ADVANCED TELEVISION SYSTEMS COMMITTEE

Recently, Sinclair Broadcasting has been contacting U.S. broadcasters, raising concerns about the VSB transmission system used in the ATSC Digital Television Standard, and suggesting that the industry should consider replacing it with an alternative transmission system developed in Europe. As explained in the attached position paper, ATSC firmly believes that there is no need to reconsider the VSB transmission system.

ATSC VSB Transmission: The Right Choice for U.S. DTV Broadcasters

Dissenting Position: Sinclair Broadcasting is lobbying broadcasters to reject the ATSC 8-VSB digital transmission system in favor of an alternative developed in Europe, COFDM. Sinclair argues that VSB is inadequate, that COFDM is better, that broadcasters should effect a change in technology as soon as possible, and that such a change would represent only a minimum disruption to DTV implementation.

ATSC Position: The Sinclair position is unwarranted and irresponsible. It is unwarranted because a growing body of evidence supports the performance of the VSB transmission system, and there is no clear evidence that COFDM is better. It is irresponsible because it seriously understates the impact of a change. U.S. broadcasters and manufacturers have already made a very substantial commitment to VSB. VSB transmission has been deployed by about 70 broadcast stations to date, the signals of which reach about 50% of the nation's television viewers, and those numbers continue to increase rapidly. A growing body of measurements reinforces the wisdom of the selection of VSB for U.S. DTV. Are there problems? Sure. Are the problems being addressed. Yes. Can we do better? Yes we can. Is there a basis to give up on VSB? Absolutely not. The best path is to continue to put our energy into improving and optimizing the overall VSB transmission system, to ensure the success of the DTV transition.

VSB Reception: Extensive test documentation shows that VSB has performed better than expected with respect to outdoor reception. More questions surround indoor reception, however. Indoor reception has always provided a challenge, for both analog and digital television services. To date, indoor reception performance for VSB has been less well documented, but increasing attention is being paid to it. While the data taken is promising, there is much work to do, and improvement is needed and expected. Some observed indoor reception problems can be tied to performance limitations of early DTV receivers. We are observing a substantial spread in performance of receivers, with some performing better than the benchmark Grand Alliance prototype, as anticipated, but others performing worse. As the products mature, improved receiver performance, coupled with improvements in indoor antennas, will go a long way towards addressing indoor reception concerns.

We emphasize that there is no concrete information to suggest that COFDM indoor reception would be better. There is substantial information to show that VSB provides superior outdoor reception. We believe it will be shown that VSB provides superior indoor performance as well.

Analog vs. Digital: As a rule, whenever analog reception in a given channel is reasonably good, VSB reception in that channel is perfect. As the analog signal degrades, VSB will continue to provide perfect pictures. But there are some situations where consumers watch very marginal analog signals, and in some of those situations VSB is not receivable. Once again, there is no concrete information to suggest that COFDM reception would be better.

VSB vs. COFDM: There has been only limited head-to-head testing of VSB vs. COFDM. One set of tests occurred in Australia almost two years ago, when a 7 MHz COFDM system was compared to a 6 MHz VSB system. The testing focused on outdoor reception. Analysis of the raw test data taken during the testing showed that VSB outperformed COFDM. In 1998, testing was also done in Singapore. An 8 MHz COFDM system was compared to a 6 MHz VSB system. While the focus was on outdoor reception, a few indoor tests were conducted. The test data, not publicly released, was consistent with that taken in Australia. Both countries currently utilize the European PAL system, and both have historical U.K. ties. Following testing, both predictably chose the European DVB system, which utilizes COFDM.

Additional head-to-head testing of VSB vs. COFDM will be held later this year in Brazil. That testing will be important for several reasons. VSB and COFDM receivers have been improved since the Australian and Singapore testing was conducted, and we are interested in how the improvements will affect results. Also, for the first time, a 6 MHz COFDM system will be tested, so the results will be more directly applicable to the 6 MHz U.S. market. Both outdoor and indoor testing will be conducted. The Brazilians are more neutral than Sinclair, and all indications are that the Brazilian testing will be thorough and scientifically rigorous. The ATSC is participating in the testing in Brazil.

The COFDM system allows its operating parameters to be varied, yielding many different operating modes. When operated in a mode in which COFDM attempts to match the performance of VSB, and in particular the bit rates are matched and the channel size is the same, COFDM underperforms VSB. To achieve the claimed COFDM transmission improvements, the bit rate must be reduced. This is more readily done in an 8 MHz channel, which has a greater capacity. But in the U.S., with our 6 MHz channels, a lower bit rate would threaten the ability to deliver HDTV within a broadcast channel.

Disrupting the Transition: Any decision to revisit the transmission standard would cause years of delay. Keeping in mind that test data on COFDM in 6 MHz channels is not now available, an extensive test program would need to be developed and conducted. Further, a completely new spectrum use plan would need to be developed, given differences in performance between VSB and COFDM. New transmission and reception equipment would need to be developed. Finally, existing DTV transmitters and receivers would need to be modified, or would become obsolete. Clearly, such a change at this point would seriously delay the broadcast DTV transition.

Conclusion: A massive effort has brought the U.S. to this point in the DTV transition. A growing body of evidence supports the selection of VSB. More information is needed, particularly with respect to indoor reception. While some DTV receivers exceed the reception performance achieved by the Grand Alliance prototype equipment, too many current receivers underperform. Much has been done, much remains to be done. We should focus our energies on optimizing what we have, not in changing. Let's stay the course with VSB.

Advanced Television Systems Committee
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