

RECEIVED

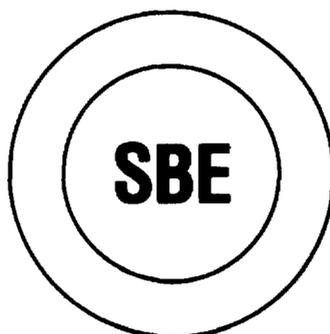
JUN 21 1995

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

DOCKET FILE COPY ORIGINAL

**Reply Comments of the  
Society of Broadcast Engineers, Inc.**

**ET Docket 95-18  
Allocation of 2 GHz Spectrum for  
Use by the Mobile-Satellite Service**



June 21, 1995

©1995 SBE, Inc. All rights reserved.

**SOCIETY OF BROADCAST ENGINEERS, INC.**  
Indianapolis, Indiana

No. of Copies rec'd  
List ABCDE

049

RECEIVED

JUN 21 1995

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

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

In the Matter of )  
 )  
Amendment of Section 2.106 of the ) ET Docket No. 95-18  
Commission's Rules to Allocate )  
Spectrum at 2 GHz for Use by )  
the Mobile-Satellite Service )

To: The Commission

**Reply Comments of the Society of Broadcast Engineers, Inc.**

The Society of Broadcast Engineers, Incorporated (SBE), the national association of broadcast engineers and technical communications professionals, with more than 5,000 members in the United States, hereby respectfully submits its reply comments in the above-captioned Notice of Proposed Rule Making (NPRM) relating to the allocation of 2 GHz spectrum for the Mobile-Satellite Service (MSS).

**I. No Loss of 2 GHz ENG Spectrum Until More Spectrum-Efficient Hardware Is Actually Available**

1. A recurrent theme in the comments of Celsat America, Inc., Constellation Communications, Inc., Motorola, Inc., TRW, Inc., *et al*, is that broadcasters should be able to "make do" with a 35 MHz reduction of its 2 GHz Television Broadcast Auxiliary spectrum in anticipation of more spectrally efficient digital modulation techniques. While SBE agrees that such techniques hold promise, broadcasters should not be expected to accept a net reduction in spectrum until such equipment is actually available, and then only if it is functionally equivalent in size, weight, power consumption, and latency to existing analog FM video 2 GHz equipment.

2. Of course, the MSS parties, as the benefiting entities, must be required to pay all costs associated with such new equipment, once it becomes available. The transition to new equipment would also have to be uniformly accomplished throughout the entire country, as it would not do to have a mixture of "old" FM video analog equipment and "new" digital video equipment trying to share the same set of frequencies.

**II. Motorola-Commissioned ENG Study Underestimates Costs**

3. Motorola Satellite Communications, Inc. ("Motorola") submitted a study by Carl T. Jones Corporation concluding that it would cost only \$109 million to relocate fixed and TV Pickup (mobile Electronic News Gathering ("ENG") and portable ("Tripod to Van") stations now operating on Channels A1 (1,990–2,008 MHz) and A2 (2,008–2,025 MHz). SBE believes that the Jones study underestimates the cost, apparently on the assumption that only those licensees operating primarily on A1 and A2 need be accommodated. This is incorrect. All 2 GHz TV Pickup stations will need to be modified, in order to keep those stations compatible; otherwise, they would be frequency agile on obsolete channels (A1 and A2) and either would not tune the replacement channels (if the ENG band is simply shifted upwards by 35 MHz) or would not tune a rechannelized 2 GHz ENG band (if the number of channels is restored to seven by reducing the bandwidth of the remaining spectrum).

4. SBE further believes that the FCC database upon which the Jones study derived its cost estimates is significantly flawed in regard to 2 GHz Television Broadcast Auxiliary stations. The conclusion reached in the Jones report, that there are almost twice as many fixed link 2 GHz transmitters than mobile and portable TV Pickup transmitters is simply wrong.

5. SBE concurs with the higher cost estimate of \$171 million that it understands the joint Reply Comments of the Association for Maximum Service Television, Inc. ("MSTV"), the National Association of Broadcasters ("NAB"), Capital Cities/ABC, Inc., CBS, Inc., Chris-Craft/United Television Stations Group, Fox, Inc. & Fox Television Stations, Inc., the National Broadcasting Company, Inc., the Public Broadcasting Service, and the Radio-Television News Directors Association ("RTNDA") will document, rather than the \$105–113 million figure derived in the Motorola comments.

