# Report : Third Meeting of the FCC Technological Advisory Council

## Executive Overview

The Federal Communications Commission Technological Advisory Council (FCC TAC) held its third meeting on Monday, December 13, 1999 in Washington, D.C. The Council is to provide scientifically supportable information on those emerging technologies that could fundamentally impact the work of the FCC. The TAC is currently organized into three focus groups with moderators to address: spectrum management; network interconnection and access, and access to telecommunications by persons with disabilities. Each of these groups reported out findings developed in the interim and expanded each area during a roundtable discussion.

The Spectrum Management Focus Group is organized into three working subgroups. Each subgroup produced documentation, summarized in this report, which should help with the work of the FCC. The noise environment subgroup is concerned with what could be a very serious emerging problem caused by the explosive growth of both intentional and unintentional radio sources. The future could be very different from what we might expect from past experience. The key to getting our hands around this issue will be a good set of models for both intentional and unintentional radiators which can then be used to predict the evolution of the noise background. The group formally recommended that a survey based on available literature be funded to start the process of assessing the impact of noise on telecommunications.

The software defined radio (SDR) subgroup reported on why regulations must change because of this emerging technology. Radios and the implementation of the rules to operate them are evolving from being in the hands of a human operator to being increasingly under autonomous software control. The range and speed of automatic reconfiguration of radios now possible have created a quantum change which must now be reflected in regulations. A interesting contrast can be drawn between spectrum regulation and the regulation of air traffic. Today, specific segments of radio spectrum in given geographic areas are assigned to specific entities for a defined application. By analogy, if air corridors were assigned using the same principal, each airline would have its own air corridor for its exclusive use. Fortunately, intelligent air traffic control was a sufficiently well developed technology when airlanes were planned so that this allocation method was not required. We will soon be reaching a situation where automatic intelligent *radio traffic control* will allow us to timeshare *radiolanes* between multiple users. An action item for this group will be to “flesh out’ a strawperson regulatory scheme that takes this paradigm shift into account.

The Ultrawideband (UWB) subgroup reported on how this technology is related to SDR and

spread spectrum issues. UWB deployment is primarily a problem of spectrum overlay and how existing services are to be accommodated in the presence of UWB signals which ostensibly occupy the same radio space. There have already been a number of filings on UWB, but the available information needs to be organized as the problem is framed in different ways by different proponents. There needs to be a clear delineation of benefits achievable only with UWB, and the costs to others of its deployment. It may be that the only way to move forward is by controlled experiment with real systems.

The Interconnection and Network Access Focus Group has several white papers in preparation.. Some of the access technologies that the group is considering are xDSL (*any* digital subscriber line), cable, fixed wireless, and FTTC (Fiber to the Curb). Some of the key interconnection issues that have been identified are: wavelength interconnection, dynamic bandwidth allocation, interconnection with maintenance of QoS (quality of service), and feature interaction. It is claimed by some that industry will solve the interconnection problem without the need for any FCC intervention. The group will need to ascertain which standards exist and the time scales proposed by industry to address interconnection For the specific problem of the interaction of tandem voice coding and compression systems, the group will need to quantify the problem and may solicit a proposal for a mitigating scheme.

The Commission is required by statute to take special action relative to people with disabilities. A number of deliverables have been planned by the Access to Telecommunications by Persons with Disabilities group. They include a set of awareness points to be used by equipment designers so they may be sensitized to the issues, short treatments of the issues, and questions to be asked to proposers of new services. To get ahead of impending problems, scenarios of future usage are being laid out. Considering that there are many products outside the purview of regulation, ways of voluntarily promoting this cause will be desirable.

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***Prepared by* J. A. Bellisio**

***Approved by* R.W. Lucky**

***January 3, 2000***

# Report: Third Meeting of the FCC Technological Advisory Council

## 1. Introduction

As announced, the third meeting of the TAC took place on Monday, December 13, 1999, at The Portals, 445 S. 12th Street, SW., Washington, D.C. Designated Federal Officer (DFO) Stagg Newman opened the meeting. This report is a distillation of that meeting written to facilitate the work of the Council. A complete videotape of the meeting serves as the verbatim minutes (see Annex 1).This report reviews the presentations and discussions of the open meeting, but does not, per se, represent the final conclusions of the TAC as a whole.

The mission and operating principles of the TAC were described in the Report of the First Meeting of the TAC, available on the FCC web site **http://www.fcc.gov/oet/tac/** . As described in that report, the FCC has made five official requests to the TAC for technical work. These requests fall into three major areas: spectrum management; network interconnection and access; and accessibility for disabled persons. Focus groups with moderators were formed at the first meeting to address each of the three areas. At this third meeting, the activities of each of the groups was reviewed. The meeting's roundtable discussion, which followed each presentation, and resulting action items are also reported. Additional and more extensive information relative to each of the working groups can be found on the web sites for those groups. *See Annex 3.*

The next formal TAC meeting will be on Friday, March 24,2000. Meetings have also been scheduled for June 28,2000, September 27,2000, and December 6, 2000.

