MIC's Initiatives on V2X for Automated Driving Society

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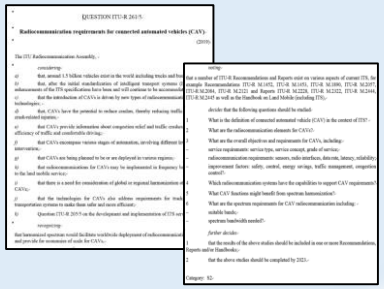
MIC promotes wireless communications for ITS in coordination with related stakeholders

International Standardization

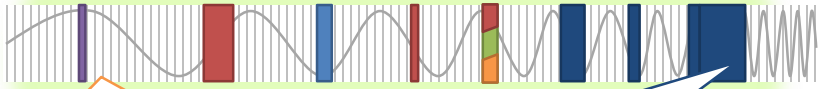
Contributing to ITU-R activities



Requirements for CAV

Regulation

Frequency allocation

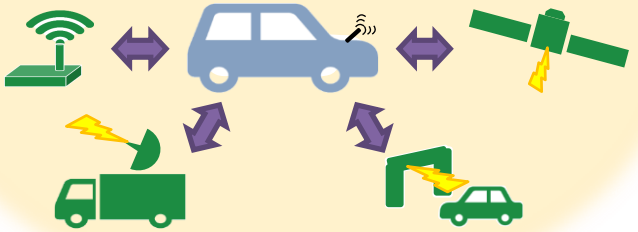


V2X

Rader

R&D and FOT

Technology development for advanced ITS



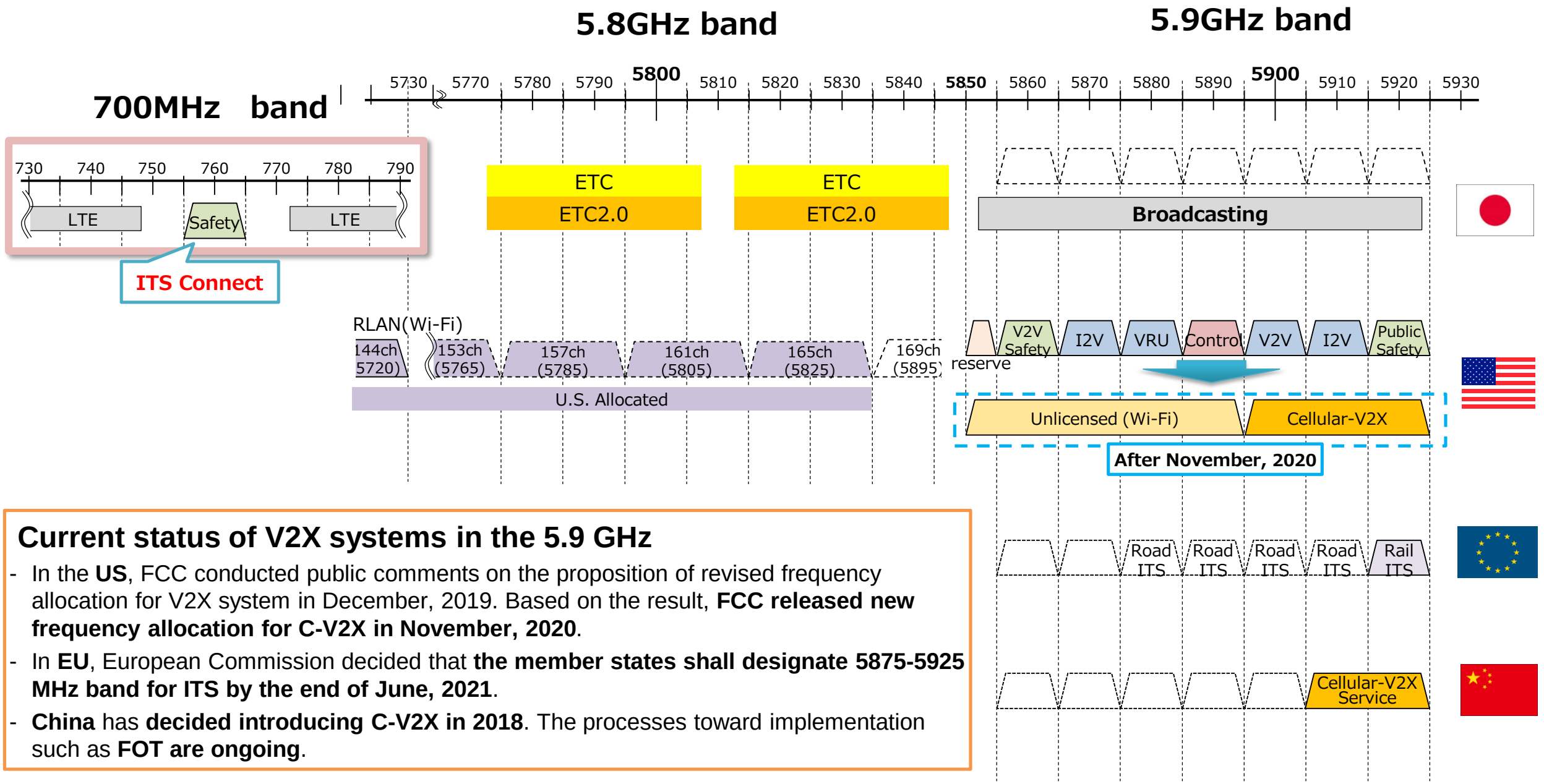
Technical studies for introduction V2X

Overseas Cooperation

Promoting global use of ITS

Trials in foreign countries

The global trends of frequency allocation for V2X



Current status of V2X systems in the 5.9 GHz

- In the **US**, FCC conducted public comments on the proposition of revised frequency allocation for V2X system in December, 2019. Based on the result, **FCC released new frequency allocation for C-V2X in November, 2020**.
- In **EU**, European Commission decided that **the member states shall designate 5875-5925 MHz band for ITS by the end of June, 2021**.
