Technologies for vehicle safety communications - Japan

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Speakers

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    & Chair, DSRC International Task Force, Roadside Communications Expert Group, ITS Info-Communications Forum, Japan
  - Hitachi, Ltd.
- Prof. Sadayuki Tsugawa
  - Chair, VSC Task Group, IVC Expert Group,
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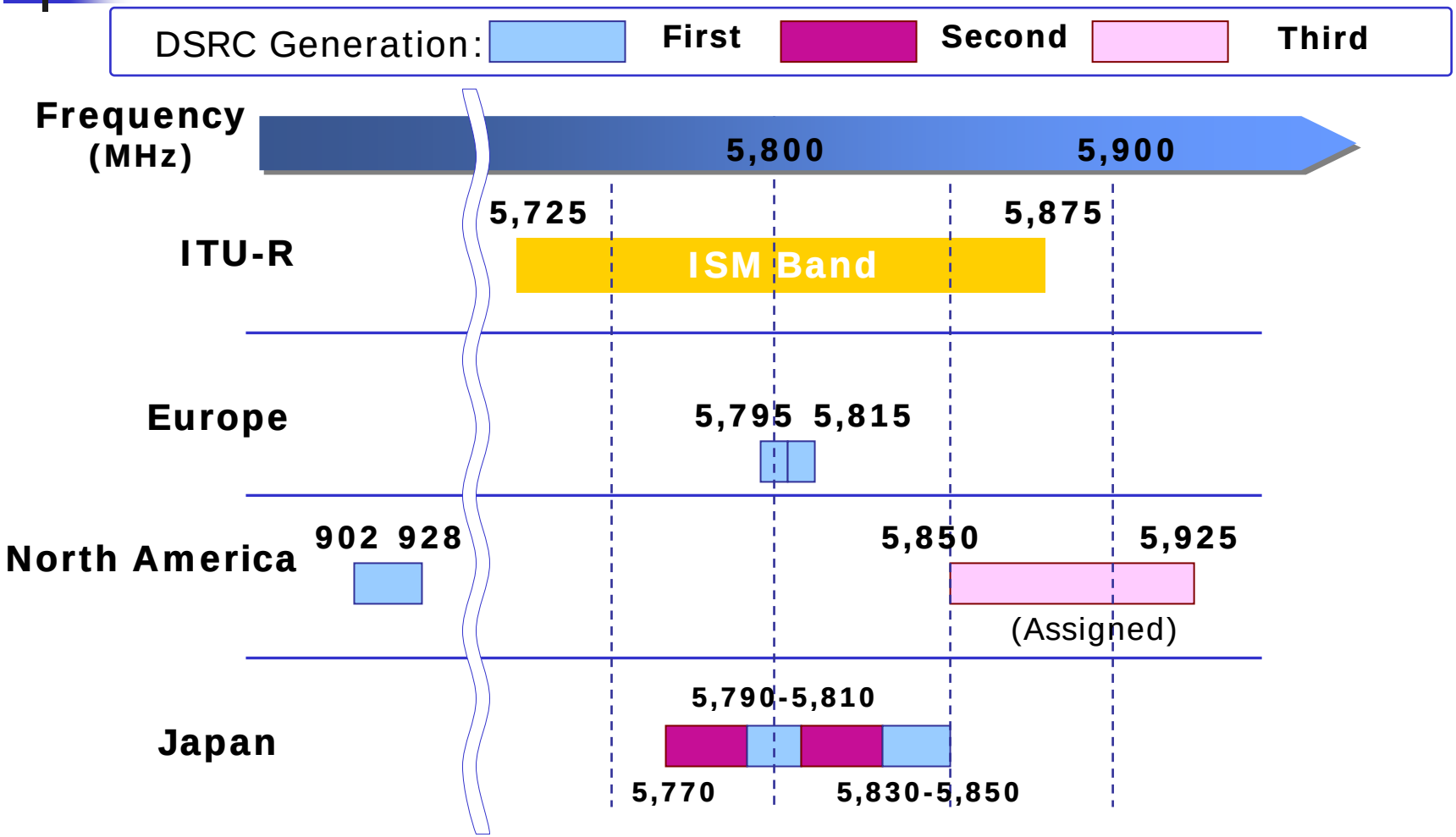
  - Chair, IVC Expert Group,
    ITS Info-Communications Forum, Japan
  - FUJITSU, Ltd.

