

Continuation of FCC Form # 442

Item # 4(f)(g) - Complex Emissions & Bandwidth

Applicant's Exhibit No. 1

The Applicant states as follows with respect to Item #4, Provisions (f) and (g) thereof:

From Item #4f:

COMPOSITE FMDX or COMPOSITE TDMX SIGNAL EMISSIONS:

Frequency and Time Division Multiplexed Emissions, using frequency modulation or frequency modulated pulse emissions, with subcarrier. Subcarriers are operated using RF on frequencies ranging from 0.6 to 5.564 MHz (60 to 600 KHz subcarriers suppressed). 1200 telephone channels - RMS per channel deviation 200 kHz; continuity pilot at 6.199 MHz produces 140 kHz rms deviation of main carrier. Bandwidth: 16.59×10^6 Hz.

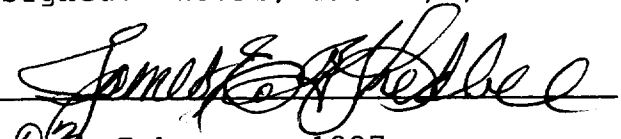
For pulsed emissions, incorporate all of the foregoing into the pulsed emissions, and time division multiplex signals for a one millisecond pulse.

From Item #4g:

NECESSARY BANDWIDTHS: All necessary bandwidths assume that data furnished by the Commission in Section 2.202(g), Table III-b (5), is correct, and corresponds therewith.

Accordingly, bandwidth is 16.6 MHz on all emissions.

Signed: K59FL, Inc. d/b/a Worldwide STAR Corporation; By:

 , James E. Whedbee, Pres.
03 February, 1997

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Item # 10 - Narrative Statement of Program of Research
and Experimentation developing the Radio Art & Science

Applicant's Exhibit No. 2

Page 1 of 3 this Exhibit...

The Applicant states as follows in respect of Item #10 on FCC Form 442 herein incorporated by reference...

Part 1 - Provision (a) of Item #10: Complete Program of research and experimentation proposed, including description of equipment and theory of operation:

Applicant's program of research is to establish a long distance cableless 447,761.19 GHz transmission using RF signals superimposed upon the main carrier. The equipment being used is commercially available using standard MF and HF transmitters coupled with a LASER type transmitter. Typically, the bands above 300 GHz are not allocated by the FCC, except with respect to radio amateur operators, although in Part 2, it is clear with respect to these frequencies, that the FCC has reserved its regulatory power over them.

Applicant's research is multi-tiered, as follows:

- g (1) Production testing of the initial model;
- a (2) Field testing of the initial production model;
- d (3) Experimentation using the production model for technical research into propagation techniques that are unique to the frequency of assignment desired;
- h (4) Technical demonstrations of the production model and the use of the propagation techniques;
- x (5) Developing radio technique using production model by means of extending normal line-of-sight signal communications through cirrus cloud reflectivity;
- z (6) Once fully developed, to demonstrate the model and equipment to prospective purchasers;
- (7) Once fully developed, to use the production model in limited market studies.

Each of the foregoing steps may take a varying length of time, but on average, the Applicant foresees about a three year study in each of the seven research and experimentation categories described above.

The theory of operation, therefore, is clearly implicit from the foregoing: superimpose an RF signal on the 447,761.19 GHz signal, to provide frequency-division multiplexed multi-channel emissions. At the receiving end, the 447,761.19 GHz signal is amplified optically,

to 14 dB/di (more or less) over the preliminary received signal, then fed to a phototransistor which further demodulates the signal into its RF component subcarriers, which are then treated similar to the IF stages in typical superheterodyne receivers. These RF component signals modulating the 447,761.19 GHz transmission are then fed from the phototransistor to one or more Part 15 type amplification stages (low-noise, high-gain), and then fed to any standard MF or HF receiver for further demodulation into their information subcomponents.

This reverse-IF technique should permit use of frequencies of 447,761.19 GHz over extended ranges (56 miles or more), using cirrus clouds as a reflective surface. The signals are emitted to the horizon (more or less), at a low angle of incident, striking the cirrus cloud at that distance, and are reflected to a receiver which is more than beyond the horizon. Because cirrus clouds are composed of ice crystals, the clouds act as both a reflector and disperser of the signal. The distant transceiver then uses the techniques beforementioned to reduce the signal to its information subcomponents, and a response is then transmitted in like fashion.

During field strength testing, as is required in the second phase of research, the local Engineer-in-Charge shall be, of course, involved to the extent Section 5.205 of the Rules requires.

Market studies will involve meeting all the requirements set forth in Section 5.206 of the Rules, and will be used to determine service reliability. If the service proves reliable, the Commission will be notified of this result, and market studies shall end upon reaching that conclusion.

Apart from the amateur radio service, which is allocated use of frequencies above 300 GHz, there is no other commercially viable communications service allocated, and therefore, this authorization is required to completely conduct all research and experimentation proposed. If, in conducting these surveys, research, and experiments, it is discovered that this service is commercially viable, it may serve to ameliorate spectrum shortages below 300 GHz.

