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Abstract: [This document introduces latest change of radio regulation for Ultra Wide Band (UWB) radio use outdoor in Japan. This is not an official document of Japanese radio authority MIC but the translated part of documents by Ryuji Kohno.]

Purpose: [information]

Update of UWB Radio Regulation in Japan

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Introduction

Background:

- Japanese radio regulation authority MIC (Ministry of Internal Affairs and Communications) has investigated technical requirement for ultra wide band (UWB) radio use according to UWB research, development, and business after it established regulatory requirement for communication uses for 3.4-4.8GHz, 7.25-10.25GHz in 2010, and collision avoidance radar uses for 22-29GHz in 2013. While UWB communication and sensing systems have been restricted indoor in Japan, the rest of world have been developing them to a lot of outdoor uses.
- Lately in this IoT era, wide variety of UWB radio uses have been expected in Japan as well as in a world and demand for UWB radio outdoor use has been increasing while keeping transparency with other nations.

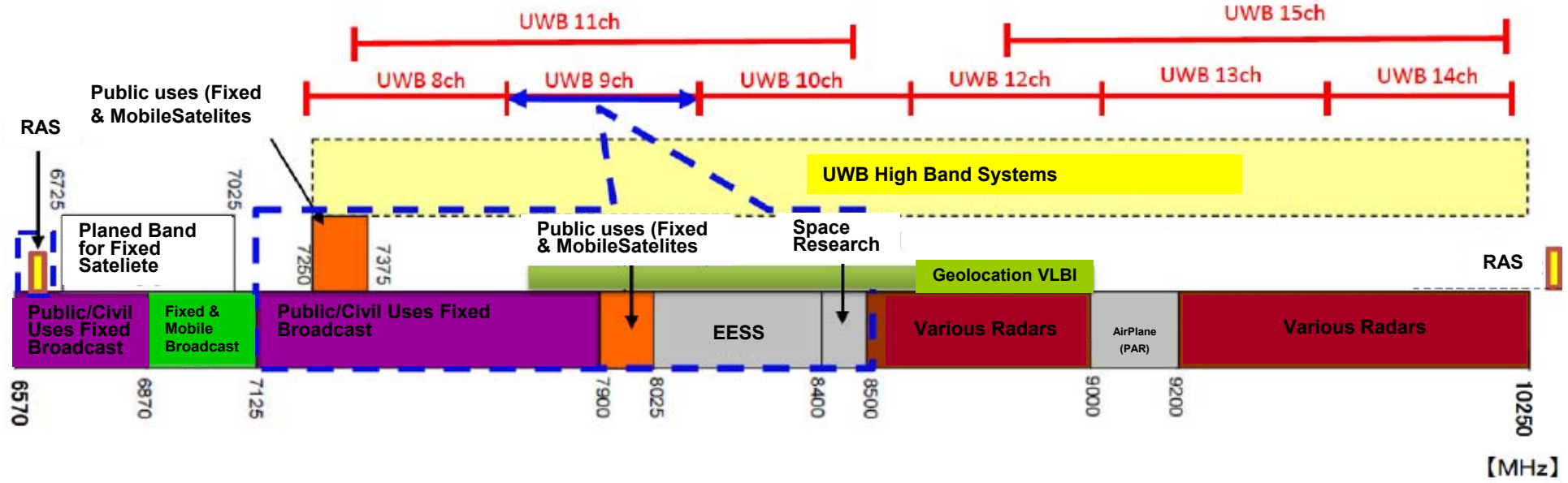
Major Change:

(1) Bandwidth, Occupied, and Impermissible Emission Available Outdoor; Channel 9 of IEEE802.15.4a™ with central frequency 7987.2GHz and bandwidth 499.2MHz out of high band 7.25-10.25GHz has been considered to be available outdoor.

(2) EIRP(Equivalent Isotropically Radiated Power); Japanese regulatory requirement for UWB radio has been regulated by antenna electricity, antenna gain as well as EIRP. For the sake of international compatibility, Japanese regulation for UWB radio uses could be regulated by EIRP.

Radio Uses in the Frequency Band 6.57-10.25GHz

- Red lines indicate channels defined by IEEE802.15.4a.
- Available band is 7.587-8.4GHz. Blue dotted line systems should be protected for coexisitence such as fixed micro wave communication, satellite, radio astronomy and VLBI etc.



