

## The Commission's Rules, Innovation, and Invention

The Commission's rules can have a quite negative impact on the process of invention and innovation in the marketplace. This happens because the rules specify the exact emission types used and in many services the actual engineering designs of the communication devices must be approved by the Commission's engineering staff.

While there are reasons that the FCC rules have been established this way, they create considerable havoc for the inventor and for the inventive process. Invention is an iterative and rather playful process where specific devices are conceived, prototyped, tested, modified, and often recycled into different devices. Invention is a tentative and experimental process where numerous concepts and designs are processed and played with until a potentially marketable technology is developed. This is the opposite of the regulatory world where very specific engineering designs are approved for the radio and wireless communications markets.

## How to Accommodate Invention in the FCC's Regulatory Structure

It is likely that the FCC will not abandon its current regulatory structure for radio communication. So how do we accommodate the free wheeling nature of invention in the FCC's regulatory system?

My suggestion is to establish some lightly regulated radio frequency bands where experimenters, both individual and corporate, can experiment with unusual and even "way out" communications technologies. These special radio frequency bands would be called Freedom Bands indicating that the users of these bands would be free to experiment with whatever communications technologies they could invent and get on the air.

The Freedom Bands would create an inventing environment similar to that in the early 20th Century where radio experimenters could do virtually anything that they could invent and actually get on the air. The environment was open and there were few regulatory inhibitions on the experimenters both amateur and commercial.

We need to create some spectrum bands where this type of inventive freedom can exist once again. This freedom will allow numerous new technologies to be born, prototyped, and tried on the air. One can imagine some of these new experimental technologies such as the following:

1. Parallel transmission of numerous channels of data for the ultra-rapid transfer of data, audio, and video
2. Transmitter, receivers, and antennas using liquid-state components including components that can be made domestically during extended emergency situations (such as after an intense solar geomagnetic storm event)

3. Ultra narrow band transmissions using low keying rates for long distance interplanetary communications and eventually for interstellar signaling to Earth-like planets
4. Power broadcasting using continuous waves (CW) or another mode to rectifying antennas (rectennas) on remote repeaters and on airborne repeaters flying “permanently” on station.
5. Multiple channel holographic three-dimensional still image and video transmissions
6. High-resolution synthetic vision radar for blind people and other visually impaired people (This technology could also be applied to robot-driven automobiles and other vehicles as well as to military purposes.)
7. Prototype natural vacuum electronics technology for eventual application to space vehicles and space stations. (Initial tests of these open structures would be conducted in glass bell jars establishing the requisite vacuum on Earth.)
8. Wireless bus extended-chassis super computer systems (Refer to U.S. Patent # 6,771,935 for an example of this type of technology)
9. High-power air ionization systems for the electric propulsion of aircraft.
10. 360-degree view radar for flying vehicles
11. Backup radio navigation system for GPS in case the GPS system is incapacitated.
12. Direct brain-to-brain communication via wireless links and suitable biological-to-radio interfaces
13. RF-driven illumination devices and systems
14. Modernized spark-gap communications devices for 21st Century applications
15. Direct wind power integrated into antenna structures powering radio transmissions and aircraft warning lights and bird-warning sounders (You will get lots of wind power from a 1000-foot tower.)

The new technologies listed above will be useful, but the even more exciting ones are the ones that we cannot conceive of yet. We need to encourage the creation of these not-yet-visible new inventions that will allow our economy to grow and thrive in the future.

#### Regulations for the Freedom Bands

The whole idea of the Freedom Bands is an inventors’ park where one can go wild in trying out new and different communications inventions and innovations. However, a few basic rules will allow these bands to operate as we want them to without causing problems for other users of the busy radio spectrum.

The users of the Freedom Bands should be required to keep their radio emissions within the band. Some sort of filtering or suppression of spurious emissions outside of the Freedom Bands is needed. My suggestion is that 60 dB of suppression is probably adequate for most users. However some high-power

emissions such as power broadcasting may require an even cleaner signal with a higher level of suppression.

In addition, we probably need a rule stating that all of the experimental devices set up on the Freedom Bands be established so they don't expose the public to dangerously high levels of radiofrequency (RF) exposure. This protection should also be applied to various animals that are likely to be exposed to the RF emissions.

Access to the Freedom Bands should be allowed to any licensed individual radio operator as well as to small companies, non-profit organizations (such as universities), large corporations, and government organizations (such as NASA, NIST, and DOD). The intention is to open this spectrum to technical pioneers of all kinds allowing the ideas to be developed to grow new industries in the radio marketplace. This system would essentially be a license-free band where many types of competitors can enter the competition. Indeed, it may be preferable to open these Freedom Bands to any U.S. citizen. We do not know who or where the next Edisons will be. They may be hidden somewhere in the ghettos or barrios of urban America or out on the tribal reservations of the American West.

The bands would also have a basic rule that they exist for experimenting, not for the routine transfer of traffic or the broadcasting of program material. The bands are strictly for technical experimentation only. The only exception would be for communication during a major emergency.

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United States Patent 6,771,935, Wireless Bus August 3, 2004

United States Patent 3,280,929 Ground-Effect Machine October 25, 1966

United States Patent 3,280,930 Ground-Effect Vehicle October 25, 1966