Wireless LAN in Japan

Technologies, Market and Regulation

Present and Future

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Contents

- ***Present Wireless LAN in Japan***
  - Products and Technologies
  - Market and Application
  - Regulations
- ***Future Wireless LAN in Japan***
  - Technologies
  - Market and Application
  - Regulations

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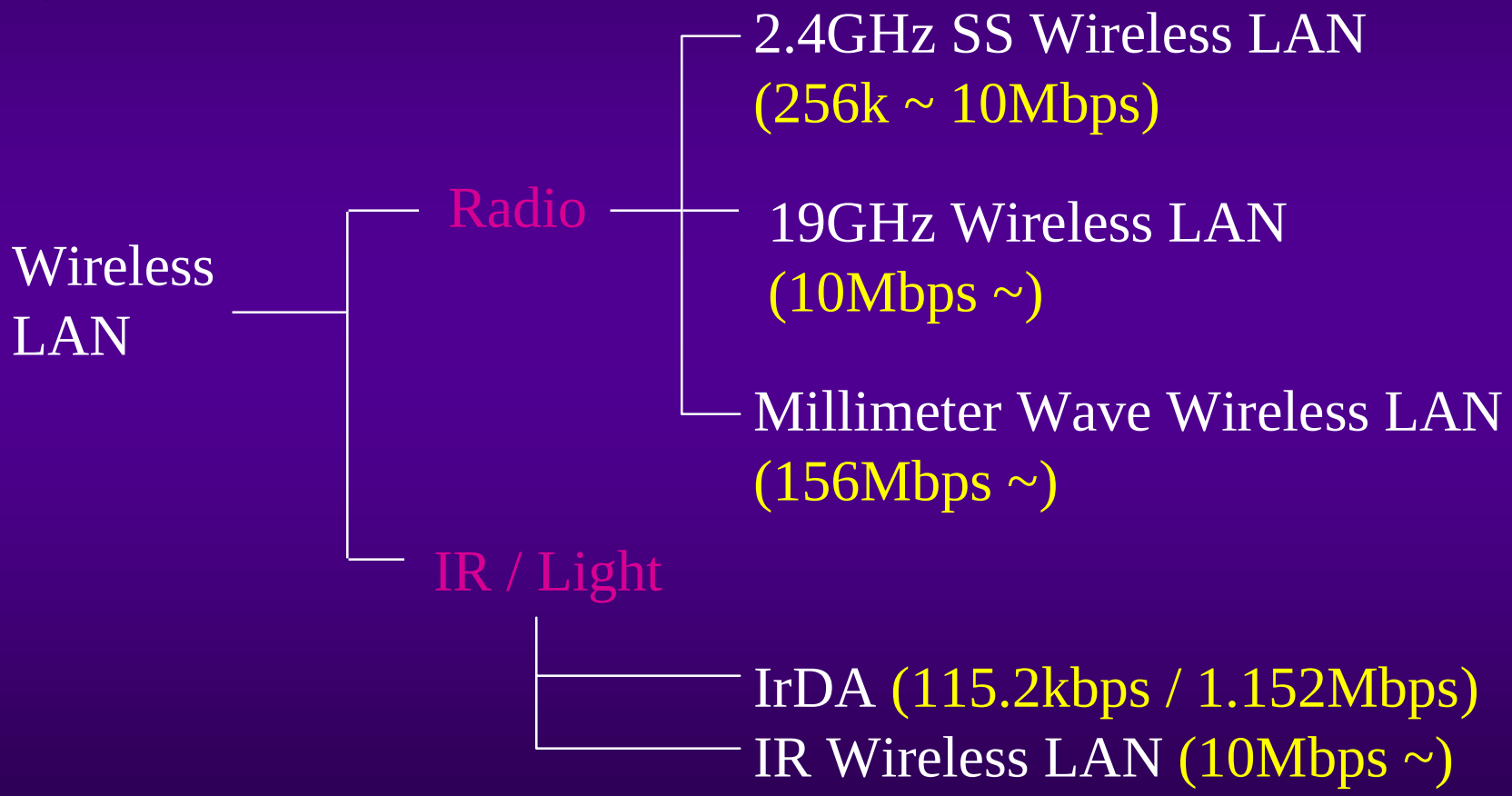
History of Wireless LAN in Japan

- **Dec 1992** : Update of Radio Regulation for “Small Power Data Communication System (SS 2.4GHz)” and “Local Area Radio Station (19GHz)”
- **Mar 1993**: The 1st SS 2.4GHz Product appeared (Clarion JX-1100A)
- **Mar 1995**: “R&D Committee of Light Wireless Communication Systems” was established in the ARIB.
- **May 1995**: “Development Committee of Millimeter Wave Wireless LAN” was established in the ARIB. (156-600Mbps / 30-300GHz)

