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Satellite Broadcasting and Communication Association of America

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Christian Broadcasting Network, Inc.

November 20, 1987

Mr. William Tricarico
Secretary
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

Re: SBCA Comments - MM Docket No. 87-268

Dear Mr. Tricarico:

Enclosed please find an original and two copies of a signature page for the above referenced pleading of the SBCA. As we discussed yesterday, my signature was inadvertently omitted at the time of filing on November 18, 1987.

I appreciate your direction and cooperation in this matter and I apologize for any inconvenience this may have caused.

Please advise if there are any questions or problems in this regard.

Thank you.

Sincerely,

Mark C. Ellison
Vice President
Government Affairs
and General Counsel

0+2

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

IN THE MATTER OF	)	
	)	
Advanced Television Systems and Their Impact on the Existing Television Broadcast Service.	)	MM Docket No. 87-268 RM 5811

COMMENTS OF THE SATELLITE BROADCASTING AND COMMUNICATIONS ASSOCIATION OF AMERICA

Comes now, the Satellite Broadcasting and Communications Association of America ("SBCA"), by its undersigned attorney and herewith submits its comments in the above captioned Notice of Inquiry (the "NOI").

INTRODUCTION

The SBCA is a trade association comprised of four basic groups: satellite manufacturers and system providers; earth station equipment manufacturers; distributors and retailers of satellite television equipment; and satellite television programmers, including program originators, common carriers and program packagers. The SBCA's membership includes permittees having full authority to construct DBS systems

utilizing all portions of the 12 GHz band as provided in the RARC-83 Plan. After several years of problems and setbacks, it now appears that Ku-band DBS in the 12 GHz band will become a reality early in the next decade. Importantly, direct broadcast allows for true competition for new creative programming since "shelf space" is not controlled by a distributor but by the marketplace.

Projections are for expansion from the current level of two million C-band equipped homes for direct broadcast reception to twenty to thirty million homes during the next decade as high powered Ku-band delivery becomes a reality. With such delivery will come a reduction in size of satellite antennas, down to two foot diameters from the current ten to twelve foot diameters now in use for C-band delivery. Thus, DBS will rapidly become an effective and wide-spread form of distribution for HDTV and other advanced technologies.

The satellite broadcasting industry is in operation today and could begin HDTV broadcasting in a relatively short period of time. The FCC should not delay satellite HDTV broadcasting, notwithstanding the fact that terrestrial broadcasters are not ready or not technically able to offer such a service.

If the FCC decides to adopt technical standards for terrestrial HDTV broadcasting, it should not impose those

standards on satellite HDTV broadcasting. Each medium of delivery has different features and different constraints, and each should be allowed to evolve in its own way. In particular, satellite broadcasting has more spectrum available and more technical flexibility than terrestrial broadcasting, and is free from multipath impairments, and is less susceptible to shadowing and precipitation attenuation. However, we recognize that compatibility with NTSC TV sets is an important and desirable goal in the marketplace.

The DBS industry will be deeply involved with HDTV and it is imperative that our industry, which includes the satellite manufacturers and system controllers, be represented in the FCC's decision-making process regarding the development of HDTV. We have been encouraged by the invitation from the FCC to provide a leadership role on the Planning Sub-Committee of the FCC's HDTV Advisory Panel, with emphasis on the issue of interface between broadcasting and alternative methods of delivery. But, the absence of DBS representation on the FCC HDTV Advisory Committee, we believe, represents a flaw in its make-up and will impair its ultimate effectiveness.

Early next year, SBCA is planning a two-day conference on HDTV hosted by Hubbard Communications with GE Americom and Hughes Communications, providing a focal point for the DBS industry as it concerns HDTV. It is not possible to fully respond to the NOI until this meeting is held to establish

direction for the DBS industry and determine the resources necessary for us to develop a comprehensive HDTV policy. However, there are key points that we would like to bring to the attention of the Commission: (i) the market should be as free from standardization as possible, to allow consumers to be the ultimate decision makers; (ii) compatibility is desirable but need not necessarily be a requirement; (iii) a rush into standardization may limit innovation, creativity, and result in the consumer losing quality as well as competitive pricing; (iv) the importance of maintaining the 12 GHz DBS spectrum.

