Marcus Spectrum Solutions

+1-301-229-7714
mjmarcus@alum.mit.edu
www.marcus-spectrum.com

**Marcus Spectrum Solutions, LLC**
*Consulting Services in*
*Radio Technology and Policy*
8026 Cypress Grove Lane
Cabin John, MD 20818 USA

# Statement for Commerce Spectrum Management Advisory Committee Meeting December 9, 2009

As requested in the *Federal Register* notice for this meeting[1], Marcus Spectrum Solutions LLC ("MSS") wishes to submit this statement for CSMAC consideration. This submission is *pro se* and not on behalf of any client.

There is considerable interest at present in a "spectrum inventory" to examine the present actual use of the spectrum and such legislation is pending in Congress. MSS fully supports such an inventory. Depending on the details of how the inventory is done, including whether it is based one nominal assignments or actual monitoring, such an inventory can either overestimate or underestimate spectrum use. Even a pure monitoring approach has this problem. This is an issue that goes back at least as far as the 1970s FCC Spectrum Management Task Force and we hope that CSMAC looks at it in that context.

But the main point here is to look ahead at how this information might be used to identify new opportunities for spectrum assignments. Let's consider an Einstein-like *gedankenexperiment*[2]: Let imagine we have completed the inventory in the optimal way and have a computer file which indicates the location, power, frequency, bandwidth, antenna pattern, and times of usage of every Federal Government ("G") and non-Federal Government ("NG") transmitter and receiver in US jurisdiction. What would we do with

---

[1] 74 FR 61113

[2] Wikipedia defines this as follows:

> A **thought experiment**, sometimes called by the German name ***gedankenexperiment***, is a proposal for an experiment that would test or illuminate a hypothesis or theory.
> Given the structure of the proposed experiment, it may or may not be possible to actually perform the experiment and, in the case that it is possible for the experiment to be performed, there may be no intention of any kind to actually perform the experiment in question. The common goal of a thought experiment is to explore the potential consequences of the principle in question.
> (http://en.wikipedia.org/wiki/Gedanken)

+1-301-229-7714
mjmarcus@alum.mit.edu
www.marcus-spectrum.com

that information to derive the desired end product: new spectrum assignment opportunities or new band reallocation opportunities?

**MSS believes that this *gedankenexperiment* would result in a regulatory log jam of "harmful interference" determinations by both FCC and NTIA that would both severely limit new spectrum access and delay such access for years if not decades.**

Let's look at the lessons of the AWS-3 band that is being examined at FCC in Docket 07-195. It is unambiguous that this band, 2155-2175 MHz is unoccupied at present[3]. Yet FCC has been involved in a very complex rulemaking for over 3 years about how the band can be used without impacting the lower adjacent band.[4]

The root cause of this problem and other similar ones in past years is the present definition of "harmful interference" – the legal issue that both FCC and NTIA must avoid in making allocations reallocating spectrum. At present ITU, NTIA, and FCC all define harmful interference the same way:

> "Interference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with [the ITU] Radio Regulations."

It is unclear when this wording was adopted, but informed sources seem to agree it was decades ago. This definition in effect has two subcases:

1) "radionavigation service or … other safety services" which can expect protection from "interference which endangers (its) functioning" and
2) other services which can expect protection from which "seriously degrades, obstructs, or repeatedly interrupts" the service.
3)

The lesson of Docket 07-195 and other complex spectrum policy deliberations is that this definition is much too vague and adjudication of its meaning in specific cases takes years. To spectrum incumbents, this is not bad. To potential users of underutilized spectrum it is a huge regulatory barrier requiring both large legal expenditures and uncertain (perhaps even unfundable business plans) due to the questions of whether spectrum might be available and when it might be available after the completion of the *ad hoc* harmful interference adjudication by FCC and/or NTIA.

I have heard statements by IRAC members that every single G assignment in the GMF is a radionavigation or "other safety service" and is therefore entitled to the first type of

---

[3] With the minor exception of some users that must vacate the band upon FCC licensing of the band for AWS.

[4] This case has contentious issues of what is reasonable receiver immunity for the incumbent user, what are reasonable out-of-band emission limits for the new entrant, what is reasonable minimum separation physical distance between mobile users in the new band and users in the adjacent band, and how should the probabilistic nature of the interference should be considered.

Marcus Spectrum Solutions

+1-301-229-7714
mjmarcus@alum.mit.edu
www.marcus-spectrum.com

protection. I urge CSMAC to review this specific issue and advise NTIA on its viewpoint.

I also urge CSMAC to review the adequacy of the current harmful interference definition and its implications for adjudications to determine if underutilized spectrum might be available for other uses. While it is unrealistic to expect a 'harmful interference" definition that is completely objective and can be implemented in some algorithm, clarification and additional guidance will reduce regulatory uncertainties and allow speedier action after the inventory is completed.

Clearly whatever inventory is done will not be as complete as that proposed in the *gedankenexperiment* above. But if the *gedankenexperiment* experiment case is destined to endless deliberations on harmful interference deliberations and adjudications, the less complete inventory data will result in ever longer delays in making spectrum available.

The CSMAC might want to recommend to NTIA that some clarification of the meaning of harmful interference proceed in parallel with the spectrum inventory in order to speed the ultimate availability of new spectrum to new users which protecting existing users.

Michael J. Marcus, Sc.D., F-IEEE
Director