Category of Wireless LAN



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Present Situation (SS 2.4GHz)

- Mainstream of Wireless LAN
- Standardization by 802.11 is in progress
- Internationally available (Japanese 26MHz B.W. is the narrowest)
- DS:FH = 1:1 in Japanese market
- 5Mbps ~ 10Mbps products is being announced

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Present Situation (19GHz)

- Station license requirement is blocking the spread
- Motorola's *Altair* the only product in Japan has been discontinued
- More costly than 2.4GHz and slower data rate than millimeter wave
- NTT announced to go on the market in Sept. 1996

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Present Situation (IR)

- Up to 150Mbps is possible
- No radio regulation is applied all over the world
- 10Mbps products are already available
- Lower cost and narrower area than 2.4GHz
- IrDA standard will be applied to low data rate wireless LANs
- Seems to be suitable for The Last One Meter of LAN

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Present Situation (IrDA)

- IrDA : An nongovernmental organization for standardization of infra-red communication systems
- IrDA-1 : 115.2kbps
- IrDA-2 : 1.152Mbps/4Mbps
- Active toward 10Mbps

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Industrial History and Trend in Japan

- **1993** : Overseas companies with Japanese corporations went on the market (NCR and Motorola)
- **1994** : Domestic companies went on the market (JRC, Clarion, JVC, NTT Data)
- **1995** : Trade companies began to import products. Some domestic companies introduced WaveLAN as OEM products. New 10 companies appeared.
- **1996** : WaveLAN and RangeLAN expand OEM supply. Some new big companies go on the market. 5Mbps product will appear.

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Companies Selling Wireless LAN in Japan

- **Communication** : JRC, TOYOCOM, NTT Data, NTT-IT
- **Computer Supplier** : NEC, TOSHIBA, HITACHI, NCR Japan, IBM Japan, SEIKO EPSON
- **Trade companies** : KANEMATSU, Panasonic Group, JEPICO, KANSAI Electric
- **Others** : Clarion, JVC, Soliton Systems, COMTRON

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Present Regulations Overview

	Radio W-LAN		IR W-LAN	Competitive Systems	
	2.4GHz	19GHz		400MHz / 1200MHz	1.9GHz
Category of Station	Small Power Data Comm.	Local Area Radio	Not Specified	Special Small Power	PHS Mobile Land
Station License	Not Required	Required	Not Required	Not Required	Not Required
Operator License	Not Required	Not Required	Not Required	Not Required	Not Required
Bandwidth / Channels	26MHz	80MHz	Not Specified		
Data Rate	No Restrictions	≥10Mbps	Not Specified	~32kbps	32kbps
TX Power	≤10mW/ MHz	≤300mW	Not Specified	≤10mW	≤10mW

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Japanese Radio Regulations for 2.4GHz SS

	USA	Japan
Frequency Band	2400 - 2483.5 MHz	2471 - 2497 MHz
TX Power	≤6dBW EIRP	≤10dBm/MHz EIRP measured at antenna terminal
TX spurious at adjacent band	≤500μV/m measured by field strength	≤25μW measured at antenna terminal
Processing Gain	≥10dB	Not specified
Spreading Ratio	Not specified	≥10
Call ID	Not required	must be memorized and automatically transmitted
Special antenna connectors	Required	Not required
Special construction of RF section not to be opened easily	Not required	Required

This table does not indicate all differences

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Update of the Radio Regulations

- More bandwidth in 2.4 GHz: The MPT must guard existing radio stations. Suitable method of frequency co-use with other radio stations existing in 2.4GHz ISM band must be found out.
- 5.7 GHz band : Earnest wish to open this band is the most important.

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Technical Characteristics of SS in Japan

- **SAW devices has been often used.**
  - Clarion : SAW Convolvers (SS Modems, SS units)
  - JRC : SAW Matched Filters (JRL-100)
  - HITACHI : SAW Matched Filters (Wireless unit for Flea Power Radio Station)
- Trend
  - **Digital Signal Processing will become main technology especially for higher data rate.**

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Higher data rate than 2Mbps by 2.4GHz SS

- Clarion demonstrated 5Mbps SS wireless modem M5 at Communication Tokyo ‘96 in April 1996.

Clarion will market 10Mbps version M10 in USA from June 1996.

