V has almost finished and V2I/V2P are in progress
- RL to RAN has been sent which is attached with V2V use cases and requirements



The scope of V2X in SA1

The vehicular communication in this study, referred to as Vehicle-to-Everything (V2X), contains the following three different types:

- Vehicle-to-Vehicle (V2V) Communications
- Vehicle-to-Infrastructure (V2I) Communications
- Vehicle-to-Pedestrian (V2P) Communications



Scenarios in V2X

18 use case have been studied in TR 22.885

- Forward Collision Warning
- Control Loss Warning
- V2V Use case for emergency vehicle warning
- V2V Emergency Stop Use Case
- Cooperative Adaptive Cruise Control
- V2I Emergency Stop Use Case
- Queue Warning
- Road safety services
- Automated Parking System
- Wrong way driving warning
- V2V message transfer under operator control
- Pre-crash Sensing Warning
- V2X in areas outside network coverage
- V2X Road safety service via infrastructure
- V2I / V2N Traffic Flow Optimisation
- Curve Speed Warning
- Warning to Pedestrian against Pedestrian Collision
- Vulnerable Road User (VRU) Safety

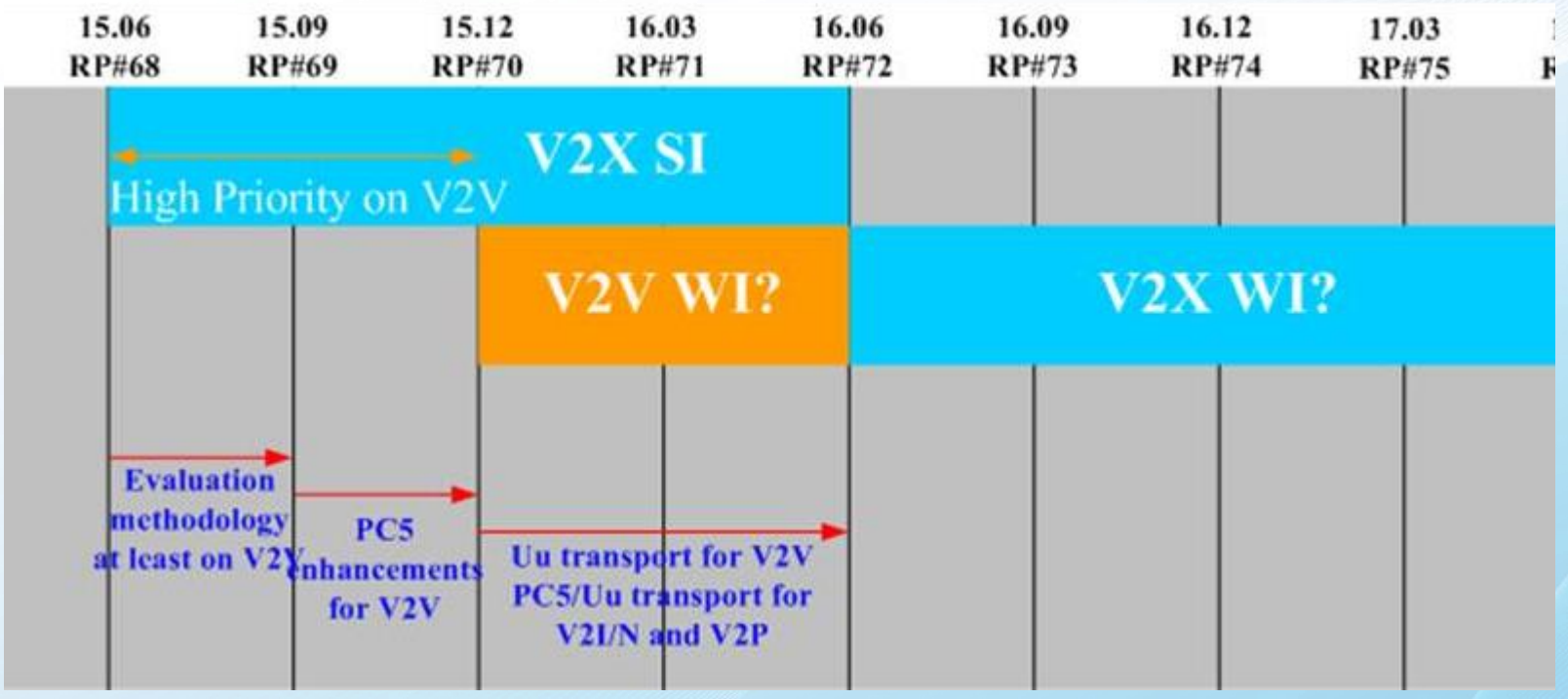
Parameters for V2X

- The system parameters for V2X include range, speed, latency , reliability and so on
- The SA1 is going to work on these parameters according to V2X scenarios and requirements

	Effective range	Absolute velocity of a UE supporting V2X Services	Relative velocity between 2 UEs supporting V2X Services	Maximum tolerable latency	Minimum application layer message reception reliability
#1 (suburban)	200m	50kmph	100kmph	100ms	90%
#2 (freeway)	320m	160kmph	280kmph	100ms	80%
#3 (autobahn)	320m	280kmph	280kmph	100ms	80%
#4 (NLOS / urban)	100m	50kmph	100kmph	100ms	90%
#5 (urban intersection)	50m	50kmph	100kmph	100ms	95%

V2X work plan of RAN1

- LTE-V technical standards will be maked in RAN
- RAN1 SI Starts at 06/2015, ends in 12/2016,
- WI will be planned to start at 12/2015 early but not sure



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Thanks for you attention!