- **China** has **decided introducing C-V2X in 2018**. The processes toward implementation such as **FOT are ongoing**.

Frequency Reorganization Action Plan (November, 2020)

Chapter 3 Priority Initiatives Ⅲ Initiatives for a Self-Driving Society

Based on the progress and importance of automatic driving systems (including safe driving support), a study is being carried out, **which will finish by the end of FY 2021, into the technical conditions for frequency sharing with needed existing wireless systems, for example when introducing V2X communications, and with consideration for existing wireless systems on frequency bands being studied internationally (5.9 GHz band)**, in addition to the existing ITS frequency bands (760 MHz band, etc.).

In addition, based on the results of these studies, **a conclusion will be reached within FY 2022 regarding frequency allocation policy, such as frequency sharing and migration/reorganization when introducing V2X communications in the same frequency band, etc.**

Chapter 4 Reorganization Policy for Each Frequency Range Ⅶ 5.85～23.6GHz Band

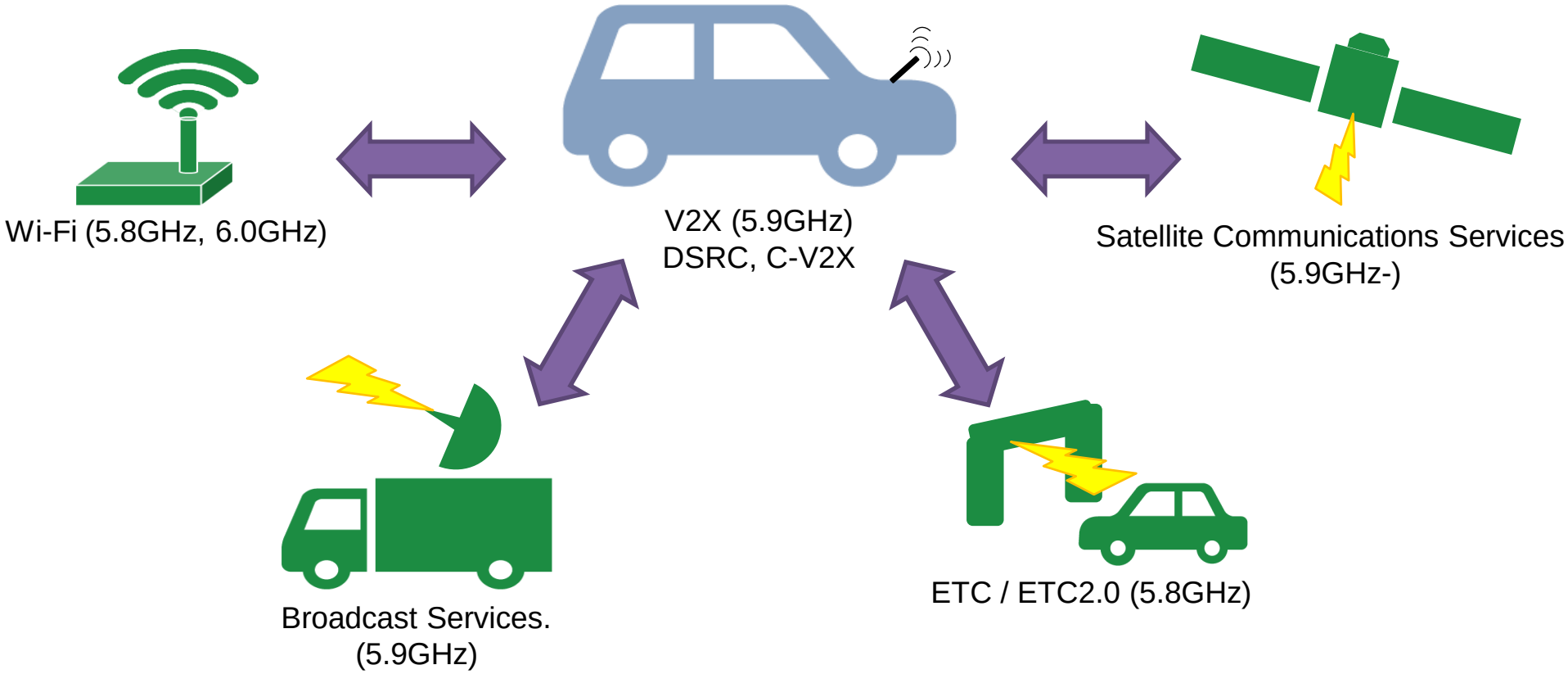
5. Commercial Broadcasting Radio Stations and Fixed-Satellite Services［5.9GHz band］