- Other development completed : NEC, HITACHI, Canon and Aironet

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Japan Original SS Wireless LAN Products

Model	JRL-100	JU-1100A	M5
Developed by	JRC	Clarion	Clarion
Type	Stand Alone	Component	Stand Alone
SS Modulation	BPSK	BPSK	BPSK
Demodulation	SAW Matched Filter	SAW Convolver	Digital Correlator
Data Rate	2Mbps	256kbps	5Mbps
Interface	Ethernet 10BaseT	Original	Ethernet AUI
Roaming	Optional	-	None
Price	\ 190k	OEM Price	Unfixed

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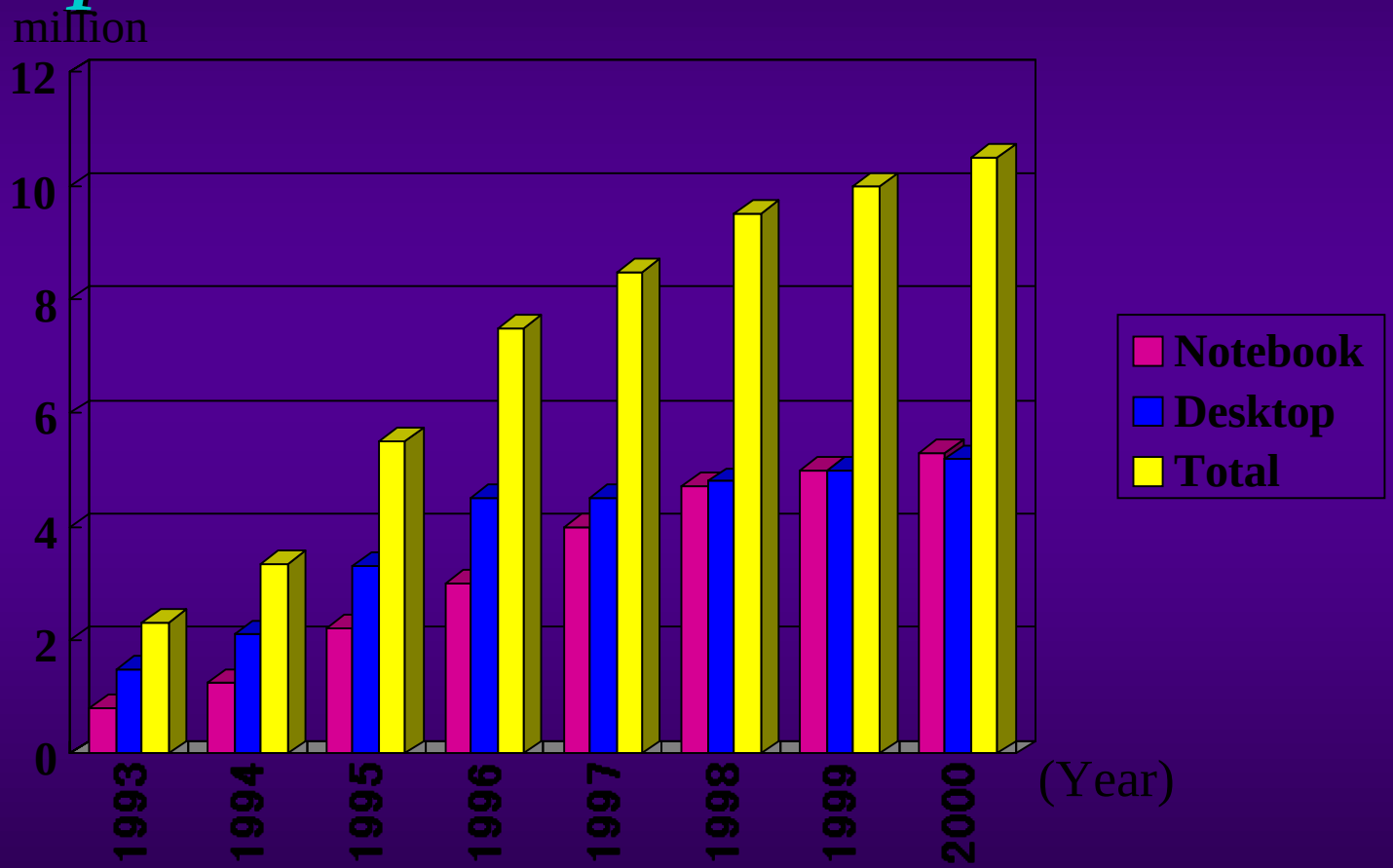
Projected numbers of PCs in Japan