**2. Agenda**

**TECHNOLOGICAL ADVISORY COUNCIL**
**Agenda -Third Meeting**

Monday, December 13, 1999
Federal Communications Commission Meeting Room
The Portals, 445 12TH Street, SW
Washington, D.C.

| | | |
|---|---|---|
| 10:00 AM | Opening | Stagg Newman<br>Designated Federal Officer |
| 10:05 AM | Introductions of Council Members with Brief Remarks (if any) | Council Members |
| 10:30 AM | Report of Spectrum Focus Group | Chuck Jackson |
| 12:10 PM | Break | |
| 1:00 PM | Report of Interconnection and Network Access Focus Group | Marvin Sirbu |
| 1:40 PM | Access to Telecommunications by Persons with Disabilities Focus Group | Gregg Vanderheiden |
| 2:20 PM | Assignments, Organization and Going Forward | Chairman Bob Lucky |
| 3:00 PM | Wrap Up - Meeting Adjourned | Stagg Newman<br>Designated Federal Officer |

## 3. Membership of the Technological Advisory Council

Except as indicated(*),all of the following were present at the Third Meeting:

***Chairperson***:

Dr. Bob Lucky – Corporate Vice President, Applied Research, Telcordia Technologies

***Members of Council***:

Mr. Bruce Allan – Vice President and General Manager, Harris Corporation,

*Mr. Jose M. Alvarez Caban – Assistive Technology Specialist, Puerto Rico Assistive Technology Project, University of Puerto Rico.

Dr.Jules A.Bellisio,***TAC Executive Director***, Chief Scientist and Fellow, Executive Director, Telcordia Technologies

*Dr. Vinton Cerf – Senior Vice President, Internet Architecture and Technology, MCI Worldcom.

Ms. Susan Estrada – President and CEO, Aldea Communication.

*Mr. Bran Ferren – Executive Vice President for Creative Technology and Research Development, Disney/ABC.

Dr. Richard Green – President and CEO, CableLabs,

Ms. Christine Hemrick - Vice President, Technology Communications, Office of the CTO, Cisco Systems, Inc.

Mr. Dewayne Hendricks – CEO - Dandin Group

*Mr. Ross Ireland – Vice President – Engineering, SBC.

Dr. Charles E. Jackson – Independent consultant.

Mr. Kalle Kontson – Division Technology Manager, Center for Electromagnetic Science and Vice President IIT Research Institute

Dr. William Lee – Chief Scientist, AirTouch/Vodaphone.

*Dr. Paul Liao – Chief Technology Officer, Panasonic and President of Panasonic Technologies.

*Dr. Wah Lim – Vice President for Technology and Development for Hughes Space and Communications Company.

*Dr. Robert Martin – Chief Technology Officer of Bell Labs, Lucent.

*Dr. David Nagel – President AT&T Labs and CTO for AT&T,

Mr. Glenn Reitmeier, Vice President, DTV and Web Media, Sarnoff Laboratories.

Mr. Dennis Roberson – Vice President & CTO, Motorola.

Dr. Marvin Sirbu – Professor of Engineering and Public Policy, Professor of Electrical & Computer Engineering, Professor – Graduate School of Industrial Administration, and Chairman of the Information Networking Institute, Carnegie Mellon University.

Dr. Gregg Vanderheiden – Professor – Human factors Group, Dept. of Industrial Engineering, University of Wisconsin, and Director of Trace Research and Development Center.

Mr. Jack Waters – VP of Network Engineering, Level 3 Communications.

*Dr. Pat White - Director, Telecommunications Practice, AD Little.

Mr. Robert Zitter – Senior Vice President, Technology Operations, Home Box Office.

***Designated Federal Officer***

Dr. Stagg Newman, Chief Technologist, Federal Communications Commission.

***Alternate Designated Federal Officer***

Mr. Dale Hatfield, Chief, Office of Engineering and Technology, Federal Communications Commission.

****Not present at third meeting***

*A set of short biographies of each member can be found in the first meeting report.*

About 50 members of the public observed the meeting. There are no comments from the public to be reported.

**4. Summary of Remarks by Representatives of the FCC**

Dr. Stagg Newman, Chief Technologist, Federal Communications Commission, will soon be leaving that position as his term is ending. He thanked the TAC Members both for their willingness to serve and for providing good technical contact points for issues as they arose. Dr. Newman described how the advent of the Internet is driving the FCC to consider new ways of making efficient use of the spectrum, and of promoting new ways of breaking down the "digital divide" between those who might and those who might not have broadband access. The TAC is helping deal with these issues and is also helping solve the problem of communications access for the disabled.

In other remarks, Mr. Hatfield reiterated the importance of developing an understanding of the merits of innovative spectrum sharing schemes.

Later in the meeting, Commissioner Ness also expressed her appreciation for the work of the TAC.

**5.0 Report of Spectrum Focus Group and Group Discussion**

Chuck Jackson introduced four reports produced by the Spectrum Management Working Group which are summarized here. The Group is divided into three working subgroups, and the roundtable discussion of the meeting was organized around each of these areas.

**5.1 Noise environment**

Dennis Roberson reported on the activities and findings of the Noise Environment Subcommittee.

The substance of the initial Subcommittee charter was to:

- Assess the state of knowledge of the noise environment and its impact on communications
- Identify man-made noise sources likely to be harmful to wireless communication
- Identify noise issues that justify FCC attention and action
- Suggest approaches for obtaining information about the noise environment

The primary industry trends driving use of the spectrum by *intentional* users are:

- Proliferation of new wireless systems
- Evolution from 2nd to 3rd generation cellular
- Expected growth from 300 million cellular subscribers now, to 1 billion in 2003
- The demands of public safety
- Emergence of fixed wireless to the home
- New satellite systems
- In home wireless networks
- Wireless LAN / Personal area networks (Bluetooth)

These intentional uses inevitably must coexist with a growing assortment of *unintentional* radiators, such as:

- PCs / Laptops (with some clock rates perilously close to heavily used wireless bands)
- Organizers ( e.g., Palm Pilots)
- Game machines (with some of the highest performance devices in the field)
- Proliferating internet appliances
- Automotive electronics (with a current average of 25 microprocessors / vehicle)
- Electronic books
- MP3 players
- Electronic monitors and sensors

The result…and this is really happening now… is that we have:

- A dramatically increasing number of devices
- New emission characteristics
- Increasingly uneven device and radio density
- Greater interference potential due to increased mobility

Because it is clear that the FCC needs to review regulatory approaches on noise interference, the following goals for the FCC TAC Noise Subcommittee were established:

- Ensure that current communications systems are not compromised
- Ensure that the potential for innovative new communication technologies is maximized

The Subcommittee sees its role to be:

- Developing proposals on how to proceed
- Facilitating proposal implementation
- Identifying possible funding sources
- Reviewing results during implementation

With the current status:

- Initial ***proposal*** developed (See: **www.jacksons.net/tac/** )
- Possible funding approaches listed

***Proposal Outline:***

- Develop a comprehensive report based on existing information
  - Search current literature
  - Obtain information from industry experts
  - Rationalize and consolidate the information
- Identify and rank major noise sources
- Develop simulation tools / models to predict future issues
  - Develop noise models of major current / future sources
  - Develop models of major communication systems
  - Simulate to predict potential future noise environments
- Verify Simulations
- Identify improved regulations
  - Develop noise models based on proposed regulatory limits
  - Evaluate noise impact via simulation

Funding will be required to implement this plan. Rough cost estimates were provided by the subgroup. (Normal procurement procedures will be used in the event work is authorized)

- Develop literature based report - $100K *(This is the most urgent task)*
- Develop noise models and perform simulation - $600K
- Verification of simulations - not yet estimated

There are several possible funding approaches. One consideration in assigning the task is the importance that this work be done under the auspices of an impartial group like the TAC.

- FCC funded
  - Include in fiscal 2001 budget
  - Begin work in late 2000
- NTIA funded or as an alternate contributing source
- Funded by FCC TAC members
- Broader industry funding
- Other? / Combinations of the above ?

**5.11 Discussion**

The presentation drove home the point that the recent explosion in new types of devices could make the future very different from what we might expect from past experience. The key to getting our hands around this issue will be a good set of models for both intentional and unintentional radiators. Typical budget cycle problems work against the sense of urgency that we have for this issue. Besides raising the funding priority for this work, we should survey the industry for to see if there might be a broadly based group that could help with the funding.

**5.12 Resolution and Action Item**

The following position was unanimously accepted by resolution by members of the TAC present: *The group both accepts the recommendation from the subcommittee [the proposed study] and officially forwards it to the Chairman with the full support of this body.* A formal letter will be sent to the Chairman requesting funding consideration for the first step of the study.

**5.2 Software Defined Radio (SDR)**

Kalle Kontson spoke about the spectrum management implications of software defined radios. He used the following visual to show where we have been, and where we are likely to go in the future. The key to understanding why regulations must change is related to the evolution of radios (and of the implementation of operating rules) from being in the hands of a human operator to being increasingly under autonomous software control. The range and speed of automatic reconfiguration of radios now possible have created a quantum change which must now be reflected in regulations.

# EVOLUTION OF THE "RADIO OPERATOR" … FROM MAN TO MICROCHIPS

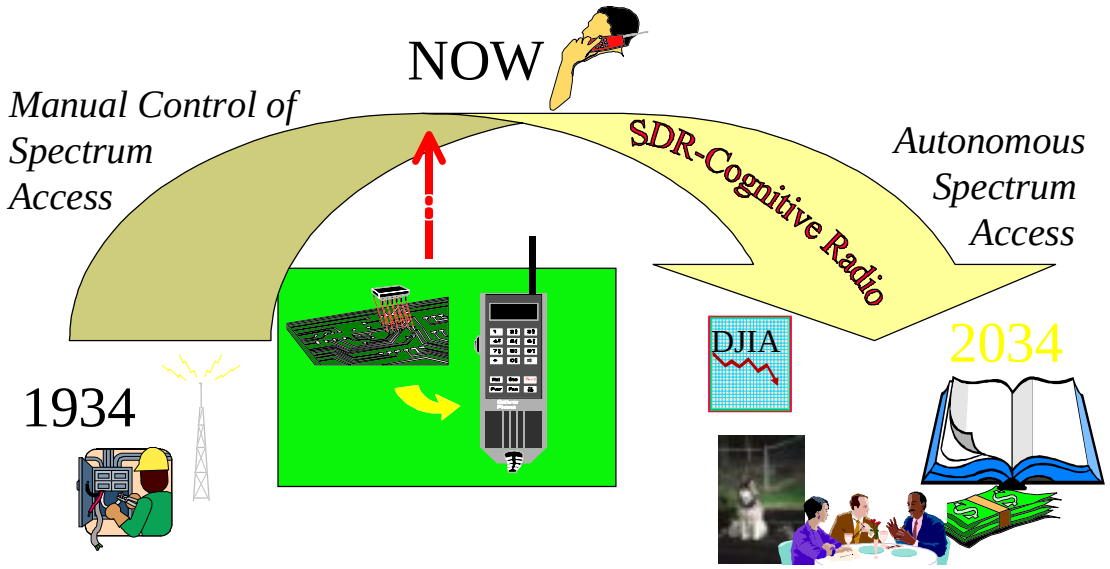


**Fig. 1**

Some defining characteristics of the SDR:

- Programmable (and RE-Programmable) functionality
  - In the r-f domain; it can be taught how to behave in the r-f spectrum trade-space
  - In the applications domain; it can be taught how to provide various services
- Current emphasis: universal access and upgrade
- The next evolutionary step is the cognitive radio
  - Adds awareness of external environment
  - Implements "radio etiquette" according to knowledge
  - Offers far more efficient use of spectrum trade-space
  - Concept developed by Joseph Mitola III

There are several parameters which trade off against each other (the trade-space):

- Power level
- Location (spatial dimension)
- Frequency and bandwidth
- Time of day
- QoS (Expected quality of service)

A interesting contrast can be drawn between spectrum regulation and the regulation of air traffic. Today, specific segments of radio spectrum in given geographic areas are assigned to specific entities for a defined application. By analogy, if air corridors were assigned using the same principal, each airline would have its own air corridor for its exclusive use. Fortunately, intelligent air traffic control was a sufficiently well developed technology when airlanes were planned so that this inefficient allocation method was not required. We will soon be reaching a

situation where intelligent “radio traffic control” will allow us to timeshare “radiolanes” between multiple users. Similarly, we can expect a single piece of radio equipment to reconfigure itself to serve multiple purposes as depicted in the following two illustrations:

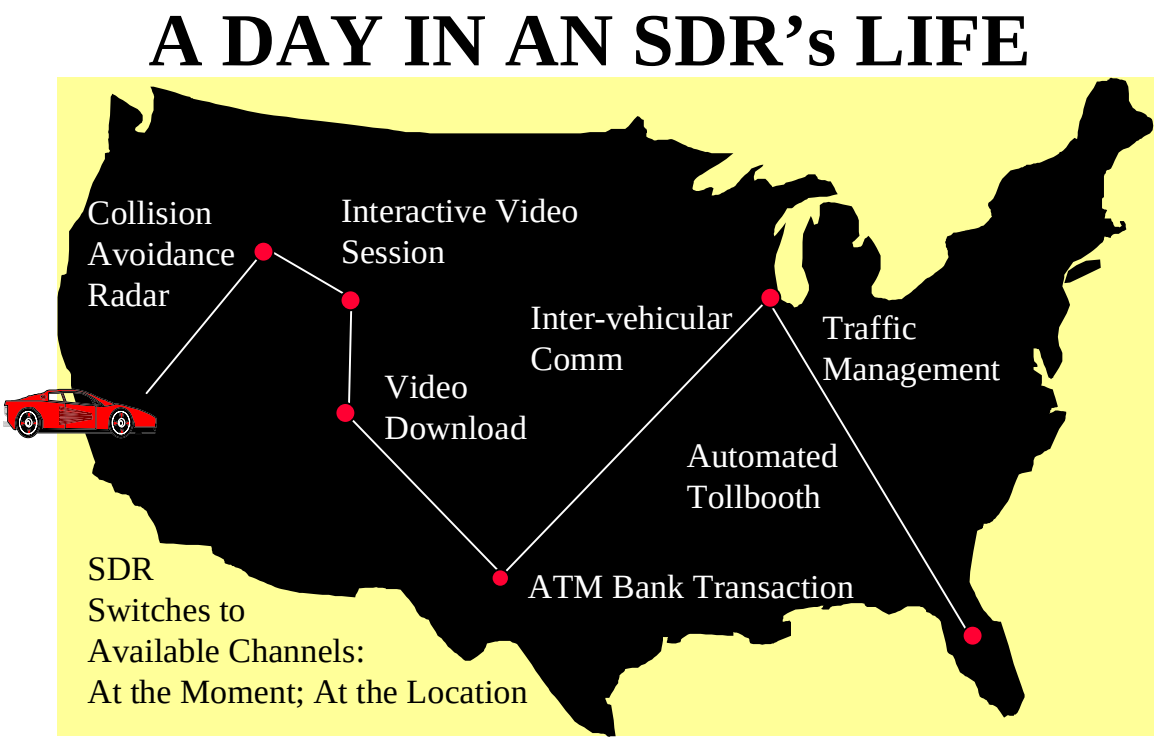


**Fig. 2**

# THE PROMISE OF TECHNOLOGY

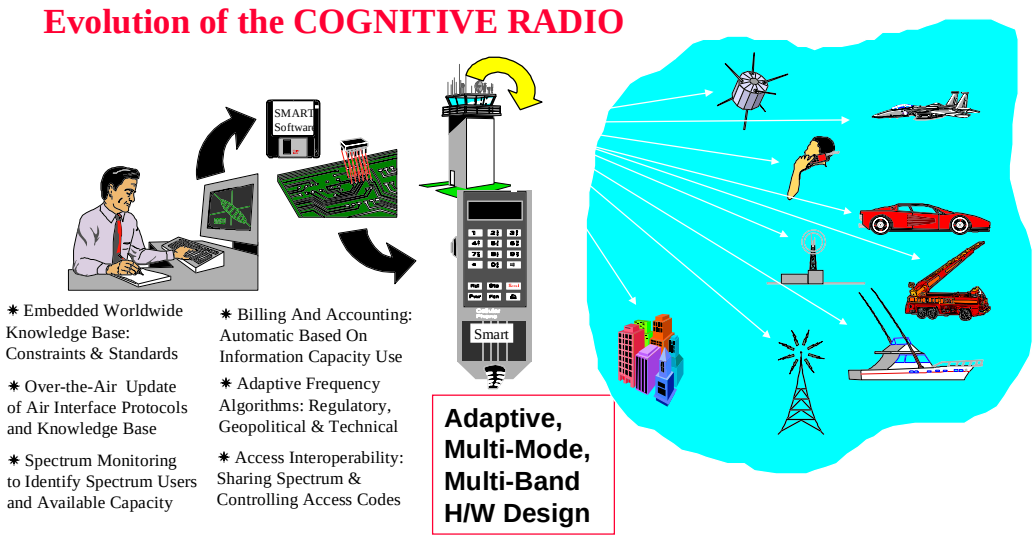


**Fig. 3**

The advent of the SDR will impact regulation in the following ways:

- Real-time, dynamic spectrum access management- it must be accommodated; but can it be handled now?
- The current regulatory framework does not promote shared access for efficient spectrum use by all
  - Demand for spectrum leads to demand for efficiency
  - Convergence of multiple users and functions in a common spectrum trade-space
    - users: public safety, military and commercial users
    - functions: voice, data, video; e-shopping, e-banking, e-investing
  - If universal interoperability is a common goal, then access to common spectrum is a prerequisite
- Allocation and standards
  - Not a service-specific or user-specific allocation; but not a part 15, either.
  - Consider moving new open access service into a specific band; create an "FCC *part **X***" with a charter to grow into other bands
  - Part X attributes:
    - Real-time, over-the-air coordination (analogous to current coordination; except it is negotiated by the radios)
    - Based on fundamental limits
- Consider some experiments & demonstrations to demonstrate viability and conceptual designs
  - Develop scenario-driven experimentation schedule
  - Analyze the taxonomy of open access behaviors
  - Identify some spectrum, and a "market"
  - Infuse federal funds & technologies

    - Leverage industry organizations (e.g., SDR forum)
    - Invite all users & functions to play
- Look to industry forums for standards
- Caution: allocations change about as fast as turtles run

With the SDR we must also consider issues of authorization:

- Authorization of both hardware & software
- Spectrum access behavior authorization:
    - Bandwidth/modulation/power control
    - Access authorization code control
    - Knowledge-base validation/certification
        - Externally-supplied, third-party databases
        - Local monitored data - stop, look, listen… and transmit
- Implementing authorization
    - Telecom certification bodies, verification, declaration of conformance, certification
- Need to define conformance
- Other non-spectrum-related software authorization/certification issues
    - Convergence of e-commerce and telecom functions into a single body of "code"
    - Security for various users: public safety, law enforcement, military, commercial
    - Priority of access
    - Integrating related industry development and testing programs; e.g., the "centers of excellence

We may also have to revisit the entire issue of licensing and auctions

- Current "property" model may be impediment
    - Consider alternatives:
    - Real-time spectrum rental - concept of Joe Mitola
    - Auction of infrastructure implementation rights, but reserve access rights to any and All conforming systems (spectrum husbandry… for a profit)
    - Reserve information capacity for non-primary users
    - Provision universal access expansion in future

**5.21 SDR Discussion**

The SDR is a "paradigm breaker". The rental of space in the frequency domain per unit time is a new way of working. We should carefully consider how to approach this without creating yet another layer of dangerous new problems for the future. An important part of doing this right will be to understand the motivations incenting the industry to "do it right".

### 5.22 Software Defined Radio- *Action Items*

- Flesh out some "*part **X***" ( introduced above) content
- Specify some SDR experiment scenarios
- Expand on authorization alternatives
- Focus on defining conformance
- Develop alternatives to auctions
- Track and contribute to FCC NOI
- Determine if we can work with the DoD to do experiments
- Send a copy of this report to the NTIA

### 5.3 Ultrawideband Radio (UWB)

Dewayne Hendricks reviewed some of the issues surrounding UWB.

Definition : For purposes of this presentation, we will use the term 'wideband emissions' or 'wideband technologies' (WB) instead of ultra-wideband (UWB). WB includes spread spectrum (SS).

The WB regulatory path up until now has included:

- The 1981 NOI (Notice of Inquiry) on spread spectrum
  - First to raise issues of narrowband vs wideband
  - Discussed the concept of 'spectrum overlay'
  - Discussed the spectrum efficiency issues of wideband vs narrowband

- Part 97 (Amateur Radio Service)
    - NPRM in 1984
    - R&O in 1985
    - STA in 1992
    - Petition for rulemaking in 1995
    - NPRM in 1997
    - R&O in 1999
- UWB NOI
    - Driven by waiver requests from UWB companies
    - Many of the same issues and questions raised as in SS NOI
    - Proposed to operate under Part 15, but asked for alternatives

Some of the issues associated with Part 15 are:

- Very successful to date, but no idea as to how many devices and where
- "Tragedy of Commons' and noise floor
- Sharing band with licensed services
- Growing use of devices for Internet access

And some of the issues associated with Part 97 are:

- More restrictive rules until this year
- Repeater interference
- Weak signal and EME (earth moon earth experiments) interference
- Need different allocation for WB experimentation and use

In summary, the really key issue is that of spectrum overlay and how existing services are to be accommodated. The only way to move forward is to deploy real systems in a controlled fashion and test and measure impacts. WB has yet to have its first successful "test flight"…and the problem is framed in different ways by different proponents.

### 5.31 Ultrawideband Radio-*Action Items*

- Compile an on-line database of the most relevant filings on WB at the Commission
- SDR and WB are tightly coupled and some implementers will use both.. Relevant SDR filings should also be compiled
- Examine the issue where a proposed licensed service wants to employ WB for spectrum overlay, such as ARS
- Find and deploy WB in those regulatory environments where there are currently no restrictions against WB operations. Generally consider the most straightforward experiments that might be needed to come to some conclusions.
- Move to controlled test bed tests as the industry starts to work out the issues and determine what it really wants to do
- Develop an appreciation of what the overarching public benefit might be from introducing this technology.