Major Technical Requirement for Outdoor UWB Systems(1/ 2)

Technical Requirement of Outdoor UWB Systems			
Permissible Variance of Band		7.587GHz — 8.4GHz	
Antenna Electricity (by EIRP)		Average Power(EIRP) 7,587 -7,662 MHz: Lower than -51.3 dBm/MHz 7,662 -8,400 MHz : Lower than -41.3 dBm/MHz	
		Peak Power (EIRP) No Change	
Antenna Absolute Gain		No Ragulation	
Permissible Occupied Band width		813MHz （Specified Band）	
Permissible Spread Band width		No Change	
Limits of Emission Power subsidiarily (by EIRP)	Not beyond 7.25 GHz	No Change	
	Higher than 7.25 GHz Not Beyond 10.25 GHz	7.25 GHz -- 7.587 GHz	-59.3 dBm/MHz
		7.587 GHz -- 8.4GHz	-54.0dBm/MHz
		8.4 GHz -- 8.5 GHz	-59.3dBm/MHz
		8.5 GHz -- 10.25 GHz	-60.0dBm/MHz
	Higher than 10.25 GHz	No Change	

Technical Requirement of Indoor High Band UWB Systems			
Permissible Variance of Band		7.25GHz — 10.25GHz	
Antenna Electricity (by EIRP)		Average Power(EIRP) Lower than -41.3 dBm/MHz	
		Peak Power (EIRP) 0 dBm / 50 MHz	
Antenna Absolute Gain		0 dBm	
Permissible Occupied Band width		3 GHz	
Permissible Spread Band width		More than 450 MHz (10 dB Bandwidth)	
Limits of Emission Power subsidiarily (by EIRP)	Not beyond 7.25 GHz	Less than 1,600MHz	-90.0dBm/MHz
		1,600-2,700 MHz	-85.0dBm/MHz
		2,700MHz -7.25 GHz	-70.0dBm/MHz
	7.25 GHz -- 10.25 GHz	7.25GHz – 10.25GHz	-54.0dBm/MHz
	Higher than 10.25 GHz	10.25-10.6GHz	-70.0dBm/MHz
		10.6-10.7GHz	-85.0dBm/MHz
		10.7-11.7GHz	-70.0dBm/MHz
		11.7-12.56GHz	-85.0dBm/MHz
		Beyond 12.75GHz	-64.0dBM/MHz

Major Technical Requirement for Outdoor UWB Systems(2/ 2)

Technical Requirement of Outdoor UWB Systems			
Limits of Permitted Emission (by Average Power, EIRP)	Not beyond 7.25 GHz	No Change	
	7.25 GHz – 10.25 GHz	7.25 GHz -- 7.587 GHz	- 59.3 dBm/MHz
		7.587 GHz -- 8.4GHz	non
		8.4 GHz -- 8.5 GHz	-59.3dBm/MHz
		8.5 GHz -10.25GHz	-60.0dBm/MHz
	over 10.25GHz	No Change	
Limits of Permitted Emission (by Peak Power, EIRP)	Not beyond 7.25 GHz	No Change	
	7.25 GHz -- 10.25 GHz	7.25 GHz -- 7.587 GHz	-35.0 dBm/MHz
		7.587 GHz -- 8.4GHz	Non
		8.4 GHz -- 8.5 GHz	-35.0dBm/MHz
		8.5 GHz -- 10.25 GHz	-35.7dBm/MHz
	Higher than 10.25 GHz	No Change	

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Technical Requirement of Indoor UWB Systems			
Limits of Permitted Emission (by Average Power, EIRP)	Not beyond 7.25 GHz	Less than 1,600MHz	-90dBM/MHz
		1,600- 2,700MHz	-85.0dBM/Mhz
		2,700MHz-7.25GHz	-70dBM/MHz
	7.25 GHz – 10.25 GHz	Non	
	over 10.25GHz	10.25-10.6GHz	-70.0dBM/MHz
		10.6G-10.7GHz	-85.0dBm/MHz
		10.7-11.7GHz	-70.0dBm/MHz
		11.7-12.75GHz	-85.0dBm/MHz
		Beyod 12.75GHz	-70.0dBM/MHz
Limits of Permitted Emission (by Peak Power, EIRP)	Not beyond 7.25 GHz	Less than 1,600MHz	-84.0dBm/MHz
		1,600-2,700MHz	-79.0dBm/MHz
		2,700MHz-7.25GHz	-64.0dBm/MHz
	7.25 GHz -- 10.25 GHz	Non	
	Higher than 10.25 GHz	10.25-10.6GHz	-64.0.0dBM/MHz
		10.6G-10.7GHz	-79.0dBm/MHz
		10.7-11.7GHz	-64.0dBm/MHz
		11.7-12.75GHz	-79.0dBm/MHz
		Beyod 12.75GHz	-64.0dBM/MHz

