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Comments of the Society of Broadcast Engineers, Inc.

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

Reply to COMSAT *ex parte* Comments

April 29, 1998

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SOCIETY OF BROADCAST ENGINEERS, INC.
Indianapolis, Indiana

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Federal Communications Commission
Office of Secretary

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

In the Matter of	)	
	)	
Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service	))))	ET Docket No. 95-18 SBE Response to *ex parte* Comments of COMSAT Corporation

To: The Commission

Response of the Society of Broadcast Engineers, Inc. to COMSAT *ex parte* Filing

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 response to the March 18, 1998, *ex parte* filing by COMSAT Corporation.

COMSAT *Ex Parte* Comments Do Not Tell the Whole Story

1. In its *ex parte* comments, COMSAT Corporation ("COMSAT") would have the Commission believe that there are no technical or operational reasons why broadcasters should not be able to reduce the channel bandwidth required for 2 GHz electronic news gathering ("ENG") transmissions from the currently used 17 MHz wide channels to 10 MHz channels. COMSAT claims that 10 MHz-wide ENG channels would work just fine if broadcasters would only upgrade to digitally-modulated equipment, and that broadcasters have no basis for objecting to a 50 MHz reduction in 2 GHz broadcast auxiliary services ("BAS") bandwidth, from 120 MHz to 70 MHz. SBE begs to differ.

2. COMSAT has told only half the story. The tests performed by COMSAT are fine as far as they went, but the tests were so limited in scope as to be virtually worthless in the environment that ENG crews actually operate; that is, "real world" conditions not considered in the COMSAT tests.

3. SBE submits that the COMSAT tests, and the resulting COMSAT filing, are defective for the following reasons:

3a. <u>No Adjacent-channel Interference</u>. The COMSAT tests were performed without the presence of adjacent-channel ENG signals. In the real world ENG crews must constantly

battle adjacent-channel interference from other stations' ENG operations. A further problem not discussed by COMSAT, but discussed by Dr. John Payne of Nucom, who made the New York City tests referred to in the COMSAT comments, is that a digitally-modulated transmission more fully occupies its channel bandwidth, compared to an FM video signal of the same occupied bandwidth. This means that receivers that could differentiate between adjacent-channel FM video modulated ENG signals under certain sufficiently favorable conditions will be incapable of rejecting an adjacent-channel digitally-modulated signal under those same conditions. And, of course, if the ENG channel bandwidth is changed from 17 MHz to 10 MHz, broadcasters will have to purchase all new receivers with 10-MHz IF bandpasses. It would be a futile effort to simply re-crystal existing ENG receivers to 10-MHz spaced channels while leaving the IF bandpass at 15 to 17 MHz, as MSS commenters have incorrectly indicated in their prior docket comments is all that is necessary for broadcasters to accommodate narrower channel widths.

3b. No Mobile Operations Tests. The COMSAT tests were based on simulation of multipath effects for a fixed platform, with un-changing multipath conditions. Broadcasters routinely transmit from moving aircraft in all major markets and many smaller ones. The COMSAT tests therefore did not investigate variations in differential amplitude and phase variations across the channel as a result of dynamically changing multipath conditions. It is considerably more difficult to establish an ENG path from moving platforms. While some forms of digital error correction can compensate for static multipath distortions, SBE suspects that forward error correction adequate for a fixed ENG path will be inadequate for a path with dynamically changing distortions. This belief is based upon experience gained during the development of the ghost canceling reference ("GCR") signal, currently broadcast on Line 19. Ghost-canceling receivers have a "training" period in the multi-second range, and therefore can only accommodate static reflections from fixed surfaces, such as buildings, but not dynamic reflections such as aircraft flutter. SBE urges the Commission to consider, for example, the importance of video sent from helicopters in the aftermath of the Los Angeles riots following the Rodney King beating trial "not guilty" verdict. Helicopter-based ENG news feeds vividly captured a driver dragged from his truck cab. Had not broadcasters been able to transmit pictures of the driver's plight in real time, law enforcement personnel probably wouldn't have been able to respond in time to save the truck driver's life. Any "solution" that has not been proven with moving transmitters and receivers is no solution.

