

Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)

Submission Title: [Underlying considerations behind the proposed Consultation of Japanese 950MHz usage by WPAN]

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Re: [15-07-0789-00-004d-japanese-950mhz-regulation(2)]

Abstract: [**The slides are intended to explain the underlying considerations within sub-WG of MIC regulatory committee.**]

Purpose: [To clarify the background of technical requirements before formal issuance of Call for Proposal by TG.]

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Summary

The consultation document recently proposed by Japanese MIC committee, regarding opening up of 950.8MHz to 955.8MHz band, is expecting further deployments of WPAN devices onto variety of usage scenarios, of which requirements are covered preferably by utilization of precious UHF band than congested 2.4GHz band.

Background consideration includes followings,

- (1) Co-existence of WPAN & RFID is more manageable than currently available License Exempt band for WPAN in Japan. RFID band is reluctantly to be overlaid by swift WPAN transactions.
- (2) As RFID system are based on the sub-channel selection function using LBT, WPAN also is to be able to search and select the unused sub-channel which is upto 600kHz (three sub-channels of 200kHz), i.e., a sort of adaptive frequency agility.
- (3) Fairness issue between License-Exempt low power WPAN and Licensed high power RFID system is reflected into the required rules of transmission duty ratio control and maximum duration of transmission.

Co-existence of WPAN & RFID in UHF is more manageable in several WPAN Application Spaces than 2.4GHz LE band, e.g., Industrial, Social infrastructural or medical systems. It is reluctantly accepted that RFID band is to be overlaid by swift WPAN transactions

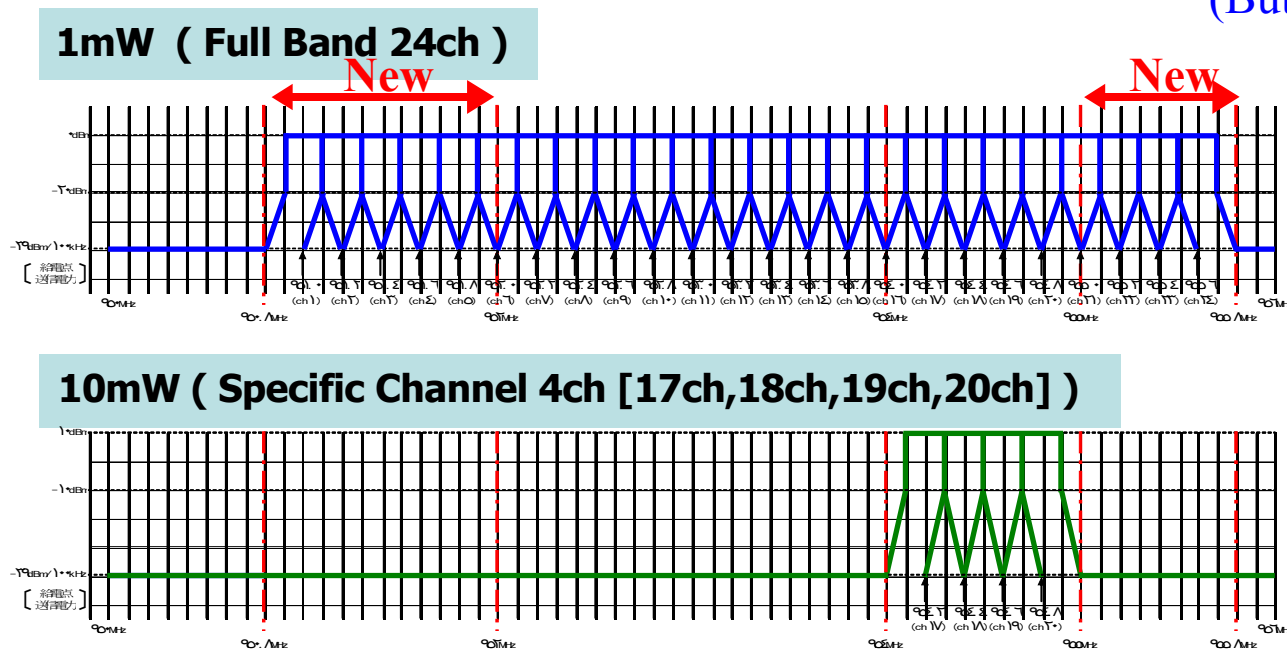
Freq (MHz)	Ch#	RFID Licensed 4WEIRP	RFID Light-Licensed 4WEIRP	RFID-License-exempt 10mW	WPAN ^{10mW} License Exempt	WPAN ^{1mW} License Exempt
951.0	1					A, B, C
951.2	2					A, B, C
951.4	3					A, B, C
951.6	4					A, B, C
951.8	5					A, B, C
952.0	6					A, B, C
952.2	7	A	A	A		A, B, C
952.4	8	A, B	A	A		A, B, C
952.6	9	A	A	A		A, B, C
952.8	10	A	A	A		A, B, C
953.0	11	A	A	A		A, B, C
953.2	12	A	A	A		A, B, C
953.4	13	A	A	A		A, B, C
953.6	14	A, B	A	A		A, B, C
953.8	15	A	A	A		A, B, C
954.0	16			A		A, B, C
954.2	17			A	A	A, B, C
954.4	18			A	A	A, B, C
954.6	19			A	A	A, B, C
954.8	20			A	A	A, B, C
955.0	21					A, B, C
955.2	22					A, B, C
955.4	23					A, B, C
955.6	24					A, B, C