### 5.4 Special Report on FCC Power Limits

At the previous meeting, there was some discussion relative to the logic surrounding FCC radiated power limits for intentional vs. unintentional radiators. Chuck Jackson's presentation, summarized here, clarified some of the issues.

Power limits:

- Limits on emitted power are found throughout the FCC rules.
- Consider three specific examples:
  - Intentional radiators under Part 15
  - Unintentional radiators under Part 15
  - PCS radios

These rules are similar to those that apply to many other radio services.
Emission limits as specified by the FCC rules:

- Intentional radiators
  - 500 mV/m at 3 meters (f > 960 MHz)
- Unintentional radiators
  - Class A digital device
  - 300 mV/m at 10 meters (f > 960 MHz)
- PCS transmitters
  - Below -43 dBW in any 1-MHz band
  - For reference kTB is -144 dBW (290 K, 10E6 Hz)

These limits need to be converted to a common basis for comparison:

| Emitter | Field Strength mV/m | EIRP at 3 Meters |
|---|---|---|
| Intentional | 500 | -71 dBW |
| Unintentional | 1,000 | -65 dBW |
| PCS | 13,000 | -43 dBW |

The following figure depicts one design of a typical wideband device. The power spectral density is can be expected to be approximately uniform and just below the legal limit.

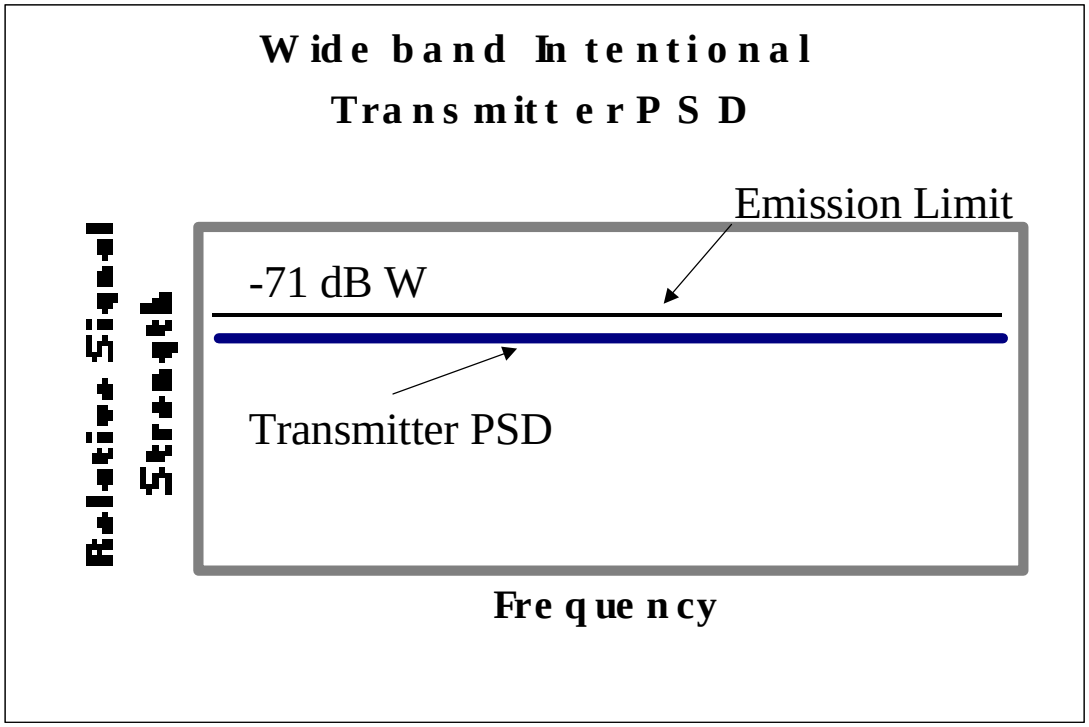


**Fig. 4**

On the other hand, a typical incidental (unintentional) radiator, shown below, may have large peaks of power approaching the legal limit, but in general will have most of its structure at a much lower level. We would also expect some periodic repeating of the PSD related to harmonics of internal clock rates.

