## Project: IEEE 802.15 Working Group for Wireless Personal Area Networks (WPANs)

Submission Title: [ Current Status of Japanese Regulatory Changes regarding 950MHz Band ]
Date Submitted: [15 Mar., 2010]
Source: [Shusaku Shimada] Company [Independent]
Address [1-55-19 Ohara-town Setagaya Tokyo, 156-0041 Japan]
Voice:[+81-33468-6540], FAX: [+81-33468-0625], E-Mail:[shusaku@ieee.org]
Re: [ 15-09-0739-00-004g-Prospective-Institutional-Changes-regarding-Japanese-950MHz-Band ]
Abstract: [ Extended $950-958 \mathrm{MHz}$ band is about to be available and its corresponding regulatory rules are scheduled to be in effect in a few months, including revised ARIB Standard T-96 which have been discussed simultaneously. Prospective spectral addition of $958-960 \mathrm{MHz}$ is not scheduled yet, while the future availability is implied in the consultation document issued this time. ]
Purpose: [ This submission is intended as an advanced or provisional information before the issue of official ordinance, for all proposers of IEEE802.15.4g PHY amendment project. ]
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## Prospective institutional changes regarding 950 MHz band

1. Expansion of Japanese 950 MHz band

- 2 step regulatory process:

Obsolete PDC band first, and possible STL band opened up in future.
( together with the introduction of medium power RFID system)
2. Relaxed maximum signal bandwidth

- Currently 600 kHz max. ( $3 \times 200 \mathrm{kHz}$ elementary channels)
$\Rightarrow$ up to 1 MHz max. ( $5 \times 200 \mathrm{kHz}$ elementary channels)

3. Deregulation regarding 10 mW (TX power) systems

- Increased available channels for 10 mW active systems
- Introduction of 128 us short carrier sense with 100 ms TX control

4. Reinforced Spurious Limitation within Aviation Navigation System band
5. Schedule

Expansion of Japanese 950 MHz band


Possible future expansion covering over STL (Studio Tower Link) band by 2015
$\stackrel{\text { Totally } 4 \mathrm{MHz} \text { addition }}{\stackrel{\text { T }}{ }}$
RFID/Wireless Sensor Network (Speculation)

## Currently Available Frequency Channels




## Possible Future Expansion by 2015


[ Informative Detail of Channel Assignment \& conditions ]

Current (2007)