- | | | | | |
|--|---|--|--|--|
| A: Carrier Sense 5ms @ -74dBm
Tx duration 4 s max
w/t Cease-TX 50ms
B: No Carrier Sense
No TX duration Control | A: Carrier Sense 5ms @ -74dBm
Tx duration 4 s max
w/t Cease-TX 50ms | A: CarrierSense 10ms@-64dBm
Tx duration 1 s max
w/t Cease-TX 100ms | A: Carrier Sense10ms@-75dBm
Tx duration 1 s max
w/t Cease-TX 100ms | A: CarrierSense 10ms @ -75dBm
Tx duration 1 s max
w/t Cease-TX 100ms
B: CarrierSense 128us @ -75dBm
Duty Ratio Control 10%
Tx duration 100ms max
w/t Cease-TX 100ms
C: No Carrier Sense
Duty Ratio Control 0.1%
TX duration 100ms max
w/t Cease-TX 100ms |
|--|---|--|--|--|

Both WPAN and RFID systems are expected to be operated by the identical organization or closely related entities, typically a few. RFID couldn't help accepting symbiotic co-existence with WPAN to achieve end user solution and more efficient usage of 'golden band'.

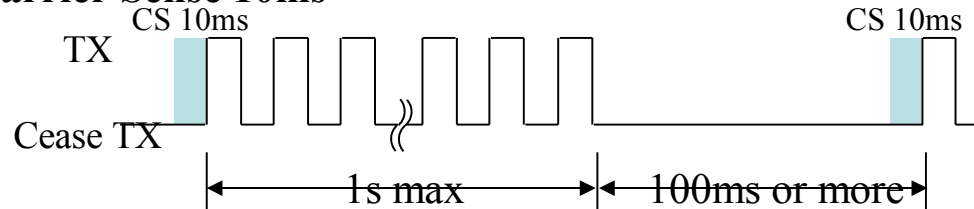
As RFID system are based on the sub-channel selection function using LBT, WPAN also is to be able to search and select the unused sub-channel which is upto 600kHz (three sub-channels of 200kHz), i.e., a sort of adaptive frequency agility, then transmit the frame and release it as quick as possible. The compromise was the bandwidth of temporal occupancy, which is upto 600kHz, bonded 3 sub-channels, because of the required segregation from the broadband traffic for the entertainment applications which tend to consume more BW.

200KHz sub-channelization ⇒ Agreement: Limiting upto 3 Channels bonding (Buttable only)

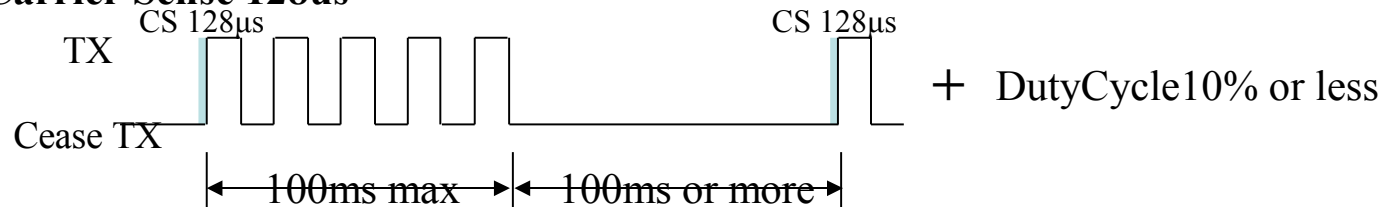


Fairness between License-Exempt low power WPAN system and Licensed high power RFID system is reflected in the required rules of transmission duty ratio control and maximum duration of transmission followed by the cease-transmission time enforced.

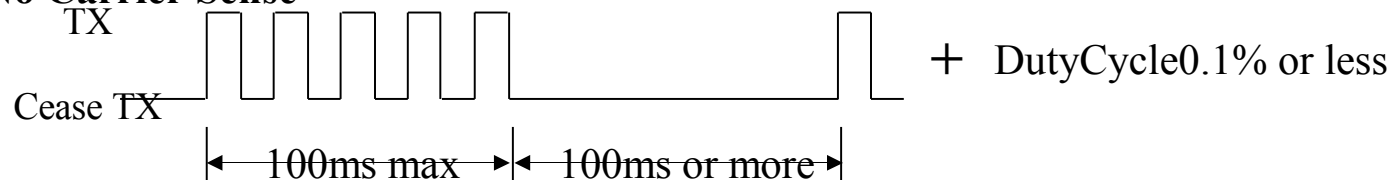
<Carrier Sense 10ms>



<Carrier Sense 128us>



<No Carrier Sense>



Each of above is intended to make sure sometimes slow and dull, RF activating ID system to contend with to catch a sub-channel to transmit. Balancing between primary licensed, high power but slow or consolidated service and LE, low power but swift service, is substantiated, and eventually could be agreed anyhow.

Discussion ?

References

IEEE Doc 15-07-0918-00-004d-technical-requirements-950mhz-low-power-active-radio-systems

IEEE Doc 15-07-0789-00-004d-japanese-950mhz-regulation(2)

IEEE Doc 15-07-0788-00-004d-japanese-950mhz-regulation

IEEE Doc 15-07-0712-00-wng0-Supplement-Commonality-Enhancement-for-Sub-GHz-WPAN

IEEE Doc 15-07-0621-03-wng0-Commonality-Enhancement-for-Sub-GHz-WPAN

*Proposed Consultation document of 950MHz frequency band usage rules for public comment Solicitation
issued by MIC in Japan*