

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C., 20554**

In the Matter: )  
Digital Audio Broadcasting Systems ) MM Docket No. 99-325  
And Their Impact on the Terrestrial )  
Radio Broadcasting Service )

**The following Reply is in response to both the Comment Sought On Use of Digital AM Transmissions During Nighttime Hours DA 04-1007 Dated April 14, 2004 and also the Further Notice of Proposed Rulemaking And Notice of Inquiry Released on 4/20/04, both of which are part of MM Docket No. 99-325.**

**The reason for filing this Reply<sup>1</sup> in the two Inquiries is that not only does this material prove why the AM IBOC System under investigation (IBOC-ui)<sup>2</sup> cannot operate satisfactorily at night<sup>3</sup>, but it also shows why the IBOC-ui System, in over a decade of trying, never met FCC Rules as proven below, thus completing the Record of this Docket.**

**The inherent flaw with the IBOC-ui System is that its design is based upon meeting this Rule limiting interference which was developed for testing Analog signals and never was expected to be used to test Digital signals.<sup>4</sup>**

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<sup>1</sup>This Reply represents the engineering opinions of the undersigned. The undersigned is a PE, a former Senior Adjunct Prof. of Electrical Engineering and is President of Kahn Communications, Inc. (KCI) a firm that has recently developed a new type of IBOC system, the Cam-D™ System.

<sup>2</sup>In the following the term IBOC-ui, which stands for the IBOC system "under investigation," is used to distinguish it from other competitive systems such as KCI's newly invented Cam-D™ IBOC System.

<sup>3</sup>Reunion Broadcasting's comments as authored by its Manager, D. Stanley Tacker, Esq., who is also a well respected Communications Attorney, describes in detail why the IBOC-ui System would violate current allocation standards if permitted to operate at night.

<sup>4</sup>Mr. T.C. Cutforth, President of Vir James, an engineering firm that has prepared some 1000 applications over its 50 year history treats the IBOC-ui nighttime interference problem from

**That is why the IBOC-ui system can never work at night and it is a failure during the daytime. The analysis provided below proves why you cannot use old-fashioned standard digital techniques to solve such a difficult problem....fortunately there is brand new technology that can cram 15 kHz high quality sound that does pass all FCC rules.**

#### **ANALOGY DEMONSTRATING THAT IBOC SYSTEM UNDER INVESTIGATION IS NOT VIABLE**

**An earlier submission offered the Commission an analogy to the monopoly grant supporters of the IBOC-ui system are seriously expecting the FCC to award their failed system. The analogy will now be updated:**

**Assume that a start-up organization, iiii, unknown to the Public, decides that the Government should permit them to sell patented iiii Trucks that have a width at least three times the width now permitted on the road. These iiii Trucks cannot be driven further than 25 miles from their point of origin and drivers that wish to make use of their highways are driven off the road by these huge trucks whenever they come near them, must also pay indirectly a toll fee to the unknown start-up, iiii, just to use public roads. Furthermore, if they wish to buy a car that can scoot around these trucks, at least some of the time, it makes the car about three times as expensive because of iiii patent license fees.**

**Now this is a rather grim scenario, but understates the IBOC-ui situation in a most serious**

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**an engineering standpoint making the salient point that the Rule the IBOC-ui System claims to meet was based on testing Analog, not Digital waves, and is clearly inappropriate for testing Digital signals.**

**Mr. Everist, head of the eminent firm of Cohen, Dippell and Everist, has provide a succinct statement that deserves very careful study by the Commission. This report details the harmful impact of the proposed rule changes to various aspects of Radio Broadcasting and points out that these changes will even require renegotiation of treaties.**

**way...trucks can only be at one location at a time, radio waves can and are at night at approaching an infinite number of locations slamming into almost every station in their skywave path.**

**The bottom line is, even GM not unknown to the Public and government agencies wouldn't have the hubris to propose such a raw deal to fleece the Public.**

### **A PROCEDURAL REQUEST**

**It is now respectfully requested that a special procedure be followed in the instant proceedings in order to thwart an obvious ploy to overwhelm the FCC staff and make a mockery of FCC's long standing policy to conduct fair Inquires by soliciting the views of licensees and individuals and firms served by the licensees and the overall public.**

**National Public Radio, NPR, and the National Association of Broadcasters, NAB, have engaged in a trick to obfuscate the obvious will of serious broadcasters and engineers who have taken time to study the engineering questions raised by the instant inquiry. The ploy is to get every single NPR station and their affiliates to send the identical message....something even Clear Channel with a significant investment of its own money, not public funds, did not stoop to such a ploy.**

**NAB is an even worse offender. At least we know where NPR is getting its funding...from the Public, largely from wealthy individuals who can get their names and political views on-the-air while reducing their fair tax burdens. We are not privy to NAB's source of funding that pays for those side benefits beyond most generous salaries working in what other lobbyists call the Taj Mahal.**

**On information and belief, the NAB dues paying members only include a modest minority of small AM radio broadcasters and indeed, also a minority of all independent broadcasters. Never-the-less they joined in the ploy of casting multiple me-too votes in lock-step with its leadership in Washington, making certain they swamp the effect of a real engineering responses.**

