

An estimation of TVWS availability in Japan

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Abstract

This contribution introduces the results of an estimation of TVWS availability in Japan.

Outline

- **Back ground**
- **Calculation assumption**
- **TVWS maps of Japan**
- **Estimation results**
- **Conclusion**

Back ground

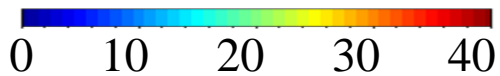
- **Analog TV broadcasting has been terminated on March 2012.**
- **TVWS regulation is still under discussion in Japan. Some applications such like wireless microphone, “OneSeg” small zone broadcasting, smart meter network, wireless broadband network, are going to be allowed to operate in TVWS.**

Calculation assumption

Items	Values	Remarks
Number of physical TV channels	40	470MHz-710MHz
Propagation model	ITU-R P.1546	Including terrain clearance angle correction.
Propagation curve	F(50,90)	F(X,Y): a two dimensional CCDF, X: spatial percentage, Y: temporal percentage.
Protected contour	41dBuV/m	Same with FCC regulations.
Separation distance (co-channel / adj-channel)	6.0km / 0.1km	Same with FCC regulations with antenna heights of less than 3 meters
Geographical information	SRTM2	NASA product.
Latitude and longitude resolution	0.01 °	About 900 meters by 1000 meters (Total 386070 grids)