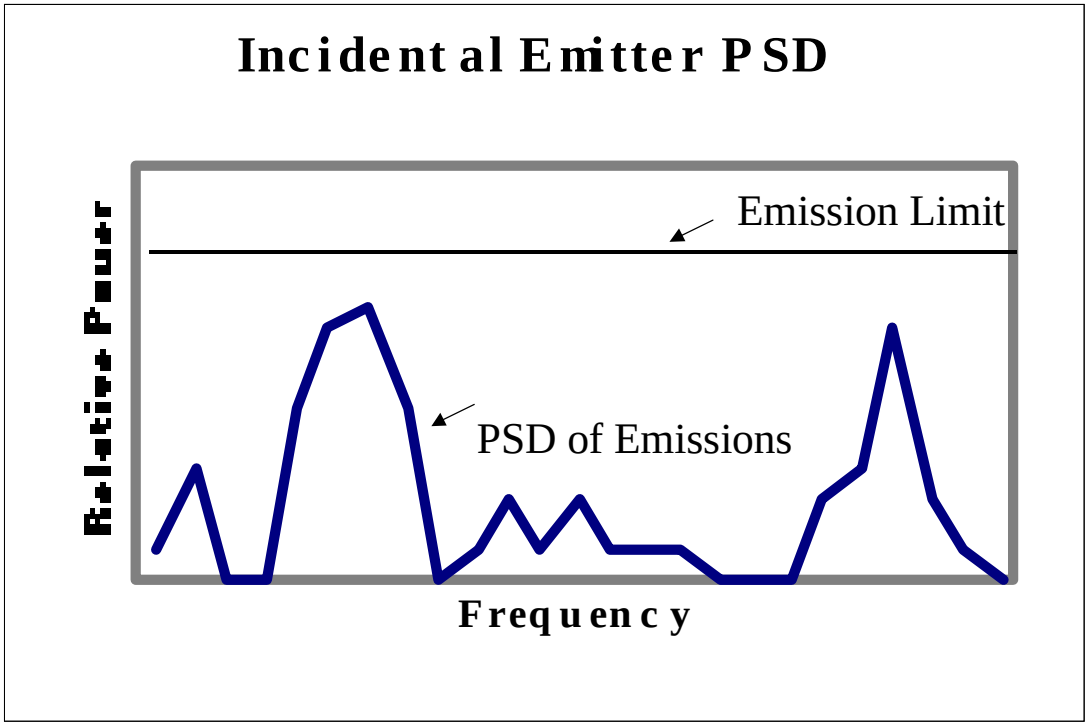


**Fig. 5**

But we have to understand that there are two sets of simultaneous constraints at work here.

- The FCC Rules
- The Laws of Physics!

The FCC's out-of-band constraints on PCS transmitters are really more like boundary conditions for the roll-off of the passband filters. As can be seen from the following figure, any real system will not only obey the FCC rules, but because of the way real filters inevitably behave, will quickly have out of band power far below the legal limit. The critical point here is that even though it appears as though a great deal of interfering power is permitted, this does not occur in practice because of the way real systems are actually implemented. Apparently, the rules were written with the full expectation that this would be the normal situation, because there is an additional clause in the rules stating:

"When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than is required in this section."

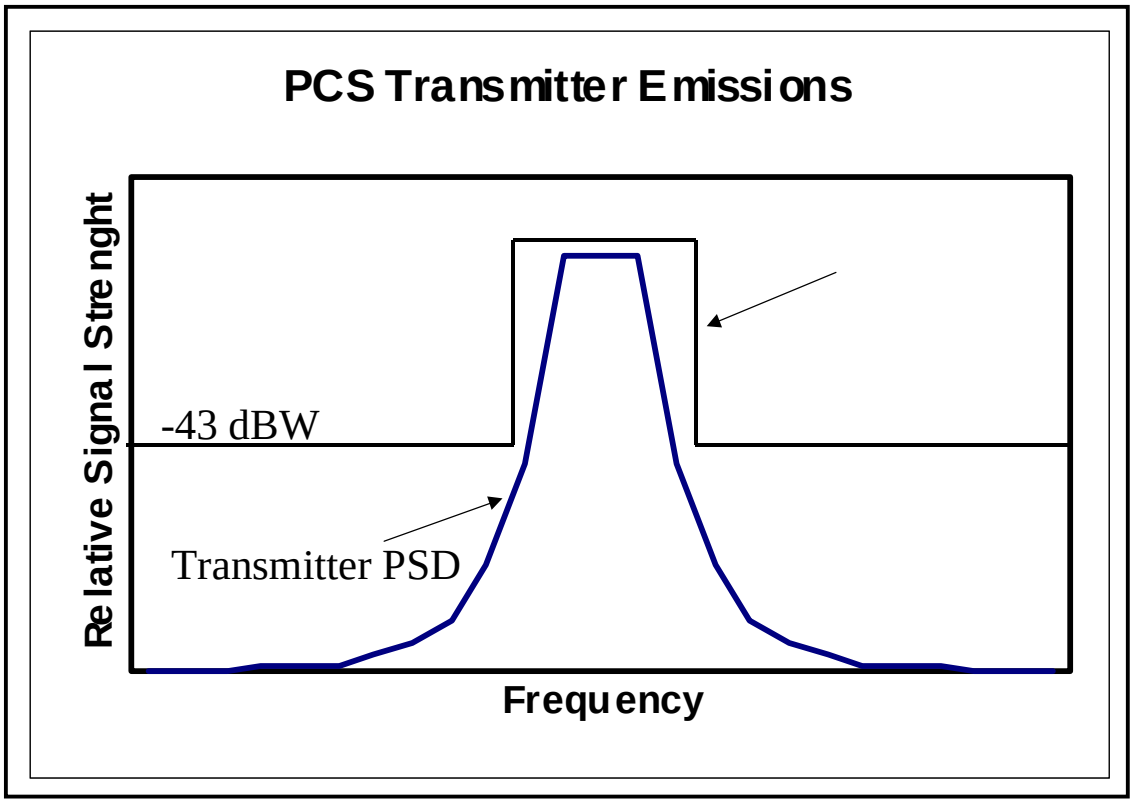


**Fig. 6**

Therefore, we have the following conclusions:

- The FCC does hold intentional radiators to somewhat tighter limits than it holds unintentional radiators.
- Under reasonable system models, this disparity does not mean that intentional radiators are less likely to cause harmful interference than are unintentional radiators such as personal computers.
- The rules contain an "escape clause" to stop an unintended interpretation of the rules from causing harm.

## 6. Report of Interconnection and Network Access Focus Group and Group Discussion

Marvin Sirbu reported on progress of this focus group.