**Accordingly, it is respectfully requested that:**

- 1) NPR and NAB's multiple responses be counted as a single vote, and**
- 2) In view of NAB's possible attempt to mislead the Commission, that it be required to submit, in camera, its membership list which the Commission can by sampling the list verify its accuracy.**

**PROOF OF THE ASTONISHING FACT THAT THE IBOC SYSTEM UNDER INVESTIGATION VIOLATES FCC RULES BY OVER A HALF A MILLION TIMES**

**As pointed out in the June 14th filing, because of the Sampling Theorem the sampled 15 kHz wave has to be present well within the sweep of the spectrum analyzer to provide the required resolution. Actually, the carrier structure used by IBOC-ui stations is present even absent program material, resolves the question. These components are present all the time.<sup>5</sup> This then means that all we must do is multiply the test period as required by 73.44, i.e. 10 minutes, 600 seconds. The following type of analysis will now be named "Finch Analysis" in honor of Mr. James L. Finch, the man in the 1950's who was RCA's highest analytical authority, revered and admired by all of us in his 20 man RCA team, respected for his genius by Bell Labs, and venerated by the Navy as its**

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<sup>5</sup>See the important Comments of Charles Hutton that by a very conservative analytical procedure he has proven that the "IBOC subcarriers are each transmitted 100% of the time..."

**Chief Communications Consultant and as the designer of the Jim Creek Mountain Antenna for long wave transmissions to submerged submarines. Mr. Finch was a Mechanical Engineer by training and used mechanical engineering techniques to solve some of the most complex problems in communications engineering.**

**Let me describe one of techniques which will be applied to the most difficult problem of determining by just what factor IBOC-ui stations violate FCC rules. The "Finch Analysis" we adopt herein is form of "worst case" determination and is based on a single unchallengeable Law of Nature. In the instant case, the law I use is readily understood by laymen. A worst case analysis is, for example, commonly used by mechanical engineers in the design of structures, such as the design of bridges. Clearly, the designer is most concerned that under any foreseeable condition the structure does not fail, and of course, the designer will then provide generous safety factors.**

**In this IBOC-ui case, we will assume that the "worse case" factors are always made most favorable to IBOC-ui stations.**

**First of all, let us state the basic law of physics that controls this analysis:**

**Energy = Power x Time**

**For example your electric bill is in kilowatt-hours. Surely, such a simple relationship satisfies the "Finch Analysis" criterion, especially since only a single Law of Nature is used in the entire analysis.**

**Now, let us determine what the energy of an IBOC-ui signal is under conditions most favorable to the IBOC-ui station. Clearly, if there is no program material present, ("dead air"), the IBOC-ui signal energy is minimized. Under these "dead air" conditions, the**

designers of the IBOC-ui system could not do more than fill the FCC power "mask." Thus, we choose to accept a most favorable condition for the IBOC-ui signal and provide no safety margin or even space for the components created by the program material. (Published spectrum photos and on-the-air measurements of WOR indicate that only a small safety factor was used to maximize coverage. But in any case, it washes out in the final step of the analysis.)

Since the spectrum frame components are present all the time, we can just make the simple arithmetic calculation:

Energy = Power of Framework x 600 seconds, as the test time under 47 CFR 73.44, is 10 minutes.

The next step is to determine the energy of the analog signal splatter. This is, of course, by FCC rules a condition that can only occur once every 10 minutes. Again, we must agree to the "best case" situation for this calculation so as to favor IBOC-ui stations.

Actually, it is a practical impossibility for an analog station to produce splatter components that fill the "mask" power levels. There is no way that an analog signal could produce such a spectrum signature from the statistics of voice and music. The only situation that remotely would fit would be some sort of parasitic oscillation that was "clean" for 10 minutes and then suddenly becomes parasitic for a millisecond - Not very probable. Clearly, this analysis is not applicable to defective transmitters. From the well-known statistics of voice and music, the most powerful component of such waves would fall at approximately 500 Hz which would, if producing maximum negative over-modulation, the condition which produces the largest amount of splatter, i.e. carrier

**"pinch off" which amounts to a duration of 1 ms (1,000 of a second). Over-modulation by higher frequency components would probably do a better job of creating interference more closely approximating the "mask," but this would make the duration of the splatter even shorter and less favorable to the IBOC-ui station.**

**So we conclude with a simple approximation:**

**Energy of IBOC-ui = 600,000 x (Energy permitted by present rules), A LITTLE MORE THAN A HALF A MILLION TIMES.**

**Note: Some IBOC-ui stations believe that the problem of interference can be solved by a 6 db reduction in the IBOC-ui signal. Thus, they conclude that instead of a 50 kw station transmitting full power, all they need to do is drop it to 12.5 kw. Unfortunately, the instant analysis indicates that the factor has to be 600,000 reducing the 50 kw station to less than .1 watts...To be precise 83.33 mw...mw is a thousandth of a watt.**

**Thus, those IBOC-ui stations who think that they can cure the interference problem by reducing power by 6 db 4/1 are wrong by over a 150,000 times!!!**