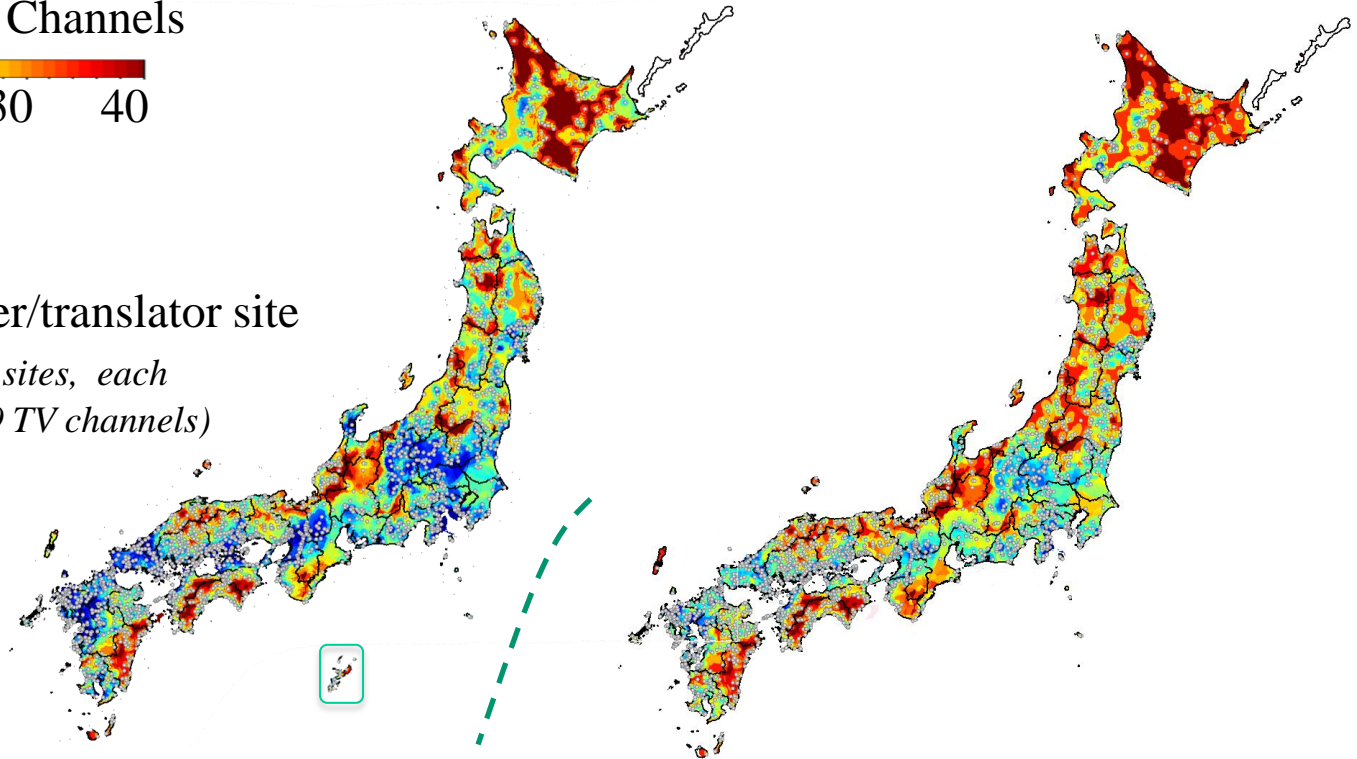
TVWS maps

Number of TVWS Channels



- Transmitter/booster/translator site

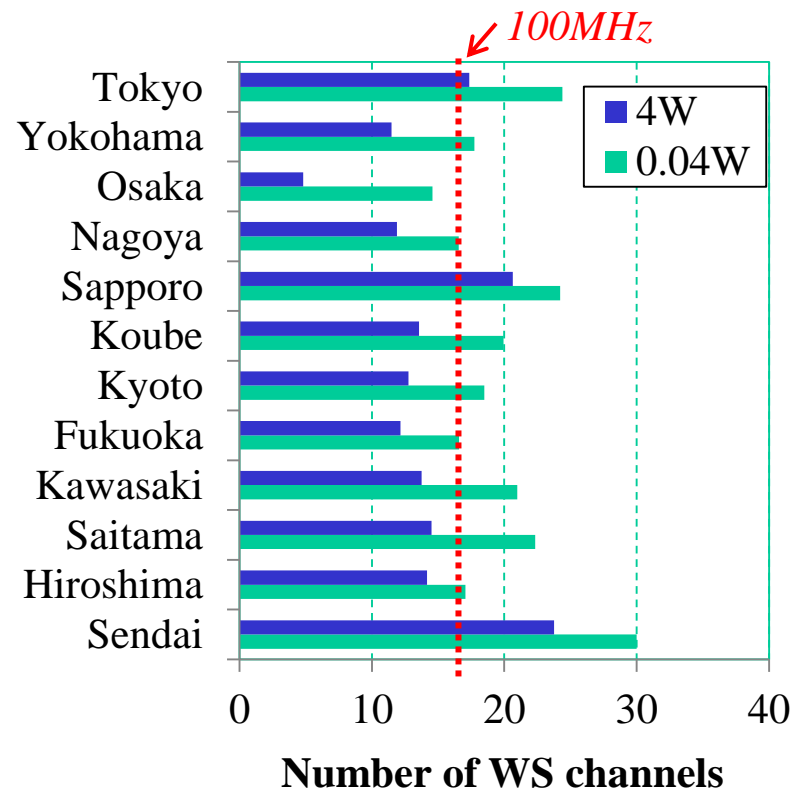
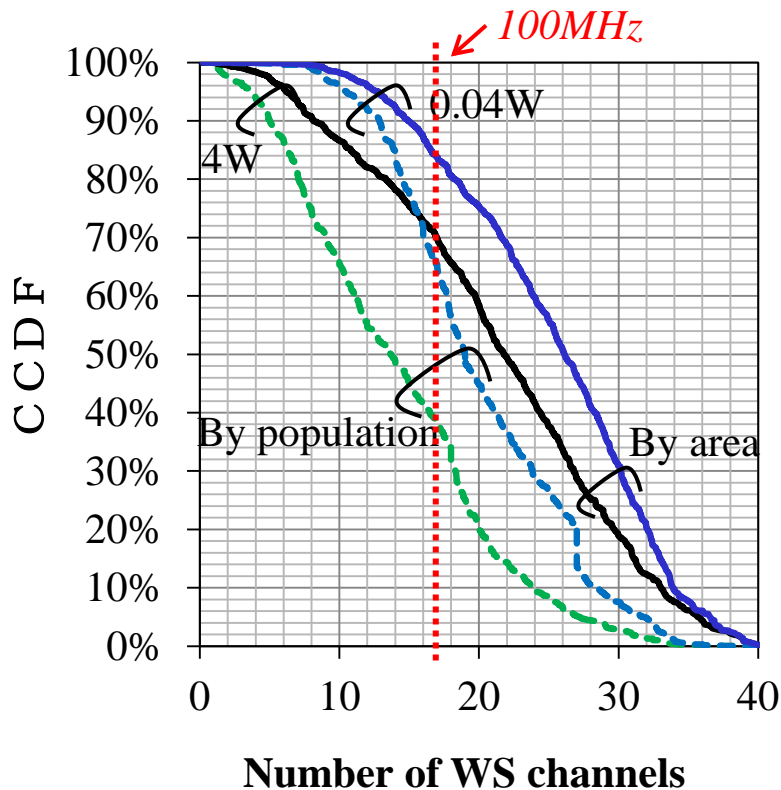
(Total more than 2000 sites, each of which transmits 2-9 TV channels)



(a) For a 4 Watt TVWS device

(b) For a 0.04 Watt TVWS device

Estimation Results



- **Over 70% of locations in Japan may expect more than 100MHz TVWS.**
- **Many heavily populated areas may expect more than 60MHz TVWS.**

Conclusions

- **Assuming the application of FCC rules, over 70% of locations in Japan may expect more than 100MHz TVWS. Many heavily populated areas may expect more than 60MHz TVWS.**
- **In Japan, TVWS seems to be able to accommodate several type of systems. Coexistence will be an important issue to be resolved.**

References

- **FCC, “Second Memorandum Opinion and Order,” FCC 10-174, September 23,2010**
- **International Telecommunications Union, “Recommendation ITU-R P.1546-3. Method for point-to-area prediction for terrestrial services in the frequency range 30MHz to 3000MHz,” 2007**