DSRC development in Japan

Satoshi Oyama
Hitachi, Ltd.

Spectrum for DSRC



DSRC: International Standards

Lower Layer

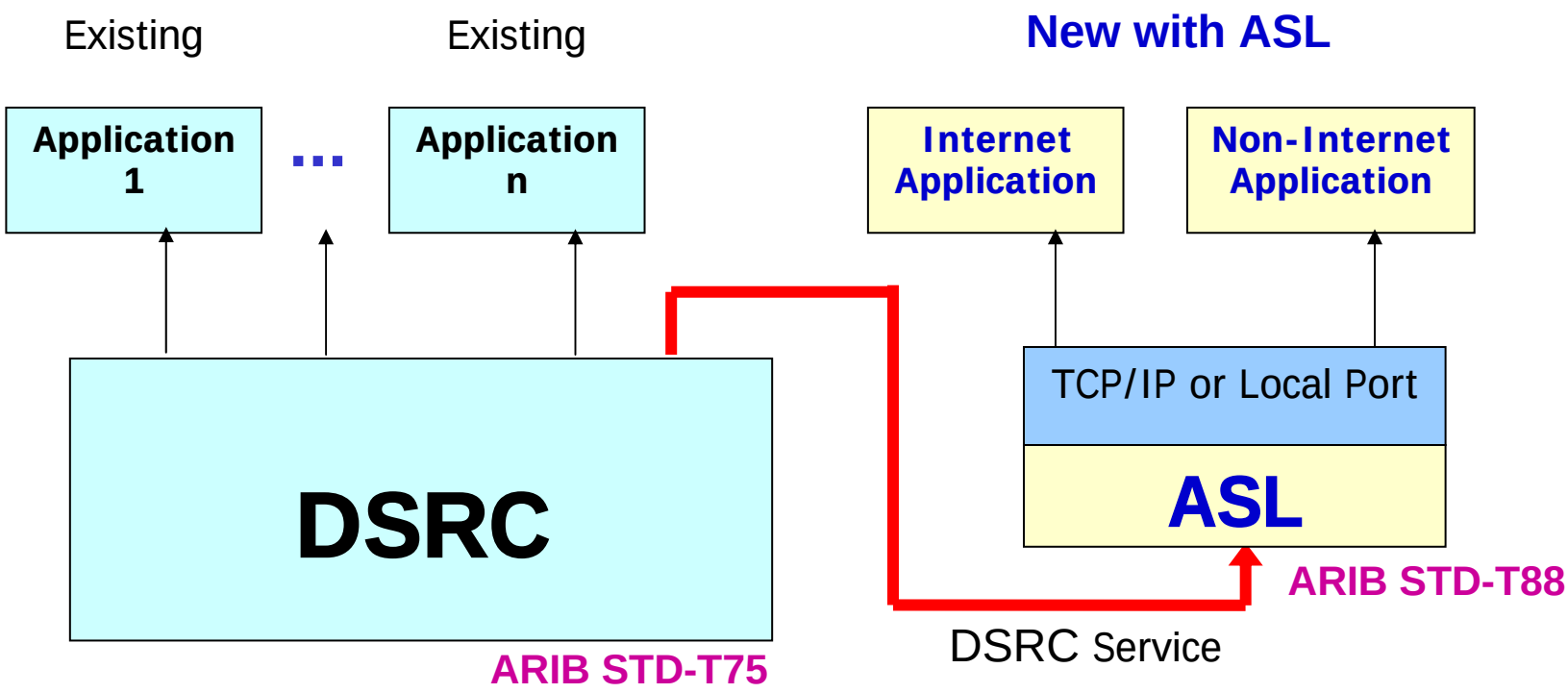
ITU-R Recommendation M.1453-1

Item	Europe(CEN)	North America	Japan
Frequency Band	5.8 GHz	915 MHz **(5.9 GHz)**	5.8 GHz
Communication System	Passive	Active & Passive	Active
Maximum Data Transmission Rate	Downlink:500kbps Uplink :250kbps	915MHz **(Down/Uplink)** :500kbps **(5.9GHz: 27Mbps)**	Down/Uplink: 1 or 4 Mbps
Outline of Protocol	Asynchronous	Synchronous & Asynchronous	Synchronous
Standards	**CEN**	**(IEEE802.11)**	**ARIB STD-T75**