MEASURE/EVALUATION

There is a need for new quality objectives and new measuring scales for HDTV. The current quality objectives and measures for 525/625 line TV do not necessarily apply to 1050/1125 TV. The FCC should take into account that viewing habits, including distance of the viewer from the TV set, glare, impact of aspect ratio on viewer habits, costs of reception equipment and other factors for HDTV, are likely to be different than for NTSC. In comparing different advanced TV systems, the FCC should evaluate how the different systems are affected by impairments such as multipath propagation, and their ability to reproduce motion faithfully without impairment. NTSC compatibility (so that a signal can be received both by a consumer with an NTSC TV set and by a

consumer with an HDTV set) should be achieved to as high a degree as possible without sacrificing other valuable features.

COMPATIBILITY AND ACCESSIBILITY

A fundamental issue associated with the advent of HDTV is that of compatibility with the current NTSC standard. Some 130 million television sets employing the NTSC standard are in use in this country today. A number of proposals for HDTV standards are currently being debated in the television industry. Those proposals range from transmissions that are totally incompatible with NTSC, to transmissions requiring adaptors to allow reception of HDTV on NTSC sets, to transmissions that are fully compatible with NTSC.

The members of the SBCA are very much involved in the debate over standards and hold deep concerns regarding the question of compatibility and ease of access for the public. While most of our members involved with this question agree that backward compatibility with NTSC is highly desirable, many would caution that a federally imposed standard mandating such compatibility could, in the long run, prevent development of the best possible system and could actually result in higher costs for the consumer.

The satellite television industry has another concern regarding compatibility: that of compatibility with the existing and widely used system of encryption and addressing. Presently, there are over 250,000 General Instrument VideoCipher consumer descramblers authorized for reception of satellite television programming. It is anticipated that number will approach the one million level by mid-1988. Programmers, consumers and cable operators have invested millions of dollars in the VideoCipher system and virtually every programmer who has announced scrambling plans have advised that they will utilize VideoCipher. Accordingly, we must consider the issue of compatibility with VideoCipher and evolving systems of encryption and addressing.

The costs imposed upon the consumer for advanced television technology must be carefully considered. An exorbitantly priced system (whether such high price results from forced compatibility or from total incompatibility), no matter how advanced it may be, will not serve the consumer.

DBS will use FM or digital modulation for the foreseeable future both because of limitations of satellite power and to make sharing with other space and terrestrial services less difficult. Therefore, it will be necessary to convert the received signal from the frequency band and modulation method used for satellite transmission to those compatible with the receiver/display device. Initially, this conversion will be

performed by circuitry in the set-top unit. Such converters would be equipped with two outputs: one would provide an NTSC-encoded channel for viewing of the HDTV program on the vast number of conventional TV sets in existence during the early years of HDTV broadcasting by satellite - albeit with only conventional definition; the other output would provide full HDTV quality for TV sets especially designed for HDTV reception. The "backward compatibility" provided by the first output will permit and encourage the transition to HDTV reception.

Developments in the area of HDTV are occurring rapidly. What appears to be a major breakthrough today may well be overshadowed by the events of tomorrow. An example of this is the recent announcement of NBC and General Electric/RCA Consumer Electronics of advanced compatible television (ACTV), which provides a picture with double the current 525 scanning lines and fewer of the visual imperfections of today's NTSC color TV transmission standard, all within the current six MHz channel allocation. Transmissions using that system could be received on NTSC standard televisions and would obviate the need for any spectrum reallocation. While this system has not been tested and may not become a reality, such rapid developments make clear the need to avoid premature standardization of HDTV and spectrum reallocation.

INTERFERENCE ISSUES

For satellites, there is the possibility of co-channel adjacent satellite interference and adjacent channel (interstitial cross-polarized channel) interference. There is already international agreement on the acceptable levels of such interference. The power levels of satellite transmission are known, and the interference can be calculated reliably. This may not be the case with the UHF taboos since the levels of interference depend on the distances of the receivers from the wanted and unwanted stations, the wide variation in properties of TV receivers, as well as varying atmospheric conditions. Satellite broadcasting is inherently able to make more efficient use of the spectrum because it is not burdened with these problems.

BANDWIDTH

There are expected to be significant improvements in signal processing technology, but it is impossible to predict the timing or level of improvement. It is important to remember that TV signals contain large amounts of redundant information, so that there is no need to transmit every bit of information in most picture frames. Even for scene changes, no more information need be transmitted than that which can be sensed visually and process psychovisually.

Bandwidth reduction by suitable data compression techniques is of great importance to both terrestrial and satellite broadcasting and should continue to be explored intensively to develop its benefits to the maximum practicable extent. Technological developments relating to bandwidth will continue to evolve and provide another argument against premature standards.

SPECTRUM

Preservation of the 12 GHz Band for DBS and Use of That Band in Terrestrial Broadcasting.