#### **MISUSE OF MONOPOLY POWER, EVEN PRIOR TO A FINAL GRANT**

**It is important that the Commission take into consideration the conduct of anyone who has an equity interest in the IBOC-ui Patents, before finalization of the monopoly grant, when one might expect them to be on their best behavior.**

**When KCI announced the start of the development of the Cam-D™ System in April of 2003, it immediately made arrangements with a major New York City AM station to use its facilities to conduct the initial on-the-air tests of the new system. This would have facilitated the all-important fine-tuning of the system's "sound" so as to satisfy the diverse**

**"sounds" acceptable in different areas of our Country. It may be surprising to non-broadcasters that a New York "sound" may be totally unacceptable in Dallas, and the Dallas "sound" wrong for Austin. It is important that any new system which defines a station's "sound" be carefully fine-tuned so that it is capable of being adjusted to satisfy all regional tastes. Of course, such fine tuning for a KCI product is best performed in New York City where KCI employees are located and also where KCI has access to some of the world's best "ears" in broadcasting and recording.**

**In light of this, it was a devastating event when KCI received the news that the station, which had agreed to make its facilities available, had been ordered by its CEO to renege on its agreement because the Cam-D System was a threat to the station's substantial investment in the IBOC System Under Investigation.**

**Then, KCI found out that all the New York City AM stations suitable for such tests were also invested in the IBOC-ui system and would not permit these tests to be run at their facilities..they all were part of the team playing the monopoly game.<sup>6</sup>**

#### **THE REAL DAMAGE CAUSED BY KEEPING Cam-D OUT OF NYC MARKET**

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<sup>6</sup>**Blocking KCI from performing its initial on-the-air tests of the newly invented Cam-D™ System at a NYC station created a serious problem as KCI was forced to perform these tests on Nebraska's 50 kw KRVN. KRVN is on 880 kHz. co-channel with WCBS so we couldn't even hear a skywave signal to evaluate its subjective sound. The signal was on-the-air night and day so that it was possible to confirm by local and distant tests, even over a thousand miles away that Cam-D fully complies with FCC interference rules, reduces fading, even beyond POWER-side™ signals and produces "good open stereo sound" in Oklahoma and excellent sound on conventual radios for San Diego "ears" over a thousand miles away. Unfortunately, at least some, but not all, KRVN employees found the sound not acceptable for some Nebraska "ears" and discontinued the tests. Of course, if KCI hadn't been shut out of NYC, we could have done the fine-tuning required to make certain our range of adjustments would not only been excellent to Oklahoma, Denver, and San Diego but also in Lexington, Nebraska. As this document is being written we are preparing to install new Cam-D™ equipment at yet another distant location..Salt Lake City.**

Even importantly keeping Cam-D out of the New York Market had dramatic affect the advertizing industry This allowed the investors in the IBOC-ui System to maintain the fiction that their system had competition. Thus, this all important advertizing group would conclude that they had better get behind the inevitable winning system which was being rubber-stamped into existence by NAB, all the major broadcast groups, NPR, and most importantly up until the present time, the FCC.

This plan to take over AM radio might well have been successful, at least until the Public realized what happening, except for one totally unexpected occurrence, the attack on Country 9/11.

#### THE AFFECT OF 9/11 ON AM RADIO

No matter how cleverly the plans to take over AM Broadcasting have been structured, under the present dangerous conditions, no government agency can seriously consider endangering America first line of communications defense, AM Radio. Americans everywhere depend AM Radio— America's fully-equipped warning system with almost BILLION working radios that people immediately turn to whenever they have the slightest concern over dangerous emergency conditions, either natural manmade.

As result of this totally unforeseen situation, there shall be payoff for those broadcasters, equipment manufacturers, receiver manufacturers and any other entity that puts its greed the Public' best interests. .No payoff days, because of one fateful day 9/11/01.

#### CONCLUSION

In view of the above, the undersigned has come to the opinion that the (desperate)

**investors in the IBOC System under investigation have used the various official and unofficial actions of the Commission to create the appearance that the FCC has made a decision, without a shred of real engineering support proving the nighttime or daytime viability of their System, (indeed all measurements and analysis prove the System is a total failure), to grant them a monopoly even though it means the destruction of AM Radio. Accordingly, in order to avoid further irreparable harm, it is respectfully requested that this matter be IMMEDIATELY taken up, out of order, so as to halt the destruction of America's communications first line of defense when literally millions of lives may be at stake by November 2004, the avowed goal of our enemies.**

**Thus, the original plea is repeated: It is formally and Respectfully Requested that the Commission immediately terminate these Proposed Rulemaking Proceedings, at least as they relate to AM Broadcasting, and permit the free unfettered marketplace to function, except for the strict enforcement of existing FCC Rules and Regulations protecting licensees from interference.**

**Respectfully Submitted,**

  
**Leonard R. Kahn, P.E., FIEEE**

**Sworn and Dated 7/12/04**

**cc: Ibiquity, Lucent, Clear Channel, ABC, Viacom, NAB, NPR and WOR**