Part 2 - Specific Objectives of Research and Experiments:

The Applicant hopes to prove that the 447,761.19 GHz frequency band may be effectively used in cableless and wireless digital communications services of a commercially viable nature. The Applicant further desires to prove that in using the reverse-IF technique in conjunction with cloud reflectivity/refractivity,

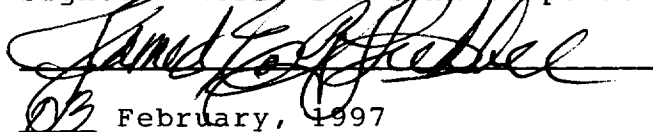
that propagation at these frequencies can be extended beyond line-of-sight, and the horizon in such a fashion as to make this band effective in the telecommunications infrastructure. Enhanced propagation techniques are further designed to reduce the load upon existing spectrum users by providing signal connectivity for services that otherwise rely upon VHF, UHF, or SHF spectrum, by combining these signals and superimposing them upon the 447,761.19 GHz signal. *see*

Part 3 - How the research and experimentation has a reasonable promise of contribution to the development, extension, expansion, or utilization of the radio art, or is along a line not already investigated...

The bands above 300 GHz are recognized from the previous WRC convention as being severely underdeveloped and underutilized. If this program is successful, it will:

- (1) Broaden the available range of wireless/cableless telecommunications spectrum frequencies available for operation;
- (2) Alleviate spectrum shortages (perceived or actual) in spectrum below 300 GHz;
- (3) Provide a new form of signal propagation not heretofore investigated;
- (4) Provide signal connectivity for services which otherwise rely upon VHF, UHF, and SHF bands for such service, thus minimizing any perceived spectral shortages; and,
- (5) A host of other objects and advantages inherent in the foregoing, providing such other and further services as may be described in the accompanying Exhibit No. 3.

Signed: Worldwide STAR Corporation; By:

 , James E. Whedbee, Pres.
03 February, 1997

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**Information required to be furnished by Applicant
regarding Points-of-Communications, Limitations upon
Uses, and Means of Station Identification**

Applicant's Exhibit No. 3

With respect to Section 5.151 of Commission's Rules:

The Applicant proposes to retransmit signals of Amateur Radio Station NØECN, using the HF Frequency Band of 3.70 to 3.75 MHz, to prove that such signals may be extended in terms of connectivity via this means of communications. Other stations granting the Applicant retransmission consent in the AM Standard Broadcast Band may likewise be retransmitted via these means. In rendering any such communications services, the point of the experiments are not to establish any communications services, per se, but are to prove that the use of signals on 447,761.19 GHz can be made to provide connectivities between a large range of services. As to any transmissions intended for public reception, those again are not the inherent goals of the proposed experimentation, but are merely being furnished incidental to the proposed experimentation to establish that such a service would be feasible in future circumstances.

With respect to Section 5.155 of the Commission's Rules:

As to the retransmission of Amateur Radio Signals, and more particularly, NØECN, the Applicant intends to modulate the 447,761.19 GHz main carrier with slow-speed morse code i.d. Since the Applicant herein is represented by James E. Whedbee, who is also the licensee of Amateur Radio Station, NØECN, and whose amateur radio license class confers morse code operating privileges on the basis of having been tested therefor by the FCC, the undersigned represents that he is proficient in the transmission and reception of morse code to 5 WPM.

With respect to Section 5.158 of the Commission's Rules:

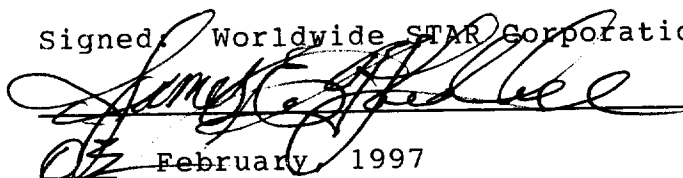
Since the Amateur Radio Service is allocated spectrum above 300 GHz, the Applicant seeks to have authorized any points of communication within the Amateur Radio Service on these frequencies. Accordingly, the applicant proposes to make contact with Amateur Radio Operators on 447,761.19 GHz during research, and experimentation, and requests the Commission's specific permission to not only be permitted to initiate such communications, but to respond to any Amateur Radio signals directed to the Applicant, if the license is granted. When and if communicating with stations in the Amateur Service,

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K59FL, Inc. d/b/a Worldwide STAR Corporation, Applicant

the Applicant shall not make any communications which might cause any Amateur Radio Station to be in violation of any Section of Part 97 of the Commission's rules. Likewise, in the retransmission of any station for which consent has been received, the Applicant requests permission to communicate with stations in that service to determine if, in fact, connectivity has been established and/or has been maintained. This application proposes no other points of communications.

THIS CONCLUDES THIS APPLICATION FOR LICENSE...

Signed: Worldwide STAR Corporation; By:

 , James E. Whedbee, Pres.

 February, 1997