In order to maximize public accessibility to HDTV via DBS, it is essential that the allocation of the 12 GHz Band be fully retained and reserved for DBS. The reallocation of any portion of that band to terrestrial broadcasting, land mobile, or any other communications technology could render the band unsuitable for satellite transmission of HDTV. Further, the 12 GHz band is technically infeasible and economically impractical for use in terrestrial broadcasting.

There are basically six coverage problems associated with the terrestrial usage of the 12 GHz band for HDTV transmission: rain attenuation, multipath propagation, blockage or shadowing within the coverage area, the small size of the coverage area,

the characteristics of the transmitting antenna, and the characteristics of the receiving antenna.

While rain attenuation can be virtually ignored in VHF and UHF, such attenuation can be very significant at 12 GHz, and its effects must be considered in determining the cost and feasibility of broadcasting in this band. In DBS delivery, rain has very little impact because the satellite signal must pass through usually no more than one mile of rain. Contrast that with VHF or UHF delivery which might require passage of the signal through twenty to thirty miles of rain.

A second problem associated with the use of the 12 GHz band for terrestrial broadcasting is the multipath propagation characteristics of such usage. Such multipath propagation results in the "ghosting" of television images and while the problem exists within the UHF band, it is far more acute at 12 GHz.

Again, in contrast to VHF and UHF, blockage (or shadowing) is a significant problem for terrestrial usage at 12 GHz. However, blockage is not a major consideration in DBS applications. In a terrestrial broadcasting system it is virtually impossible to design the system in a manner which allows avoidance of trees, hills, buildings and other obstacles. Such a design would be crucial as terrestrial broadcast at 12 GHz requires true line-of-sight; a tree or

building blocking line of sight could be fatal. This blockage factor must be taken into account on a statistical basis.

Quite apart from rain attenuation, blockage and multipath problems, the rapid reduction of field strength with distance from the transmitter associated with terrestrial broadcasting at 12 GHz leads to greatly limited service areas for each transmitter used. The SBCA Technical Committee has advised that to provide coverage in each service area without interstitial pockets of poor signals, at least twenty-five 12 GHz supplemental transmitting stations would be needed to meet the coverage provided by one local broadcast station.

The transmitting antenna presents another problem for terrestrial broadcasting at 12 GHz. Transmission lines and waveguides at 12 GHz introduce power loss as much as 4.5 dB per 100 feet. For a transmitter located at the base of the high towers needed for coverage in flat portions of the country (e.g., 1000 feet), the loss would be tens of dBs. Additionally, heat dissipation in waveguides would limit the RF power to only 3000 watts, far less than would be needed for transmission. The alternative of transmitters located at the top of towers would present structural, maintenance, regulatory, and safety problems which would be totally unacceptable.

The final consideration in examining coverage problems related to terrestrial broadcasting at 12 GHz is the

characteristics of the receiving antenna required for such service. VHF dipole antennas and UHF loop antennas are simple but they extract less power from a radio wave as frequency increases. The power reduction from VHF to 12 GHz may be as much as 60,000 times (i.e., 48 dB). Such reduction must be made up for by an increase in transmitter power, use of a more expensive high-gain antenna, or both.

In fact, it is highly likely that reception of 12 GHz broadcast signals would require the use of highly directive parabolic dish antennas which would require expensive installation at the top of masts to obtain true line-of-sight reception (i.e., no vegetation blockage, etc.), rigid mounting and accurate positioning throughout their lifetime. While similar, but much less severe, installation and positioning problems exist with dish antennas for DBS, it must be kept in mind that the decision to receive DBS is one which the consumer elects to make to receive subscription services; these problems should not be imposed upon the general public for reception of off-air broadcast signals.

The foregoing problems of rain attenuation, multipath propagation, limited coverage, blockage, and antenna characteristics can be overcome, if at all, only through expensive, burdensome, and undesirable countermeasures. Such measures would include installation of multiple transmitters (perhaps as many as twenty-five for each station in each

service area), very high power requirements for transmitters, and installation of parabolic dish antennas on tall masts in most situations. Such requirements make it clear that terrestrial broadcast at 12 GHz is not feasible now or in the future.

Any reallocation of the 12 GHz band must also take into consideration the effect of terrestrial broadcast at 12 GHz on broadcast satellite service (BSS) receivers in Canada and Mexico. The RARC-83 Plan developed a channel assignment and orbital plan in the 12 GHz band for the BSS in ITU Region 2, the Western Hemisphere. Any terrestrial transmitters within the United States broadcasting at 12 GHz would have to be as much as 180 to 200 miles from Canadian and Mexican borders to prevent mutual interference problems. Accordingly, the area serviceable by 12 GHz terrestrial broadcast would be greatly limited.