| $\begin{array}{\|r\|} \hline \text { Element CH } \\ (200 \mathrm{kHz}) \\ \hline \end{array}$ | $\begin{array}{\|l\|} \hline \# \text { Center } \\ \text { Frequency } \\ \hline \end{array}$ | Active ID Sensor Ne | $\begin{aligned} & \text { 1W Licens } \\ & \text { tPassive RF } \end{aligned}$ | $\begin{aligned} & \Phi \mathrm{d} 10 \mathrm{~mW} \\ & \text { IDassive RFID } \end{aligned}$ | $\begin{array}{\|r\|} \hline \text { Element CH } \\ (200 \mathrm{kHz}) \end{array}$ | $\begin{array}{\|l\|} \hline \# \text { Center } \\ \text { Frequency } \\ \hline \end{array}$ | Active ID Sensor Ne | 1W Licens | $\pm \mathrm{d} 10 \mathrm{~mW}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 951.0 |  |  |  | -1 | 951.0 |  |  |  |
| 2 | 951.2 |  |  |  | 2 | 951.2 |  |  |  |
| 3 | 951.4 |  |  |  | 3 | 951.4 |  |  |  |
| 4 | 951.6 |  |  |  | 4 | 951.6 |  |  |  |
| 5 | 951.8 |  |  |  | 5 | 951.8 |  |  |  |
| 6 | 952.0 |  |  |  | 6 | 952.0 |  |  |  |
| 7 | 952.2 |  |  |  | 7 | 952.2 |  |  |  |
| 8 | 952.4 |  |  |  | 8 | 952.4 |  |  |  |
| 9 | 952.6 |  |  |  | 9 | 952.6 |  |  |  |
| 10 | 952.8 |  |  |  | 10 | 952.8 |  |  |  |
| 11 | 953.0 |  |  |  | 11 | 953.0 |  |  |  |
| 12 | 953.2 |  |  |  | 12 | 953.2 |  |  |  |
| 13 | 953.4 |  |  |  | 13 | 953.4 |  |  |  |
| 14 | 953.6 |  |  |  | 14 | 953.6 |  |  |  |
| 15 | 953.8 |  |  |  | 15 | 953.8 |  |  |  |
| 16 | 954.0 |  |  |  | 16 | 954.0 |  |  |  |
| 17 | 954.2 | 10 mW |  |  | 17 | 954.2 | 10 mW |  |  |
| 18 | 954.4 | 10 mW |  |  | 18 | 954.4 | 10 mW |  |  |
| 19 | 954.6 | 10 mW |  |  | 19 | 954.6 | 10 mW |  |  |
| 20 | 954.8 | 10 mW |  |  | 20 | 954.8 | 10 mW |  |  |
| 21 | 955.0 |  |  |  | 21 | 955.0 | 10 mW |  |  |
| 22 | 955.2 |  |  |  | 22 | 955.2 | 10 mW |  |  |
| 23 | 955.4 |  |  |  | 23 | 955.4 | 10 mW |  |  |
| 24 | 955.6 |  |  |  | 24 | 955.6 | 10 mW |  |  |
| 25 | 955.8 |  |  |  | 25 | 955.8 | 10 mW |  |  |
| 26 | 956.0 |  |  |  | 26 | 956.0 | 10 mW |  |  |
| 27 | 956.2 |  |  |  | 27 | 956.2 | 10 mW |  |  |
| 28 | 956.4 |  |  |  | 28 | 956.4 | 10 mW |  |  |
| 29 | 956.6 |  |  |  | 29 | 956.6 | 10 mW |  |  |
| 30 | 956.8 |  |  |  | 30 | 956.8 | 10 mW |  |  |
| 31 | 957.0 |  |  |  | 31 | 957.0 | 10 mW |  |  |
| 32 | 957.2 |  |  |  | 32 | 957.2 | 10 mW |  |  |
| 33 | 957.4 |  |  |  | 33 | 957.4 | 10 mW |  |  |
| 34 | 957.6 |  |  |  | 34 | 957.6 |  |  |  |
| 35 | 957.8 |  |  |  | 35 | 957.8 |  |  |  |
| O |  | CS:128us/-75dBm TX:100ms with 100ms pause (10\% DC). or CS:10ms/-75dBm TX:1s with 100ms pause (100\%(No) DC). or without CS (0.1\% DC and 1mW TX Power) |  |  |  |  |  |  |  |
|  |  |  |
| 10 mW (obsolete) |  |  |  |  |  |  |  |  | 1mW: Same as above 10mW: CS:10ms/-75d |  |  | with 100 | ms paus |  |  |  |
| $\begin{array}{\|r\|} \hline \text { Element Cl } \\ (200 \mathrm{kHz}) \\ \hline \end{array}$ | \# Center Frequency | $\begin{gathered} \hline \text { Active ID } \\ \text { Sensor Ne } \end{gathered}$ | 1W Licens tPassive RF | dd 10 mW IDassive RFID | Element CH <br> $(200 \mathrm{kzz})$ | \# Center Frequency | Active ID Sensor Ne | $\begin{aligned} & \text { 1W Licens } \\ & \text { etPassive RF } \\ & \hline \end{aligned}$ | $\begin{array}{\|l\|} \hline \text { ed } 10 \mathrm{~mW} \\ =\text { Dassive RF\|I } \end{array}$ |

Speculated (by 2015)

| $\begin{array}{\|r\|} \hline \text { Element CH } \\ (200 \mathrm{kz}) \\ \hline \end{array}$ | \# Center Frequency | $\begin{array}{c\|} \hline \text { Active ID } \\ \text { Sensor Net } \end{array}$ | $\begin{aligned} & \text { 1W Licens } \\ & \text { Pas aive RF } \end{aligned}$ | d 10 mW W |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 951.0 |  |  |  |
| 2 | 951.2 |  |  |  |
| 3 | 951.4 |  |  |  |
| 4 | 951.6 |  |  |  |
| 5 | 951.8 |  |  |  |
| 6 | 952.0 |  |  |  |
| 7 | 952.2 |  |  |  |
| 8 | 952.4 |  |  |  |
| 9 | 952.6 |  |  |  |
| 10 | 952.8 |  |  |  |
| 11 | 953.0 |  |  |  |
| 12 | 953.2 |  |  |  |
| 13 | 953.4 |  |  |  |
| 14 | 953.6 |  |  |  |
| 15 | 953.8 |  |  |  |
| 16 | 954.0 |  |  |  |
| 17 | 954.2 | 10 mW |  |  |
| 18 | 954.4 | 10 mW |  |  |
| 19 | 954.6 | 10 mW |  |  |
| 20 | 954.8 | 10 mW |  |  |
| 21 | 955.0 | 10 mW |  |  |
| 22 | 955.2 | 10 mW |  |  |
| 23 | 955.4 | 10 mW |  |  |
| 24 | 955.6 | 10 mW |  |  |
| 25 | 955.8 | 10 mW |  |  |
| 26 | 956.0 | 10 mW |  |  |
| 27 | 956.2 | 10 mW |  |  |
| 28 | 956.4 | 10 mW |  |  |
| 29 | 956.6 | 10 mW |  |  |
| 30 | 956.8 | 10 mW |  |  |
| 31 | 957.0 | 10 mW |  |  |
| 32 | 957.2 | 10 mW |  |  |
| 33 | 957.4 | 10 mW |  |  |
| 34 | 957.6 | 10 mW |  |  |
| 35 | 957.8 | 10 mW |  |  |
| 36 | 958.0 | 10 mW |  |  |
| 37 | 958.2 | 10 mW |  |  |
| 38 | 958.4 | 10 mW |  |  |
| 39 | 958.6 | 10 mW |  |  |
| 40 | 958.8 | 10 mW |  |  |
| 41 | 959.0 | 10 mW |  |  |
| 42 | 959.2 | 10 mW |  |  |
| 43 | 959.4 | 10 mW |  |  |
| $\begin{array}{\|r\|} \hline \text { Element CH } \\ (200 \mathrm{kzz}) \\ \hline \end{array}$ | \# Center Frequency | $\begin{gathered} \hline \text { Active ID } \\ \text { Sensor Net } \end{gathered}$ | 1W Licens tPassive RF | ed 10mW |