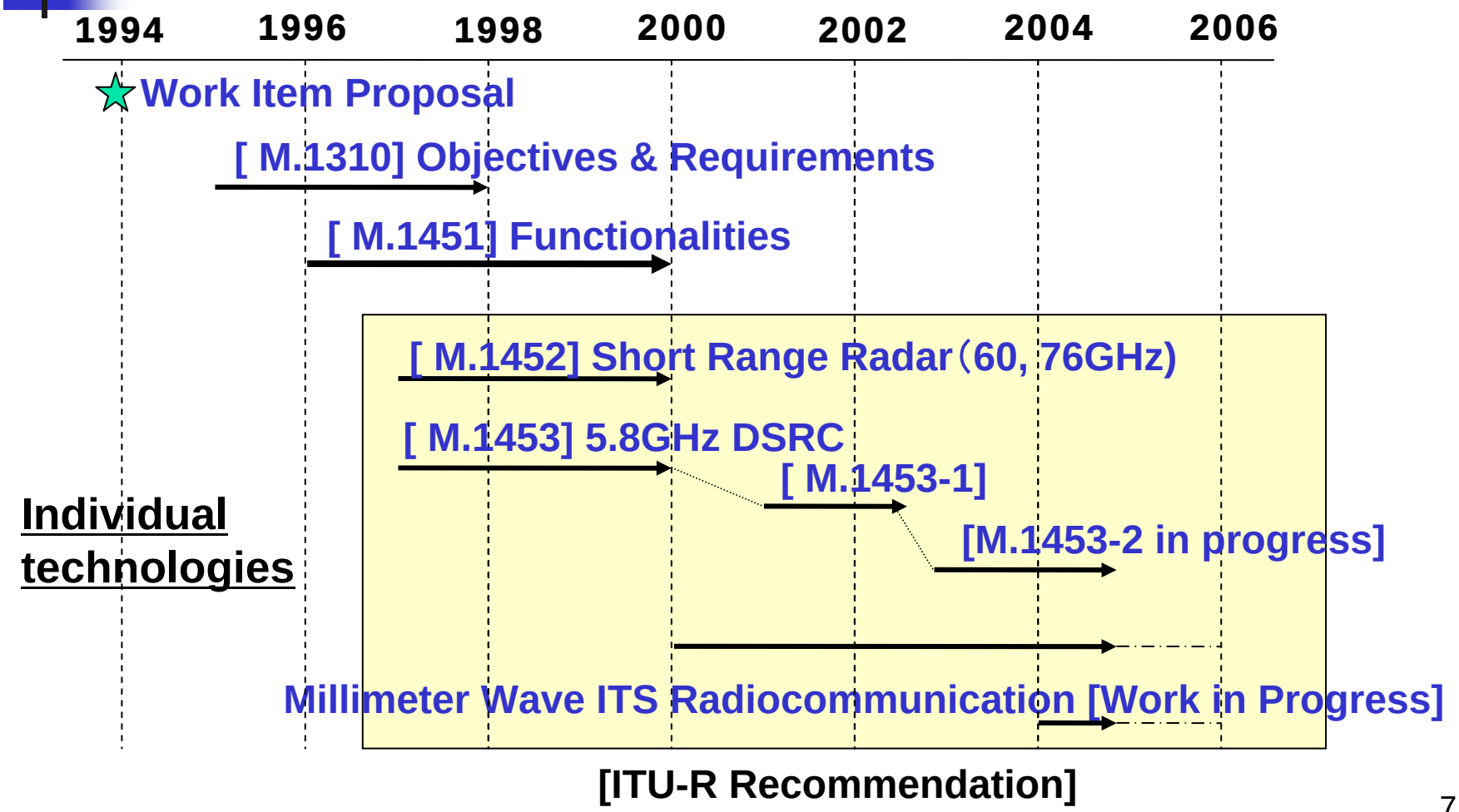
ARIB: Association of Radio Industries and Businesses

