Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	**)**	
	)	
Revitalization of the AM Radio Service	**)**	**MB Docket No. 13-249**
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	)	

To the Commission:

Comments of Nickolaus E. Leggett, N3NL
Amateur Radio Extra Class Operator, Inventor, and Analyst

I am a certified electronics technician (ISCET and iNARTE) and an Extra Class amateur radio operator (call sign N3NL). I hold an FCC General Radiotelephone Operator License with a Ship Radar Endorsement. I am an inventor holding three U.S. Patents. My latest patent is a wireless bus for digital devices and computers (U.S. Patent # 6,771,935). I have a Master of Arts degree in Political Science from the Johns Hopkins University.

I am one of the original petitioners for the establishment of the Low Power FM (LPFM) radio broadcasting service (RM-9208 July 7, 1997 subsequently included in MM Docket 99-25). I am also one of the petitioners in the docket to establish a low power radio service on the AM broadcast band (RM-11287). I have filed a total of over 200 formal comments with the FCC over the years since the 1970s. I have filed comments with other Federal agencies as well including the USPTO, FAA, FERC, EPA, and the TSA.

The Value of AM Radio Broadcasting

AM radio broadcasting is a very valuable component of the American radio broadcasting system. AM radio provides effective broadcasting to numerous battery-powered portable and mobile radio receivers. This aspect of AM radio is very valuable in a widespread emergency where electric power is not available. These emergencies include blizzards, hurricanes, earthquakes, solar geomagnetic storms, electromagnetic pulse (EMP) events, and possible terrorist actions.

AM radio broadcasts can be received by very inexpensive radios that even poor people can own and use. Some of these radios are available for just a few dollars. In addition, people can even build their own radios. This means that there is no economic barrier at all to being an AM radio listener.

The propagation characteristics of the AM radio band provide excellent coverage of large rural areas and long distance propagation of signals at night. This brings in remote areas of the Nation that are not well served by FM radio or terrestrial television.

Many young people are introduced to radio electronics by building their own simple AM radio kits. Some of these kits are elementary crystal sets that consist of a diode detector and some tuned (inductor-capacitor) circuits. These crystal sets do not require any power supply or battery and they merely use the power radiated by the broadcast transmitter. This historical type of radio works surprisingly well on the AM band. When I was a child, I had a Philmore crystal set with a "cat's whisker" wire connected to a galena (lead sulfide) rock and a spider web antenna of copper wires. Other child's radios are basically a crystal set followed by a single-transistor audio amplifier. These radios can drive a small loud speaker.

Further Proposals for the AM Radio Service

We can use the AM radio service to enable inner-city minority neighborhoods to provide local neighborhood broadcasts. This special service will allow these minority groups to organize and develop their own neighborhoods and to develop the talents of community residents. I had originally considered that the low power FM (LPFM) radio broadcasting service would have provided this service to minorities, but the Commission has recently decided against allowing especially low-powered stations that could have been accommodated in the urban FM spectrum.

One approach would be to upgrade Part 15 power limits within the AM broadcast band to allow basic stations of a few Watts output power to be operated under special rules. Specific frequencies within the broadcast band could be allocated for this broadcasting on a non-interference basis with higher-powered AM radio stations. This upgraded Part 15 service would use simple AM transmitters that would consist of an oscillator, buffer, and final amplifier in addition to a modulator. The carrier wave would be modulated with the audio signal in the final amplifier of the transmitter. This type of low power transmitter is very simple to operate and service. Local residents could provide this service.

If the Commission decides that it cannot accommodate this enhanced Part 15 operation in the conventional AM broadcast band, it still can provide such a neighborhood service using the following aspect of the ionosphere. There are several of the short-wave broadcast bands that provide world-wide shortwave propagation during the day time. At night, these bands do not provide this long distance broadcasting. The Commission could allocate specific frequencies in these daytime short wave bands for <u>nighttime</u> local broadcasting by inner city residents. Thus while the short wave bands were inactive at night, the local communities and neighborhoods

could broadcast locally using very simple low-power short wave AM transmitters. Neighborhood residents would operate and maintain the basic stations. Residents would organize church groups and scouts to build basic short-wave radio receivers for community use. Others would purchase cheap short-wave radios from Radio Shack and other vendors. This off-peak shortwave service would allow urban minority groups to build their communities and the talents of the community residents. (Note: I will be filing a formal petition to the Commission on this off-peak local short wave service.)

