

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

<b>In the Matter of</b>	)	
	)	
<b>Amendment of Parts 1, 2, 15, 74, 78, 87, 90, and 97 of the Commission’s Rules Regarding Implementation of the Final Acts of the World Radiocommunication Conference (Geneva, 2007) (WRC-07), Other Allocation Issues, and Related Rule Updates</b>	)	<b>ET Docket No. 12-338</b>
	)	
	)	

**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, EPA, and the TSA.

## **My Comments**

I am commenting on the proposal for a new amateur service band on the frequency range of 135.7 to 137.8 kHz. This frequency range is in the low frequency (LF) spectrum. The WRC-07 allocated this frequency band to the amateur radio service on a secondary basis. My comments are in response to Paragraphs 13 through 19 (Pages 8 through 10) of the Commission's Notice of Proposed Rulemaking (NPRM).

In these paragraphs, the Commission asks if an amateur radio service allocation can be established that is compatible with the Power Line Carrier (PLC) systems that are operated in the 9 – 490 kHz band.

## **Proposed Steps for Analyzing this Issue**

The FCC should take the first step of analyzing the PLC system itself. It is likely that this LF communications system is a poor way to control electric power lines. The PLC is apparently vulnerable to interference from low-power radio-frequency sources. If an amateur radio station running an equivalent isotropically radiated power (EIRP) of one Watt could cause a PLC system to trigger a power line shutdown, then clearly the PLC system itself is quite vulnerable to failures and intentional attacks. Terrorist transmitters, electromagnetic pulse (EMP) attacks, or solar geomagnetic storms can all cause major shutdowns of the electric power grid through interference with the PLC.

The FCC should consider requiring the electric power grid to use a more robust control system than its current PLC system. The Commission should set up a Notice of Inquiry (NOI) on using alternative robust technologies such as fiber-optic networks to control the Nation's electric power grid. At the same time, the Commission should examine the legal validity of allowing unprotected Part 15 users, such as the PLC, to displace or block licensed radio services.

If the Commission decides that the PLC system is a safely reliable method for controlling the Nation's electric power transmission system, then it should examine various methods for encouraging compatibility between amateur radio operations on LF with the operation of the PLC system.

### **Methods for Increasing Compatibility**

There are several methods for increasing the compatibility between the amateur radio stations and the PLC system if such steps are necessary. The radiated power of the amateur stations can be reduced below the 1 Watt level that is being discussed. Amateur radio LF stations can be required to be at least one mile or more away from electric power high tension lines. Amateur radio operators can be required to take special examination elements that would authorize their use of the LF allocation. These examination elements would include the measurement of LF power emissions for specific types of antennas and constructive steps for preventing interference with PLC systems. Use of the LF allocation can be restricted to Amateur Extra Class licensees.

It would be a mistake to just block amateur radio operators from any use of the LF spectrum. Many nations have the view that amateur radio stations can constructively use a LF frequency band for communications and experimentation. The Commission should take a very careful view of how this can be accomplished here in the United States. We do not want a situation where American amateur operators are blocked from using LF, while many other nations encourage their amateurs to use the LF allocation.

### **Why Amateur Radio Operators are interested in Low Frequency Operations**

The LF allocation would allow amateur radio operators to experiment with low frequency radio communications. LF is very different technologically from the commonly used high

frequency (HF). Much of the circuitry is rather like audio frequency systems and many varieties of discrete components can be made by individual amateur radio operators. These components can be combined into novel radio circuits and new devices can be invented for LF use. For example, one can see ducts and pools of electrolyte solutions being used as specific discrete components such as variable capacitors and variable resistors.

Low frequency is a technical frontier where amateur radio operators can contribute much of value. Many amateurs, such as me, will answer this call if we are allowed to by the regulations.

**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.