**II. Comsat Comments**

6. SBE agrees with three conclusions reached in the comments of Comsat Corporation ("Comsat"): 1) mobile and portable ENG TV Pickup stations and MSS cannot share spectrum; 2) fixed, terrestrial link stations and MSS can share spectrum; and 3) a moderate 1 MHz reduction in the 17 MHz bandwidth now used by FM video analog ENG equipment would cause only minor degradation in picture quality. However, SBE wishes to make it clear that any reduction in channel bandwidth *must* be accompanied by new or retrofitted transmitters that can transmit on the narrower channels, *and* by new or retrofitted receivers

## **SBE Comments: ET Docket 95-18**

that can not only tune the narrower channels, but also have an appropriately narrowed IF bandpass, so that there is no degradation in adjacent-channel rejection. Of course, the MSS industry would have to pay the costs of this new or retrofitted equipment.

7. SBE disagrees that the Comsat-developed VideoLynx 2000 Series integrated MPEG-2 digital video encoder and decoder will allow broadcasters to use the existing 2 GHz Television Broadcast Auxiliary spectrum with "increased spectrum efficiency," as Comsat suggests at page 22 of its comments. Comsat seems not to understand the difference between a relatively large satellite news gathering ("SNG") truck versus a much smaller ENG van versus even smaller equipment used by the networks for many of their sports coverage applications (*e.g.*, auto racing). The VideoLynx Model 2100T encoder and modulator is a rack-mounted device with dimensions of 5.25 inches high by 19 inches wide by 17 inches deep, requires 120 VAC 60 Hz power, weighing 30 pounds, and introducing a latency of about 200 msec. While the Comsat VideoLynx MPEG-2 encoders and decoders result in contribution-quality NTSC signals at a data rate of 12 Megabytes/second ("MB/sec"), roughly equivalent to a bandwidth of 12 MHz assuming a good modulation scheme, at a bandwidth of 6 MHz the digitally encoded and compressed signal is only suitable for "talking heads"; that is, television pictures with very little movement. Thus, use of currently available digital codecs offer the potential for, at best, about a 30% reduction in bandwidth over that now used by FM video 2 GHz Television Broadcast Auxiliary equipment.

8. Further, while the physical size, weight, and power requirements of a VideoLynx encoder are suitable for a SNG truck, they would be marginal, at best, in most ENG vans, and ludicrously inappropriate for many network sports applications and "man-pack" portable packages typically used to cover political conventions. For example, as shown by the photographs in the attached Figure 1, miniature and low-power consumption 2 GHz transmitters employing a low-profile, upward-pointing "patch" antenna were used in two race cars at the 1995 Indianapolis 500 race. These car-mounted cameras and transmitters sent high-quality FM video analog signal to a helicopter, which in turn relayed the feed to a large network trailer parked near the raceway. It is obvious that a piece of rack-mounted electronic equipment such as the VideoLynx encoder would not be at all suitable, nor is it likely that miniaturized versions of the VideoLynx equipment will be available soon.

## **SBE Comments: ET Docket 95-18**

9. Finally, there is the question of cost. SBE understands that a typical VideoLynx encoder/decoder pair costs well over \$100,000. Thus, its cost alone precludes it from being a practical solution at the present time.

### **III. APCO Comments**

10. The Association of Public-safety Communications Officials-International, Inc. ("APCO") urges that, if new spectrum is to be made available between 2,110 and 2,145 MHz, these "cleared out" frequencies should be awarded to public safety users, and not used to give broadcasters no net loss of 2 GHz spectrum. APCO opines that broadcasters can make do with a 35 MHz loss of spectrum by using its remaining spectrum more efficiently. This makes SBE ask the question why public safety users cannot similarly solve their spectrum needs by the more efficient use of its existing spectrum. Only after public safety microwave users have first converted their own stations to more spectrum efficient systems should they be entitled to point their finger at broadcasters, and other users of microwave spectrum, and demand the use of more spectrum efficient equipment.