If the Commission applies some imagination and open-mindedness in the AM broadcast service, it will be possible to open up broadcasting to minority neighborhoods in our largest cities and to small towns throughout rural America as well.

More Freedom for High-Power AM Broadcasters

The Commission should consider the benefits of providing more regulatory freedom to high-power AM broadcasters. This would increase the appeal of the AM radio service and would improve the economics of the service.

The FCC should allow specially credentialed engineering firms and individual professional engineers to build and test AM broadcast radio equipment for their customers. This would allow lower-cost competition to the certified (type approved) equipment provided by the current vendors. Quite frankly, much of the AM broadcasting technology is not that sophisticated and it can certainly be constructed on a station-by-station basis by licensed professionals. This additional freedom would allow AM broadcasters to have stations constructed that exactly met their needs without having to pay for additional features that they do not need. This would be a market-based approach that would improve the economics of AM

broadcasting. This would also encourage the engineering community to invent new broadcasting technologies.

The Commission should also allow AM broadcasters' greater freedom in designing their own antenna systems. Since AM broadcasting is one of many broadcast services available, there is much less reason to require antenna designs and coverage patterns to be perfect in nature. Let the broadcasters have more freedom to be experimental and to follow market leads. The Commission would retain its power to regulate the airways and interference but it would reduce the need to micromanage the AM radio service. This would also provide an empirical test of reduced regulation broadcasting and its ability to provide a reasonable public service.

Subsidies

The Commission should approach Congress about the possibility of providing subsidies to AM broadcast stations that install special equipment to deal with emergencies. These Federal subsidies would pay for all or part of the cost of installing special emergency survival equipment such as:

- Long-duration emergency generator systems
- Especially reinforced antenna structures
- Shielding of electronic equipment from electromagnetic pulse (EMP) surges
- Emergency manual controls for translators
- Enhanced security equipment and tamper-resistant buildings. (Blast resistant concrete structures)
- Portable/mobile equipment for emergency relocation movement
- Flood-resistant structures

- Bunk house quarters for emergency operators and technicians

Analog Radio Transmission

Much of the value and benefits of AM radio broadcasting is due to its analog circuitry and rather low frequency of operation. This situation leads to a broadcasting mode that can be easily repaired and modified even under emergency conditions. The very cheap and simple AM radio receivers allow poor people to listen to AM radio and children to experience radio electronics for the first time. For these reasons, the Commission should avoid mandating the conversion of AM radio broadcasting to digital broadcasting.

Respectfully submitted,

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Appendix A – My Patents and Document References

Some of my document references are listed below:

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

"Demonstration and Development of Amateur Radio Applications of Natural Vacuum Electronics"; Nickolaus E. Leggett, N3NL - 22nd AMSAT Space Symposium and Annual Meeting October 8-10, 2004 in Arlington, Virginia

"A 'Lighthouse' Protocol for Random Microwave Contacts", Nickolaus E. Leggett, N3NL, QEX The Experimenter's Exchange – Technical Notes July/August 2004 – American Radio Relay League, Newington, CT.

Wireless bus invention – U.S. Patent # **6,771,935**

Abstract

In order to avoid mechanical assembly problems and transmission of undesired electrical currents among circuit cards or boards in a telecommunications switch or similar digital device, a conventional hard-wired midplane bus is replaced by a wireless bus. The wireless bus includes a radio frequency or light wave transceiver on each card. Antennas on respective cards can either be oriented within direct line-of-sight of each other, or can project into a waveguide which directs the transmitted signals past all the other antennas. For example, the waveguide may be a metal enclosure which surrounds all the cards. Alternatively, respective aligned apertures in the cards can define a continuous transmission path. A data rate exceeding 1 megabit per second and a transmission power on the order of 1 milliWatt are preferred, since the bus is intended for use within a single switch housing. Radio frequencies in the middle to high microwave range or light frequencies in the visible range are preferred for providing sufficient bandwidth and to facilitate servicing.