Potential Detrimental Effects of Spectrum Reallocation.

The American television viewing public is becoming more sophisticated with respect to television technology. It desires and is willing to pay for equipment that will allow the expanded services available through DBS service. A survey conducted by the Roper Organization in December, 1986, indicated that sixteen percent of the adult population would like to own a home TVRO system. It is logical to assume that

with the advent of high powered DBS service and its corresponding smaller dishes, that number would be significantly higher.

As discussed below, various parties are working toward the launch of DBS systems and it is anticipated that at least one such system will be operational early in the next decade. It would be clearly contrary to the public's interest to disrupt or abridge this nascent technology at a time when the anticipated benefits of DBS are about to become a reality.

There are presently five permittees holding licenses for construction of DBS systems: Hughes Communications Galaxy, Inc., Satellite Television Corp., USSB, Dominion Video Satellite, Inc., and Advanced Communications Corp. At least one of those parties, Hughes Communications Galaxy, Inc., is in the actual construction stage of a DBS system and is currently planning a launch of that system. The STC satellites are essentially ready for launch. Once those satellites and others are in service, DBS will have the capability of delivering a vast number of programming services to the public, including advanced technologies such as HDTV.

As previously noted, the band 12.2-12.7 GHz has been allocated domestically to the DBS service. Current users of this band in the operational fixed service must vacate the band by September 1988 or assume a secondary user status at that

time (DBS order at 702). DBS use of the band must conform to the plan of orbital positions and frequency assignments adopted at the 1983 Regional Planning Conference. In this plan, the band 12.2-12.7 GHz was divided into 32 channels, each 24 MHz wide. Adjacent channels overlap each other but are assigned opposite polarization.

The U.S. received all 32 channels at each of eight orbital positions, although four of these positions are too far west for nationwide coverage and one is too far east to avoid eclipse problems. At the three orbital positions that offer national coverage and eclipse protection, the FCC has assigned all 32 channels at 101 degrees and 119 degrees W.L. and 30 channels at 110 degrees W.L. among a total of five construction permit holders. Eight channels have also been assigned to one of these permittees at 148 degrees W.L. and applications have been accepted from two additional corporations who have requested 16 channels each at 110 degrees W.L. where only 2 are available and at 148 degrees W.L. where 24 are as yet unassigned.

It is clear that all 32 channels at the four key orbital positions have been assigned or requested and, at two of these positions, the total number of assigned and requested channels greatly exceeds the total number provided to the US in the RARC-83 Plan.

If the FCC were to reallocate half of the DBS band to terrestrial broadcasting, the effect could be more complicated than merely eliminating half of the applicants by taking away all the channels assigned to them. In most cases it would mean taking away half the channels assigned to each applicant. The reason for is that a given DBS satellite is normally assigned channels with only one polarization, which means either the odd-numbered or even-numbered channels. Thus, a typical 16-channel assignment embraces nearly the entire 500 MHz of bandwidth. To reallocate half the band would be to reduce the maximum co-polarized assignment per satellite to 8 channels.

The majority of the DBS permittees consider that such a limit would have an unacceptable impact on their business plans. In addition, some permittees would be forced to scrap large investments in satellites planned to deliver the number of channels authorized by the FCC and most importantly, the vast choice of channels offered by DBS would be lost, to the detriment of the public.

CONCLUSION

The SBCA would urge that the federal government assume a role of moderate involvement in the evolution of HDTV. As noted above, any action of the government with respect to the reallocation of the 12 GHz spectrum could be highly detrimental to our industry and greatly impair our ability to move forward

with advancements in television technology. Further, the reallocation of spectrum in the near future would be premature. As noted above, NBC has announced a plan for HDTV which could be delivered in the current 6MHz VHS spectrum. Clearly, the television industry must have more time to evolve without a premature standardization or spectrum reallocation.

Further, we would urge that the government not intervene to protect one delivery system to the detriment of another. The satellite television industry is capable of and is prepared to move forward with HDTV. If terrestrial broadcasters are not presently in a position to move likewise, advancement by our industry should not be impeded by governmentally imposed restraints.

HDTV must be allowed to mature without artificial and unnecessary constraints. The time for establishment of any standard has not arrived. Those involved in the development of this technology must be free to innovate, but must, at all times consider the balance between perfection of technology and economic feasibility for the American consumer. In all events, the preservation of the 12 GHz spectrum must be maintained for the development of DBS.

November 18, 1987

Respectfully submitted,

SATELLITE BROADCASTING
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