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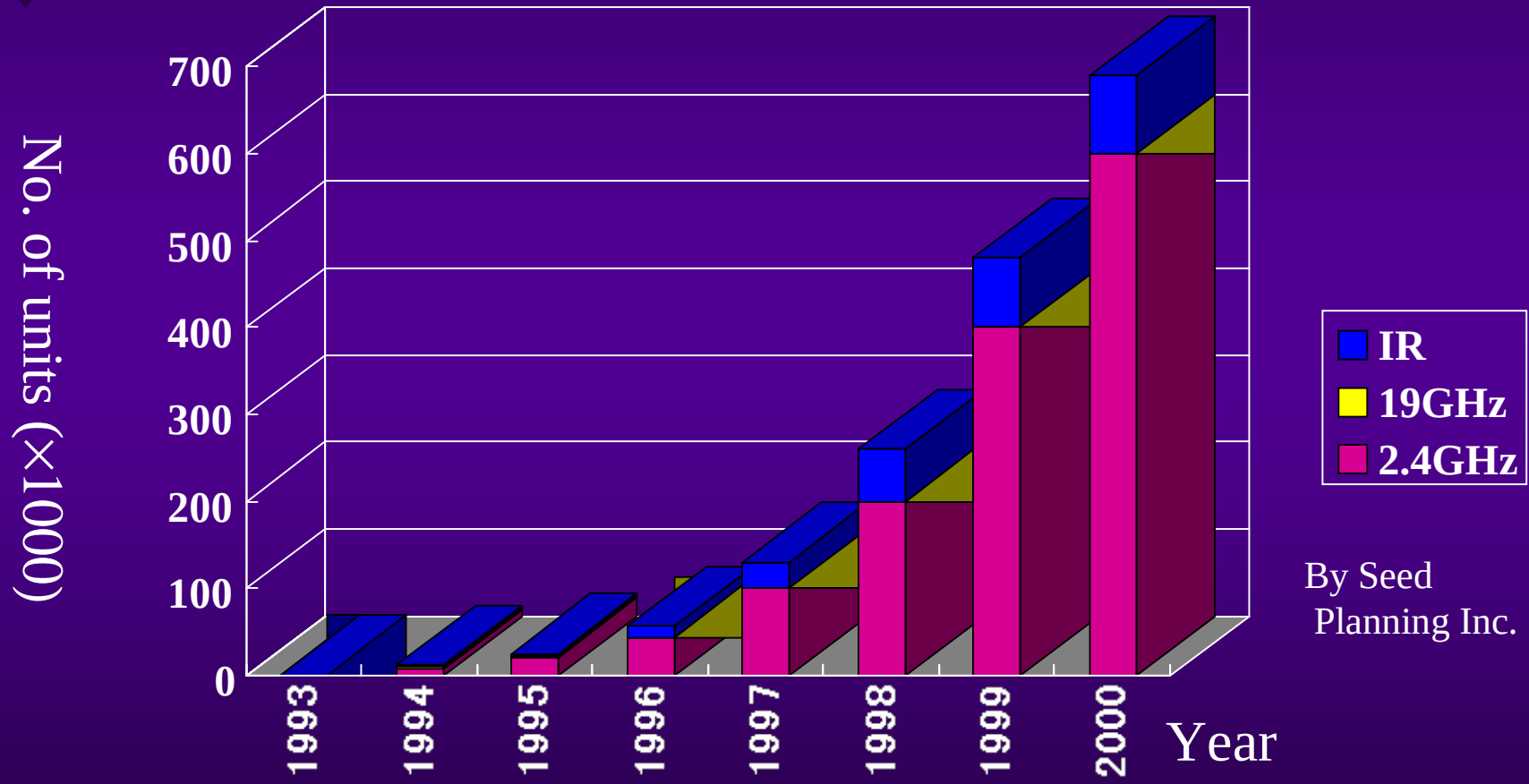
Market Estimation of Wireless LANs in Japan



By Seed Planning Inc.

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Application of Wireless LANs

- **Offices** : “Every room is my office”
- **Distribution Industries** : Wireless POS, Warehouse
- **Factories** : AGV, Warehouse, Wireless Observation
- **Hospitals** : Mobile terminals referring patient’s record
- **Tentative LAN** : Exhibition, Disaster restoration
- **Home** : Avoid spoiling the appearance

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Conclusion--Japan What's different

- **More attractive market than USA !?**
  - Personality : Sensitive to technical trend.
  - Organization : Frequently changed → Saving rewiring cost is important.
  - Office space : Very narrow → Many notebook PCs ← Ideal to Mobile Computing.
- **Many time-consuming jobs after sale**
  - Buyers understand that price includes set up cost and training.

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