There are several white papers in preparation as agreed by the group:

- Internet interconnection
    - Interconnection and QoS
- Overview of Access and Interconnection Issues
- Interconnection and Feature Interaction

Some of the access technologies that the group is considering are xDSL (*any* digital subscriber line), cable, fixed wireless, and FTTC (Fiber to the Curb)
Some of the key interconnection issues that have been identified are:

- Wavelength interconnection
- Dynamic bandwidth allocation
- Interconnection for QoS
- Feature interaction

Interconnection and Feature Interaction-some examples and sources of problems:

- Call waiting and call forward/busy -which takes priority?
- Interprovider feature interaction-800 call Alternate Route on Busy (IXC) and Call Waiting provided by LEC
- Problems caused by feature provision migrating out of switch and into feature servers which could be provided by third parties

There are a number of techniques for managing feature interaction:

- Formal modeling -finite state machines
- Automated model checking tools

Conclusions of the subgroup:

- Ideally features could be independently offered by multiple parties, but feature interaction guarantees this is not possible
- New industry mechanisms are needed to resolve interaction among features provided by different parties
- It is conceivable that we could limit the extent to which features are allowed to be distributed across domains

### 6.1 Interconnection and Network Access - *Action Items*

- Can we begin to list *all* of the interdomain management issues?
  - What standards exist or are planned by various industry groups to address the interconnection problem? What are the time scales proposed by industry to solve different parts of the interconnection problem? Will some sort of regulatory intervention serve a useful purpose? What evidence can we produce to demonstrate, as claimed, that industry will solve this by themselves
- Are current deployments in the access area (e.g., digital subscriber lines and cable modems) discouraging the deployment of more capable, futuristic alternatives, or are they a logical and necessary stepping stone to the "ultimate access network"?
- For the specific problem of the interaction of tandem voice coding and compression systems, can we quantify the problem and propose a mitigating scheme?

## 7. Report of Access to Telecommunications by Persons with Disabilities Focus Group and Group Discussion

A number of deliverables have been planned for this group. They include a set of awareness points to be used by equipment designers so they may be sensitized to the issues, short treatments of the issues, and questions to be asked of those proposing of new services. To get ahead of impending problems, scenarios of future usage are being laid out.

There are two approaches to meeting the requirements of access for the disabled:

- Industry can become aware and proactively address the problem

  *or*

- Government Agency(s) can create regulations to force awareness and accommodation

Types of issues and topics that need to be addressed:

- New designs that can cut off existing access (by accident / oversight)
  - Preservation of captioning during transport, especially with respect to storage technologies
  - TTY and incompatibility with new systems
  - Technology migration
- Those that allow new access or access to new technologies
  - Teleconferencing
  - Video teleconferencing
- Facilitating migration from assistive technologies to standard (new) technologies
- Mechanisms that facilitate or inhibit

Some of the currently identified awareness points are:

- AV transport provisions to prevent the stripping off of aids for the disabled
- Confusion of "access info" with "commercial piggy-back info"- the importance of having different must-carry policies for assistive ancillary data
- Benefits of migration to assistive technology – how everyone can benefit
- Requirements for migration to AT to occur
- Features to facilitate assists (Auto-Caption and Auto Transcription)
- Features to facilitate "on demand" remote assistants
- Features to facilitate turn taking and participation among people with different response profiles and sensory abilities.
- Concerns of industry
- Concerns of consumers with disabilities

### 7.1 Access to Telecommunications by Persons with Disabilities - Action Items

- Schedule teleconference meeting(s)
  - To review and discuss topics where there is a draft
  - To discuss other topics on way to draft
  - To identify other issues / topics
  - To see if there are any specific recommendations that the committee feels should be brought to the full council for discussion and action

- Continue use of list and web to augment teleconference(s) and as dissemination point for results.
- Develop specific recommendations to FCC (if any) that might come from discussions (for presentation to the full council) – We may need regulations to both raise the priority of this issue, and also to ensure a level competitive playing field for those who are first to implement assistive technologies
- Considering that there are many products outside the purview of regulation, propose ways of reaching this community. How can the FCC help spread the message?

## 8. Going Forward

Each focus group leader should summarize the action items as they see them for their group, and specific actions should be assigned as an individual responsibility to persons in the group for reporting at the next meeting.

The next scheduled formal TAC meeting is March 24,2000. Meetings have also been scheduled for June 28,2000, September 27,2000, and December 6, 2000.

**Annex 1: Meeting Videotape**

A VHS videotape of the December 13,1999 meeting serves as a set of comprehensive minutes of that meeting. Copies of the tape can be obtained from the Commission's contracted copier, ITS. It can be reached through ITS' web page.

**http://www.itsdocs.com**

or by phone at 202-857-3800

**Annex 2: FCC staff**

***FCC staff available to address questions from the TAC:***

Contact Stagg Newman as the DFO. With respect to specific Federal Advisory Committee Act (FACA) questions, a resident expert is FCC attorney:

Paula Silberthau, at: PSILBERT@fcc.gov
Phone 202-418-1874

Additional FACA information is at the Office of Government Policy web page at:

**http://www.policyworks.gov**

**Annex 3: Focus groups , moderator, and group web addresses for interaction.**

**Spectrum Management** (Charles L. Jackson, moderator)

**http://www.jacksons.net/tac**

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**Accessibility for Disabled Persons** (Gregg Vanderheiden, moderator)

**http://trace.wisc.edu/docs/fccadv/disability.htm**

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**Network Interconnection and Access** (Marvin Sirbu, moderator)

**http://www-fcc.ini.cmu.edu/FCC/index.html**

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