DSRC: ARIB Standards

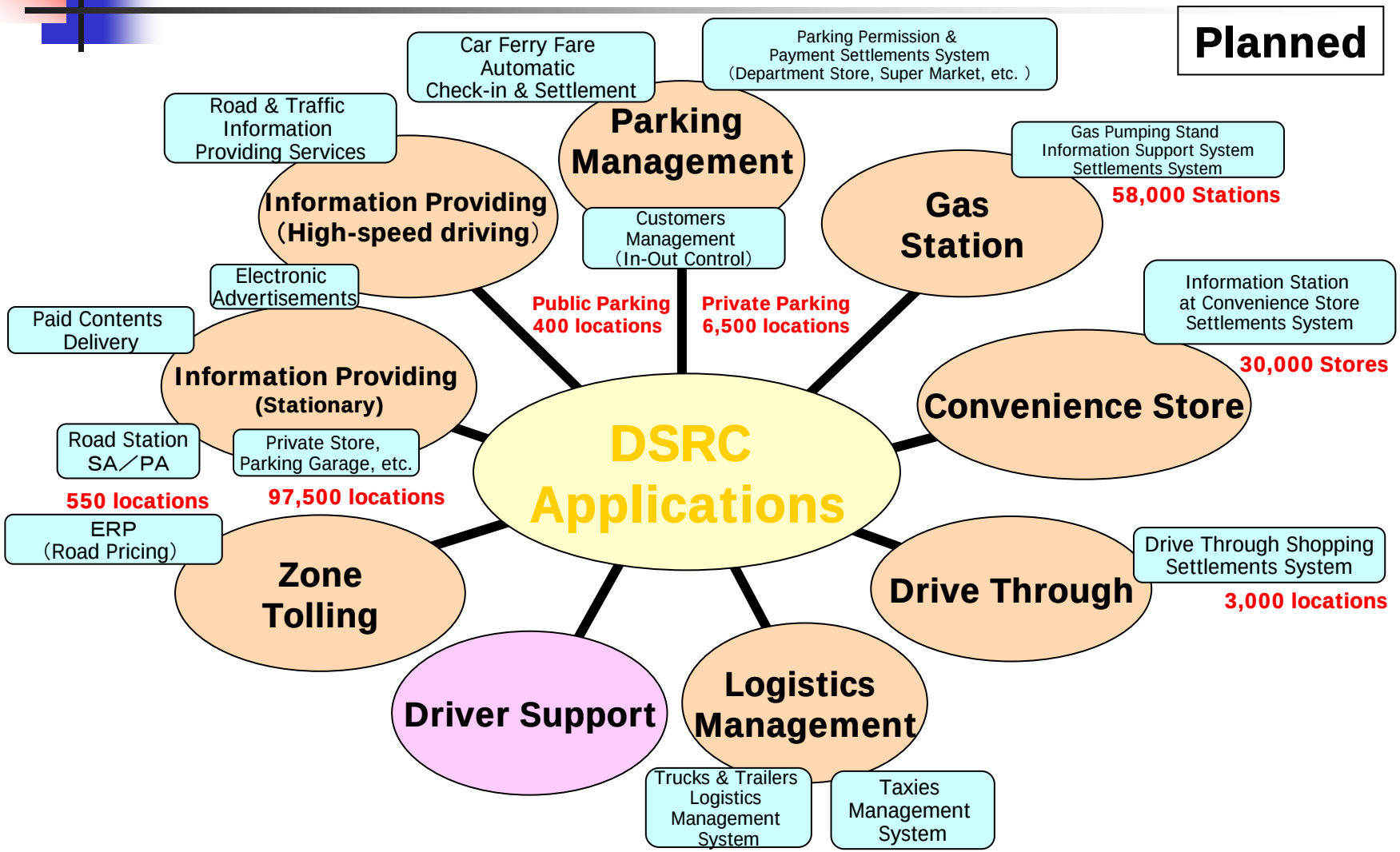
Draft ITU-R Recommendation M.1453-2



ITU-R: ITS Recommendations



DSRC Applications in Japan



Technologies for vehicle safety communications

Prof. Sadayuki Tsugawa
Meijo University

Applications of DSRC

- Technologies
  - 5.8 GHz, DSRC
  - Infrared
- Road-to-Vehicle Communications
  - ATMS/ATIS oriented applications
  - AVCSS oriented applications
- Inter-Vehicle Communications
  - AVCSS oriented applications