11. Besides, where do local governments get a large part of their information when a disaster strikes? By monitoring radio and television broadcasts. As documented by the attached letter from the Los Angeles County Emergency Operations Center ("EOC"), ENG feeds from the scene of a natural or man-made disaster often benefit government officials at their emergency command centers. Broadcasters, and ENG, play an important public safety role, even though they operate in the Television Broadcast Auxiliary service rather than the Special Emergency or Public Safety radio services.

### **IV. TRW Comments**

12. At page 11 of its comments, TRW, Inc. ("TRW") states that "The BAS is likely to adopt digital technology of its own accord in the near future, in order to keep broadcast picture quality competitive with that of the cable and DBS services." SBE thinks that TRW has it backwards: if broadcasters are forced to convert to highly compressed digital signals picture quality will *decrease*, not increase. Digitizing an analog signal *increases* its bandwidth. It is only because of the repetitive nature of television signals that compression algorithms can be used to offset this increased bandwidth requirement. However, the more severe the compression the more objectionable the resulting artifacts, especially for pictures with a great deal of movement, such as those generated during sports coverage.

**V. Freeze or Sunset Provisions Are Premature At This Time**

13. At least two parties, Loral/Qualcomm Partnership, L.P. and TRW, Inc. urge the adoption of a “freeze” on new Television Broadcast Auxiliary stations operating on Channels A1 or A2, and some sort of sunset period for existing Channel A1 and A2 stations to vacate 1,990–2,025 MHz. SBE agrees that both steps will ultimately be needed, but not until all of the other issues regarding how broadcasters are to be “made whole” are resolved. To adopt a freeze or sunset provisions prior to resolution of those issues would be unfair to broadcasters and provide a disincentive for MSS parties to negotiate with broadcasters in good faith.

**VI. Pressler Amendment**

14. On June 7, 1995, the U.S. Senate adopted an amendment to S-229 proposed by Senator Larry Pressler that would *require* the FCC to allocate 50 MHz of 4-GHz spectrum (4,635–4,685 MHz) to the Television Broadcast Auxiliary service. In exchange, the bill would *require* the FCC to assign 2,025–2,075 MHz (ENG Channels A3, A4, and all but the topmost 1 MHz of Channel A5) to other services, the use of which would be determined by competitive bidding. Thus, under the Pressler amendment, broadcasters would be faced with the loss of *five* ENG channels, not two. Further, this would leave only Channels A6 (2,076–2,093 MHz) and A7 (2,093–2,110 MHz) available for “long haul” ENG shots. ENG trucks would be forced to carry dual-band transmitters, antennas, and receivers. This new calculus therefore needs to be considered, in the event the Pressler amendment becomes law. SBE fails to see how the grant of 50 MHz of spectrum at 4 GHz will make up for the loss of 85 MHz at 2 GHz.

15. SBE questions how this re-assignment of spectrum would impact the National Aeronautics & Space Administration (NASA), which uses 2,025–2,110 MHz for space science (both earth-to-space and space-to-earth). Broadcasters’ and NASA’s shared use of these frequencies have so far been compatible. Although grant of partially offsetting 4 GHz spectrum may mitigate broadcasters’ needs for Television Broadcast Auxiliary spectrum, the re-allocation proposed in the Pressler Amendment could be devastating to NASA.

**VII. Summary**

16. The 2 GHz ENG Television Broadcast Auxiliary band is critical to the ability of broadcasters to bring to the American public timely coverage of natural and man-made disasters, political conventions, and sporting events. Newcomers who would benefit from use of these frequencies should bear all costs to make broadcasters whole. Broadcasters are

**SBE Comments: ET Docket 95-18**

willing to cooperate, but proposed solutions must be based on actually available new technologies and equipment, and not upon "blue sky" promises of miraculous hardware that will magically allow the same communications availability in substantially less bandwidth.

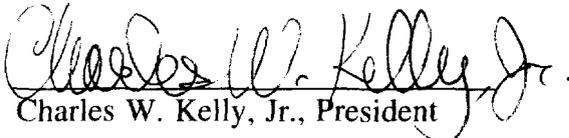
**List of Figures**

17. The following figures or exhibits have been prepared as a part of these ET Docket 95-18 Reply Comments:

1. Photographs of small-sized, light-weight cameras and 2 GHz transmitters and antennas used by networks to provide real-time coverage of auto races
2. Los Angeles County EOC letter.