3c. Re-sync Time is Unknown. Since no "dropouts" were registered in the COMSAT tests, re-sync time has not been explored. In fact, SBE has heard of other tests showing that once

decoder-to-encoder sync lock was lost, it can take over 5 seconds to almost a full minute (depending on the codec equipment being used) after re-establishing the radio frequency ("RF") link for the decoder to re-sync and again start reproducing a video output. These lengths of time, if typical of currently available digital equipment, are simply unacceptable. Either COMSAT must demonstrate some mechanism that will prevent loss of sync so dropouts do not occur or the reset time must be drastically lowered.

3d. High-motion Video Signals Cannot Be Compressed as Much as "Talking Heads." The COMSAT comments mentioned only casually, at Page 6 of its *ex parte* filing, that

> For high-motion sports video material (basketball game), the minimum required data rate is approximately twice the encoding rate for movie material

as if this was not a significant limitation.

3e. Only 480I/30 "NTSC" Format Tested. The COMSAT tests were only for conventional National Television System Committee ("NTSC"), that is, 480 interlaced lines at a 30-Hz frame rate, or 480I/30. COMSAT provides no exploration of equipment and bandwidths necessary to handle even standard definition television ("SDTV") signals, that is, 480 lines progressive with 30 or 60 Hz frame rates (480P/30 or 480P/60), let alone true high-definition television ("HDTV") with rates of 720P/60 or 1080I/30, which Congress has ordered the TV industry to begin transmitting soon. SDTV and HDTV require significantly higher data rates, and COMSAT has provided not an iota of evidence that these signals could begin to fit into a 10 MHz channel without serious picture degradation due to excessive compression of a contribution-grade (as opposed to just a distribution-grade) signal.

4. Digital Compression Equipment No Solution to Applications Where Size, Weight, and Power Draw are Critical Parameters. Even if the COMSAT tests had been comprehensive enough to be meaningful, digitally-compressed equipment would still not be usable in applications where size, weight, or power draw are critical factors, such as man-pack camera/transmitters roaming the floor at political conventions or a plethora of sports-based TV Pickup applications such as race car-mounted or Olympic bobsled-mounted camera/transmitters.

5. No Consideration of Latency Problem. The COMSAT tests did not even address the latency problems inherent in the digitally compressed television signals. Especially where some feeds are digitally compressed and others are not, real-time on-air conversations between commenters at a remote site, with digital compression/decompression time delays in

the hundreds of milliseconds range, and latency delays are additive. Studio or control booth commentators can make the person subjected to the time delay appear stupid, regardless of whether that person is an experienced network reporter, a senior government official, or a member of Congress.

Summary

6. SBE submits that COMSAT has repeatedly erred in considering digital television as merely digitizing NTSC signals, which is not what the Congress has ordered. Further, COMSAT's failure to demonstrate acceptable performance in the presence of adjacent-channel interference is such a glaring omission that by itself it makes the COMSAT tests virtually worthless. SBE urges the Commission to make no reduction in broadcasters' 2 GHz BAS bandwidth until and unless further and properly done digital ENG tests completed by broadcasters*, who know better than COMSAT or other Mobile Satellite Services ("MSS") parties what parameters need to be tested, show that such reduction can be accommodated without compromising their existing and Congressional mandated use.

Respectfully submitted,

Society of Broadcast Engineers, Inc.

By _____
Ed Miller, CPBE, President

By _____
Dane E. Ericksen, P.E., CSRTE
Chairman, SBE FCC Liaison Committee

By _____
Christopher D. Imlay, Its Counsel

April 29, 1998

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

* For example, the Walt Disney Company, owner of ABC, Inc., has now committed $500,000 for comprehensive tests of available digital SNG/ENG equipment. SBE is advised that the ENG portion of those tests are currently scheduled to commence in June 1, 1998, and that the test results should be available by August 31, 1998.