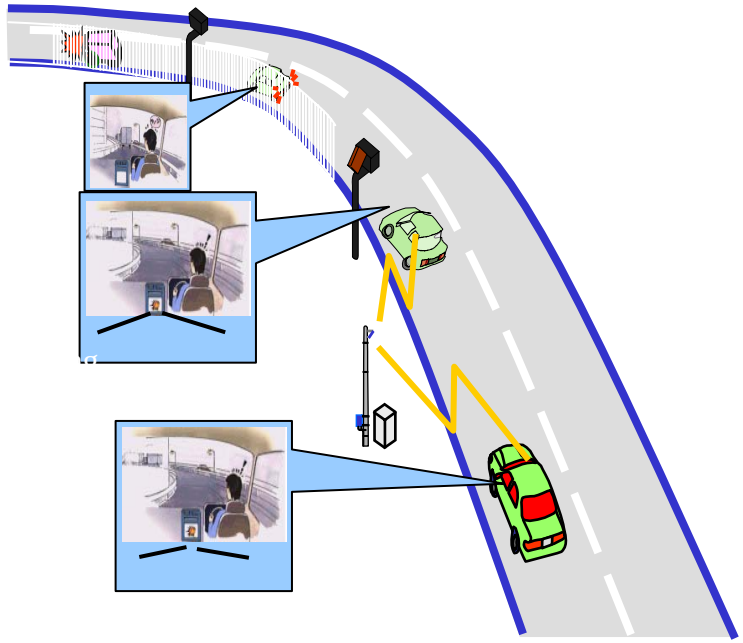
ATMS: Advanced Traffic Management Systems
ATIS: Advanced Traveler Information Systems
AVCSS: Advanced Vehicle Control and Safety Systems

Applications of RVC to ATMS/ATIS

- Practical Use Phase
  - ETC [2001-]
  - Toll collection at parking lots [2004-]
- Experimental Phase
  - On-board Internet [2003-]

Applications of RVC to AVCSS

- Safety-oriented Applications
- Experimental Phase [2000-]
  - AHS: Road-vehicle cooperative system for Safety



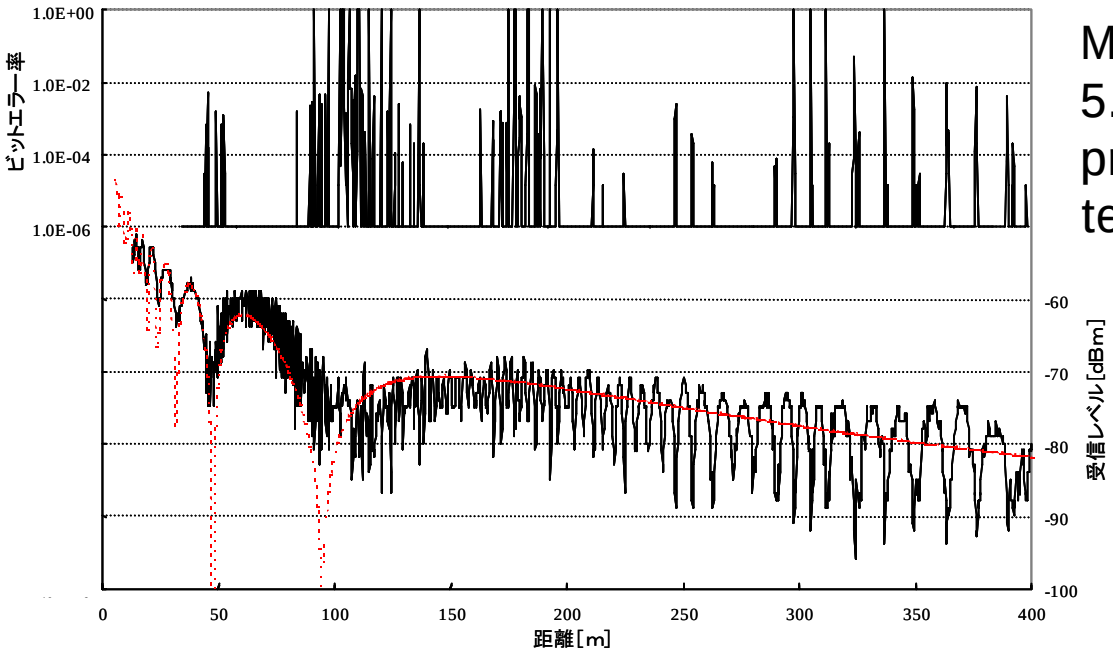
AHS: Advanced cruise-assist Highway Systems