## Relaxed Maximum Signal Bandwidth


[ Background ]
Traffic per node is small in WSN, but the commissioning stages and security provisioning phase of operation require higher link capacity.
15.4 g PAR states 1500 octet payload is required to be accommodated in a frame and this facilitate the transaction of node or network authentication and the exchange of certificate and temporal keys.
[ Purpose ] Up to 1 MHz signal BW is able to accommodate 1500 octet payload with realistic TX duration by using higher bit rate, and finally contributing to the security enhancement as well.

## Relaxed Maximum Signal Bandwidth

Channel Mask ( 10 mW case )


## Relaxed Maximum Signal Bandwidth

Channel Mask ( 1 mW case )


## Summary of Technical Requirement

## Channel Access Conditions for various system categories

| System Categories | $\begin{gathered} \text { Duty Cycle } \\ \text { Control } \\ \hline \end{gathered}$ | Carrier Sense Requirement | TX <br> Requirement | Available Channels by law ordinance ( Co-existence practice recommended by ARIB Std. ) |
| :---: | :---: | :---: | :---: | :---: |
| $\begin{gathered} 1 \mathrm{~mW} \\ \text { Active ID/WSN } \end{gathered}$ | 0.1\% | Not required | TX 100ms with 100ms Pause | $1-33 \mathrm{Ch}$. ( yield $7-19$, if in use ) |
|  | 10\% | 128us $-75 \mathrm{dBm} /$ Combined Ch. | TX 100ms with 100ms Pause | $1-33 \mathrm{Ch}$. ( yield $7-19$, if in use) |
| 10 mW <br> Active ID/WSN | 10\% | 128us $-75 \mathrm{dBm} /$ Combined Ch. | TX 100ms with 100ms Pause | $\begin{gathered} 17-33 \mathrm{Ch} . \\ \text { ( yield } 17-19, \text { if in use ) } \end{gathered}$ |
|  | 100\% | 10 ms $-75 \mathrm{dBm} /$ Combined Ch. | TX 1s with 100ms Pause | $\begin{gathered} 17-33 \mathrm{Ch} . \\ \text { ( yield } 17-19, \text { if in use) } \end{gathered}$ |
| 10 mW Passive RFID | 10\% | 128us $-64 \mathrm{dBm} /$ Combined Ch. | TX 100ms with 100ms Pause | 21-33Ch. |
|  | 100\% | 10 ms $-64 \mathrm{dBm} /$ Combined Ch. | TX 1s with 100ms Pause | $\begin{gathered} 7-33 \mathrm{Ch} . \\ \text { ( yield 7-19, if in use ) } \end{gathered}$ |
| 250mW Passive RFID | 100\% | 5 ms $-74 \mathrm{dBm} /$ Combined Ch. | TX 1s with 100ms Pause | 7-27Ch. <br> ( yield 19-27 as long as possible) |
| 1W Passive RFID Registered | 100\% | 5 ms $-74 \mathrm{dBm} /$ Combined Ch. | TX4s with 50ms Pause | $7-27 \mathrm{Ch}$. ( yield 19-21 as long as possible ) |
| 1W Passive RFID Licensed | 100\% | Not required | Without TX control | $8,14,20,26 \mathrm{Ch}$ ( yield 26 as long as possible ) |

## Reinforced Spurious Regulation



## Schedule

2009 Nov. first week MIC Telecommunication Council WG Approval ( Draft consultation) Completed
2009 Nov. second week MIC Telecommunication Council Approval (Solicitation of public comments ) Completed
2009 Nov. 13 to Dec. 13 Submission period for Public Comments.
Completed with no objection
2009 Dec. second week MIC Telecommunication Council Approval ( Final draft consultation )
2009 Dec. third week Completion of Consultation

Completed
Completed

2010 March to April MIC Radio Administration Council Approval ( TELEC test procedure) Almost completed
2010 May to June Notification of Law Ordinance
Scheduled on time

## END