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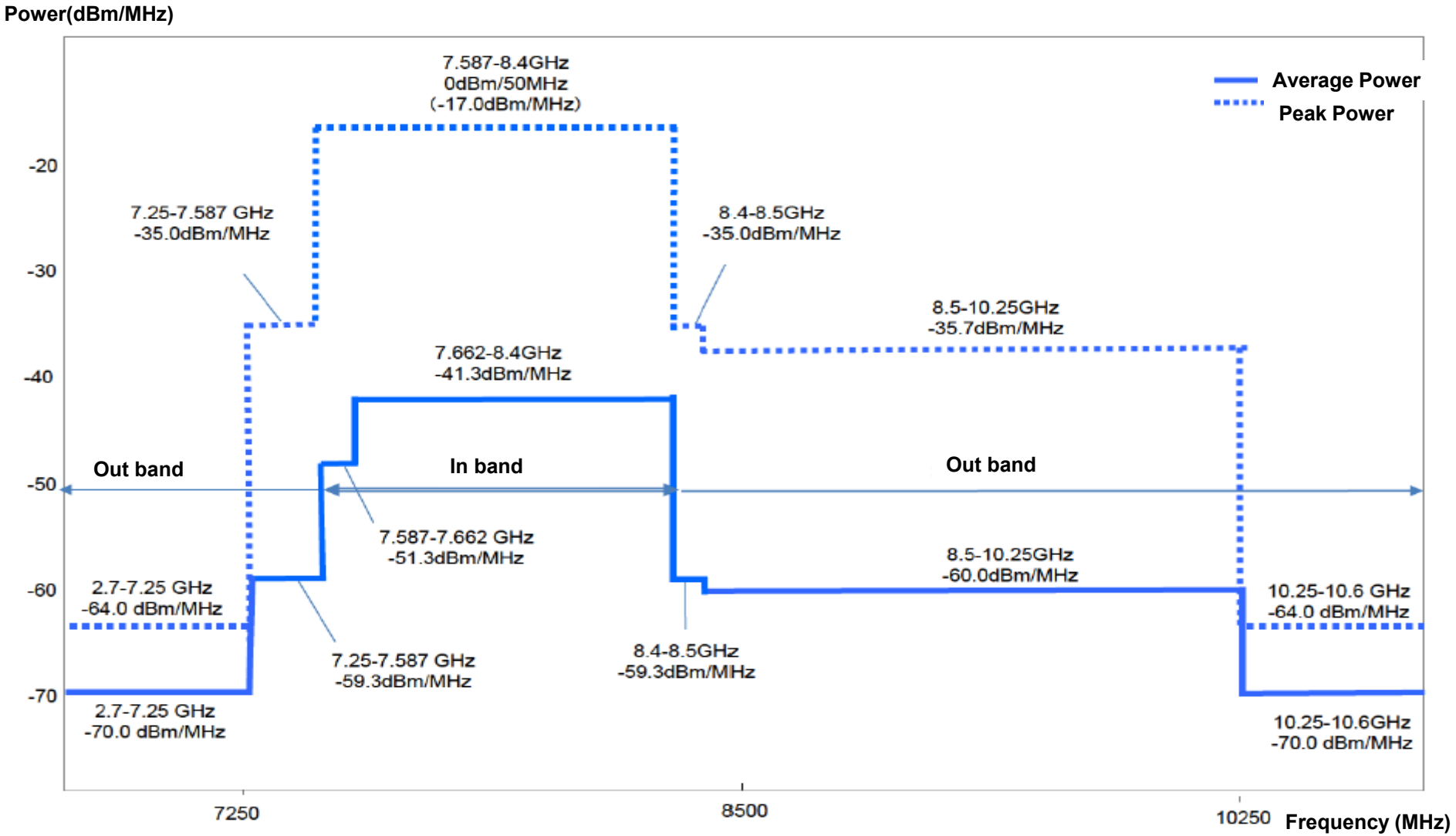
Updated UWB Spectral Mask for Outdoor Uses in Japan



Remark

- These slides are translated from MICT documents by Ryuji Kohno, so it means these are not official MIC documents.