Applications of IVC to AVCSS

- Safety-oriented Applications
  - Compatibility of safety & efficiency
- Infrared-based IVC [1993-1997]
  - Slotted aloha
- 5.8 GHz DSRC-based IVC [1997-2001]
  - CSMA

Current Technological Issue

- Propagation Characteristics
- Field Measurement is Necessary



Measurement of 5.8 GHz DSRC propagation on test track

IVC Technologies for vehicle safety communications

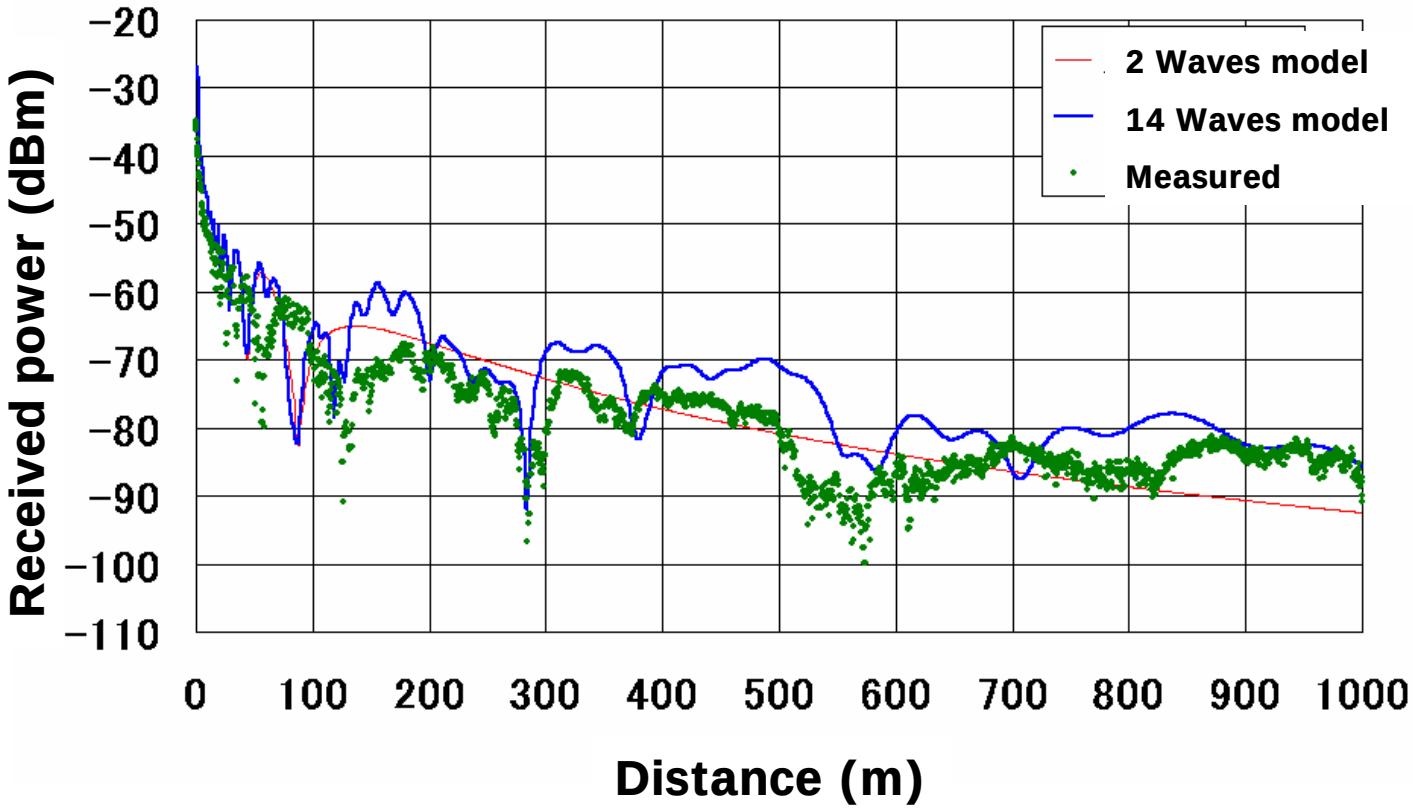
Tetsuo Horimatsu
Fujitsu, Ltd.