Based on the progress and importance of automatic driving systems (including safe driving support), a study is being carried out, which **will finish by the end of FY 2021, into the technical conditions for frequency sharing with needed existing wireless systems, for example when introducing V2X communications,** and with consideration for existing wireless systems on frequency bands being studied internationally (5.9 GHz band), in addition to the existing ITS frequency bands (760 MHz band, etc.,).

In addition, based on the results of these studies, **in cases where V2X communications are to be introduced on the same frequency band, there is a goal to allocate frequencies to V2X in FY 2023 after the necessary frequency bandwidth has been secured by migrating existing wireless systems, etc.**

MIC has been conducting technical study for the introduction of the V2X system in the 5.9 GHz band.

A technical study is conducted on the possibility of sharing with existing radio systems.



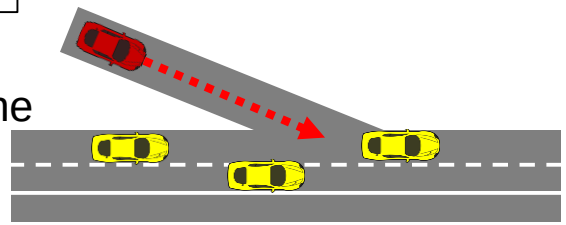
Technical study of V2X communication for self-driving (FY2020 - 2022)

- In order to define the technical requirements of V2X communication, MIC conducted a technical survey and developed 25 use cases in FY2020.
- MIC are making a draft roadmap of communication requirements, with consideration of the technical study and the future usage rate of self-driving vehicle.

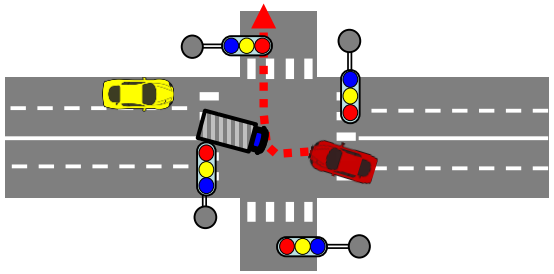
Example of Use Case

25 use cases

Joining the main lane on the highway

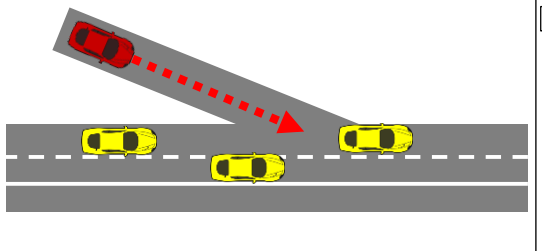


Turning right



→Define requirements for V2X in 700 MHz and 5.9 GHz band

Example of a roadmap



The stage of spread of self-driving cars			20XX Introduction	20XX Growth	20XX Maturity	
			Speed adjustment	Providing the information of the gap on the main lane	Adjustment the gap between the cars on the main lane	Arbitration among self-driving cars
Technical Requirement	V2V / V2I		V2I	V2I		
	Message / Size		Estimated time of merging lanes	Estimated time of merging lanes		
			Average speed on the highway	Average speed on the highway		
Communication Requirement	Delay		XX ms			
	Amount of data		XX bps			
	Consecutive emission		X times / 100 ms			
	Packet arrival rate		XX %			
	Distance		XX m			
Communication Method	Short Range	ARIB STD-T75				
		ARIB STD-T109				
	Long Range	LTE				
		5G				
	Frequency		XX	XX		
	Band		YY	YY		

→Technically evaluate the possibility of introducing V2X in 5.9 GHz band