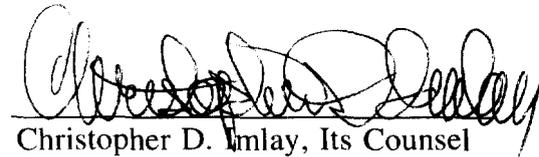
Respectfully submitted,

Society of Broadcast Engineers, Inc.

By   
Charles W. Kelly, Jr., President



By   
Dane E. Ericksen, P.E., CSRE, CSTE  
Chairman, SBE FCC Liaison Committee

By   
Christopher D. Imlay, Its Counsel

June 21, 1995

Booth, Freret & Imlay  
1233 20th Street, Suite 204  
Washington, D.C. 20036  
(202) 296-9100

**SBE Reply Comments to ET Docket 95-18**

**Photographs of Race Car Mounted  
2 GHz Television Broadcast Auxillary Equipment**



Photographs of low-profile "patch" 2 GHz transmitting antenna used to transmit race car-mounted camera shots from an Indianapolis 500 race car to an overhead helicopter, acting as a relay station. Size, weight, and power consumption are all critical in such applications.



**SBE Reply Comments to ET Docket 95-18**

**Photographs of Race Car Mounted  
2 GHz Television Broadcast Auxiliary Equipment**



Photographs of miniaturized television cameras used to transmit real-time and high-quality pictures of race car footage. Only 2 GHz Television Broadcast Auxiliary frequencies offer the optimum propagation characteristics for reception from such technically difficult and challenging platforms.



**SOCIETY OF BROADCAST ENGINEERS, INC.**  
Indianapolis, Indiana

950607.1  
Figure 1B

**SBE Reply Comments to ET Docket 95-18**

**Los Angeles County EOC Letter**

**LOS ANGELES COUNTY  
EMERGENCY OPERATIONS CENTER**

1275 North Eastern Avenue  
Los Angeles, California 90063  
213-980-2208 213-881-6898 (Fax)

**DATE: June 15, 1995**

**TO: RICHARD RUDMAN, KFWB**

**FROM: STEPHEN T. GATTIS, LIEUTENANT  
LOS ANGELES COUNTY SHERIFF'S DEPARTMENT  
EMERGENCY OPERATIONS BUREAU**

**SUBJECT: AUDIO/VIDEO SYSTEM INFORMATION**

The EOC audio/video system includes the distribution of video signals, both dedicated and switchable, throughout the EOC building. The Situation Room displays both NTSC and RGBS signals on three (3) six foot by eight foot fresnel rear projection screens using three dedicated Barco 1209 Projectors. Six large Barco monitors above the large screens also provide the ability to simultaneously view four different local off-air media broadcast signals and two satellite signals. Additionally, several NTSC/RGBS monitors are located throughout the facility as part of the information distribution process so that EOC staff can maintain a high level of awareness during an emergency. Signal sources include:

1. Off-air television reception of four simultaneous local broadcasts from all available local channels. Tuning of channels can be accomplished remotely from within the Situation Room or directly at the tuner located in the Electronic Equipment Room.
2. Two simultaneous signals from either Ku or C band satellite receivers with video cipher cards. This capability is particularly valuable if local television service is interrupted due to a major disaster or a major national event has occurred. Tuning



**SBE Reply Comments to ET Docket 95-18**

**Los Angeles County EOC Letter**

**AUDIO/VIDEO INFORMATION**  
**MEMO TO RICHARD RUDMAN, Continued**

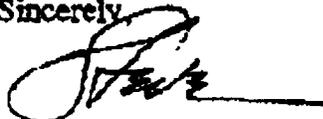
of satellites can be accomplished remotely from within the Situation Room or directly at the tuner located in the Electronic Equipment Room.

3. Live local amateur television via the Disaster Communication Service for damage assessment.
4. Video tape players that record six simultaneous broadcasts for later analysis using time base generators.
5. In-house video cameras to record briefings, training sessions and meetings relevant to emergency management.

Sound in the Situation Room is distributed using an infrared sound distribution system that allows emergency managers to select any one of twelve channels, including six televised media broadcasts and two commercial radio broadcast signals.

I hope this information helps you. If you need anything else, please do not hesitate to call. I will be on vacation from June 17 to July 3, 1995.

Sincerely,



Stephen T. Gattis, Lieutenant  
LASD, Emergency Operations Bureau  
EOC Project

