

# CSMAC Spectrum Sharing Sub-Committee

Discussion Materials March 2012

# Questions we are working on

First question we have chosen to work on: (Question 4d in original NTIA list)

“How do we setup sharing arrangements, when the primary service may continue or has the right to continue to evolve?”

Secondary or follow-on question: (Question 4a in original NTIA list)

“What kinds of sharing are workable for the industry in the long term?”

More Specifically: What kinds of sharing arrangements would the industry consider as workable as part of the 500MHz plan.

Method:

- Have split the work into two thread Technical Recommendation and Process recommendations

# Technology Update

Three analysis have been conducted to date:

1. **Impact of incumbent use changes under various sharing scenarios -**  
*Conclusion:* many use cases changes can be accommodated based on sharing approach.
2. **Isolation Analysis –***Conclusion:* sharing based on minimal knowledge of incumbent location and operating frequency results in large exclusion zones and is not going to be efficient.
3. **Sharing approaches –**
  - There are multiple promising sharing approaches where incumbent location and/or operating frequency can be determined and used to obtain efficient spectrum sharing.
  - There is no one size fits all spectrum sharing technique or policy that allows total flexibility of incumbents to change doing anything they want and still makes the band attractive to industry at large as part of the 500MHz plan.
  - Developing specific sharing systems would be done on a band specific basis with consideration of the details of the incumbent and entrant system technical parameters and the type of entrant commons vs exclusive use shared use.

# Technical Recommendations

**The NTIA should consider the following recommendations when addressing sharing with Federal uses.**

- 1. Develop a set of spectrum sharing system requirements.** The requirements are used to develop and to analyze spectrum sharing approaches. The requirements include general requirements for most spectrum bands and requirements for specific bands. The requirements include estimated limits on the changes in incumbent use (waveforms, locations, occupancy, etc). The NTIA should develop both incumbent and entrant requirements, assuming that in some cases the entrant systems maybe other federal systems. The requirements should be made public and open for comment. Currently the requirements are not well known, which makes it difficult for incumbents and entrants to develop or analyze spectrum sharing approaches.
- 2. Require that a management and control (e.g. an interactive database or other system) feature be used in all spectrum sharing approaches.** The management and control feature is needed to supervise and reconfigure the entrant system. The management and control feature would have a defined reaction time (not necessarily continuously connected). The management and control feature would apply to geographic-based, to sensing-based, or to any other spectrum sharing approach.
- 3. Not select a certain spectrum sharing approach at this time.** There are many potential spectrum sharing approaches that are capable of meeting the spectrum sharing requirements. The different approaches have their own costs, advantages and disadvantages that depend on the entrant and incumbent system details. Once the NTIA releases: (a) The requirements, and (b) More detailed information on the incumbent systems and the incumbent CONOPS, then these different sharing approaches can be evaluated by industry, and then specific proposals can be made to the NTIA. When analyzing alternate approaches, both the entrant and incumbent factors need to be considered in selecting the spectrum sharing approaches. It is likely that multiple spectrum sharing approaches will be used in a band to most economically accommodate the incumbent and entrant requirements. Selecting a spectrum sharing approach now is likely to result in a costly or an ineffective approach that will not ultimately be successful.

# Motivation for process recommendation

- Commercial carriers have strong desire for cleared spectrum as do incumbent users.
- While strong desire for more spectrum to be made available via sharing, there is a desire not to compromise the request for cleared spectrum.
- This makes engaging detailed technical discussions of how to share in abstract difficult.
- Insight is that there needs to be a process to engage sharing in a more specific manner and address information challenges.
- Additionally, given the technical complexity of these systems and the wide range of uses for which they are or will be deployed, it is unlikely that individual users or representatives from one sector of the industry will have expertise that covers all systems and technology advances.
- The most efficient and effective means to determine and implement potential sharing opportunities is through a direct dialogue between experts familiar with the systems under consideration.

# Process Recommendation

## The NTIA Should

- 4. Facilitate a dialogue between incumbents and potential new entrants to develop specific sharing recommendations.** In instances where sharing is necessary, NTIA should work with the FCC, federal agencies and potential new entrants to develop specific recommendations on the extent, impact and method of sharing spectrum. Direct discussions between experts will result in the most efficient and dynamic sharing method based on a detailed understanding of how systems and technology operate and are used. The discussions should be open to any interested parties, but must be focused on a limited number of issues or scenarios to develop actionable recommendations that would be codified as appropriate through a rule making proceeding. The discussions should be held as early in the process as possible to provide sufficient time and to allow open and direct discussion between the parties, including federal agencies. They must have senior level oversight to ensure that the discussions are based on official recommendations and with an expectation that proposals will be implemented.

# Possible Next Topics

## Discussion Topic

Original Questions	Notes
a) What kinds of sharing are workable for industry in the long term?	Completed
b) Test Bed - -- What do you define a testbed to be? How can they best be used to facilitate the development of sharing capabilities?	Possible next topic.
c) What can realistically be done in terms of sharing acceptance of interference?	Could do but probably need more context on band and incumbent systems
d) How do we set up sharing arrangements, when the primary service may continue or has	Completed
e) What other near or mid-term approaches can be recommended? <b>Other possible focus areas</b>	This would likely have to be a band specific analysis

• Focus on sharing a specific band (eg 1755-1850, 1435-1525, 2350-2390, 3550-3650, 5GHz)

- Focus on specific technologies (eg how to share with radar)
- Do a technology overview/survey
- Work on specific industry segment (eg utility, commercial cellular, unlicensed)

### Questions:

Is it better to focus on near term specific things like 1755 or 5 GHz or look at longer term further out items?

Is there a way to get agency engagement on specific band analysis?

# Appendix



# Supporting Documents

The following documents have been submitted by the working group to support this presentation:

## 1. Spectrum Sharing Working Group Notes

(CSMAC Spectrum Sharing Working Group Notes Feb 3 2012 v3.pdf)

- Analysis of spectrum sharing approaches
- Impact of incumbent use changes under various sharing scenarios.

## 2. Spectrum Sharing Isolation Analysis

(CSMAC Spectrum Sharing WG Spectrum Isolation Analysis v1.pdf submitted at November 2011 meeting)

## 3. Process for Developing Sharing Analysis

(CSMAC input on Process for Developing Sharing and Impact Analysis 2-17-12 v1.pdf)