Experiment

Experiment in case of out-of-sight propagation

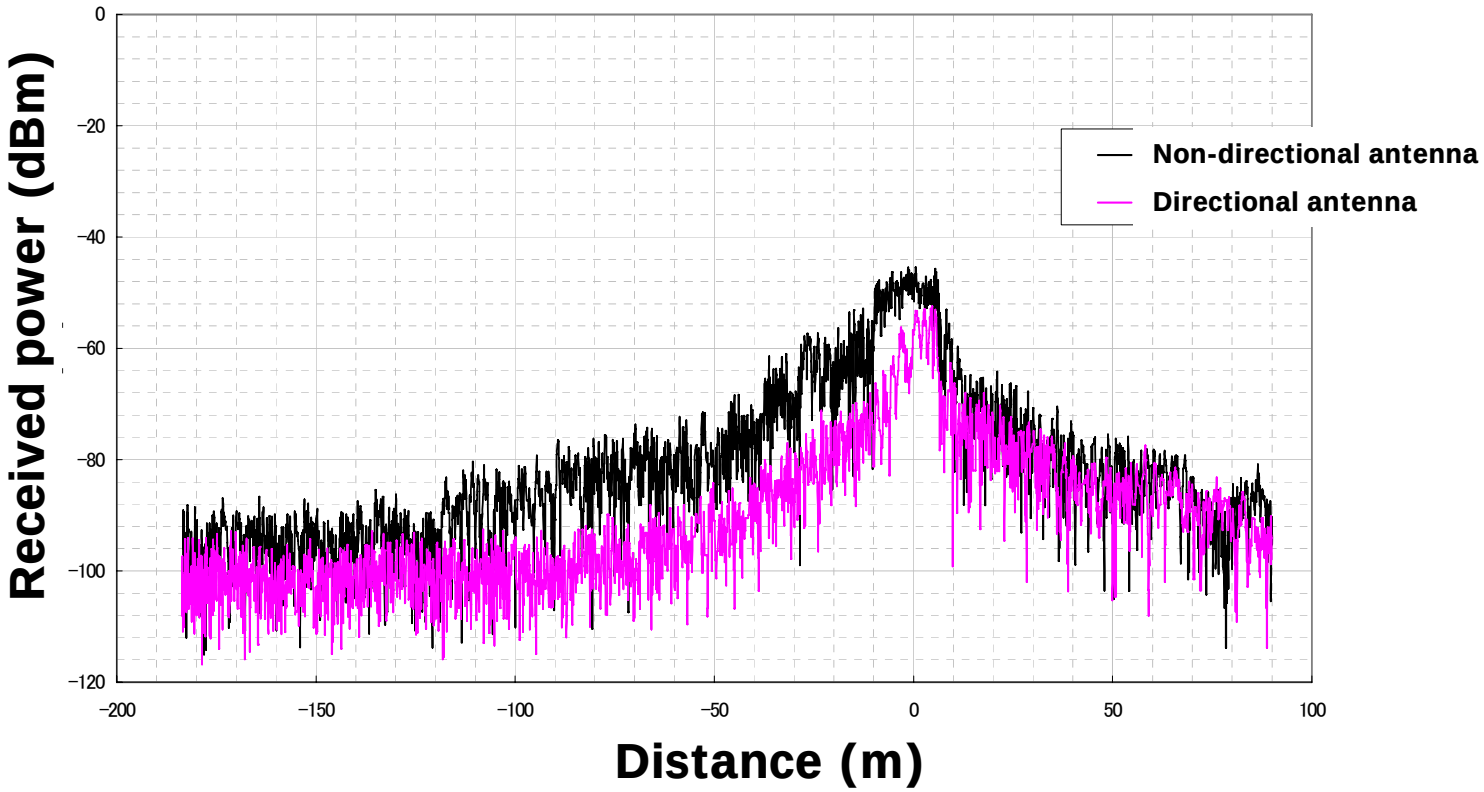
Data in case of line-of-sight propagation

5.8 GHz band



Data in case of out-of-sight propagation

5.8 GHz band



Communication Spec.
（Example）

	Stop & Go	Intersection Collision Warning
Frequency Band	60 GHz	5.8 GHz
Modulation	FSK	π/4-QPSK(ASK)
Modulation Speed	512 Kbps/128 kbps	640 kbps/4 Mbps
Media Access	CSMA	CSMA
Emission Power	less than 10 mW	less than 10 mW