

VSB/COFDM PROJECT

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Project Managers

Lynn Claudy, NAB
Victor Tawil, MSTV

By Facsimile 44 (0) 1264 334509

January 26, 2001

Mr. Nicholas Jennings
Managing Director
Broadcast Technology Ltd
United Kingdom

Dear Mr. Jennings:

This letter responds to your letter dated January 22, 2001 concerning the use of your equipment in the recent VSB/COFDM field test program in the United States. First of all, we'd like to thank Broadcast Technology Ltd. (BTL) for its willingness to supply COFDM equipment for the recent field tests by the VSB/COFDM Project, a project funded by 30 United States broadcast organizations and managed by NAB and MSTV. This field test project, since it was designed to be a direct comparison of 8VSB and COFDM in the United States, was bound to be controversial by its very nature, given the high stakes involved and we appreciate the courage and leadership exhibited by BTL in making its equipment available.

It is indeed sad that the focus of this program has become the adequacy of the performance level of the BTL receiver, as this is a thinly veiled and desperate attempt by those who are disappointed by the test results to discredit the test program. In fact, the test program was very much a product of all the participants, including Sinclair Broadcast Group (Sinclair) and BTL, and contrary to accusations made, was an open process with solicited input from all possible quarters at every step. It is only after the tests had been completed that questions were raised about the test planning and selection of the COFDM receiver and dragged your fine company into the controversy. For this we are truly sorry. But we'd like to set the record straight.

For several years, the DVB Project has enthusiastically asserted that the DVB-T standard fully supports operation in a 6 MHz channel. It was our assumption in the Spring of 2000 that given the tests and demonstrations that had previously taken place with 6 MHz COFDM equipment in the United States and abroad, suitable equipment for a large scale field test in a 6 MHz environment would likely be available for a comparison test with the United States DTV transmission standard. One of the first tasks undertaken by the VSB/COFDM Project was to create a small task force chaired by Mark Aitken of Sinclair to solicit the best performing COFDM equipment for evaluation and testing. By mid-May 2000, the VSB/COFDM Project had contacted a number of manufacturers and major developers of COFDM equipment (Tandberg, Nokia,

Rohde & Schwarz, and PTV), and sent solicitation letters to Nokia, BTL, Pace, Philips, Sony, ITIS, and Panasonic as well as the DVB Project office asking for 6 MHz COFDM equipment to be used in a comparison field test trial (that letter is attached). Through a plain language reading of that letter, there should have been no misunderstandings about the nature of this field test among equipment manufacturers solicited. Curiously, the DVB Project took little interest in this project and chose not to respond to our request at all.

As you know, several manufacturers, in addition to BTL, did respond and we tested several other receivers in pursuing selection of the best COFDM receiver. It was our stated intention all along to test receivers as complete systems. We had no intention of modifying the design of those receivers with additional front-end filters or other modifications and it is clear from your letter that such a modification of the BTL receiver could introduce distortions that cause rounding or tilt of the received signal. The laboratory test results of the receiver comparisons prior to actual field trials are included in the 8VSB/COFDM Comparison Report. Clearly, the BTL receiver was the only COFDM receiver that was at all suitable for a field test in the United States environment and it performed rather well in the laboratory. The "receiver anomaly" which shows asymmetrical out-of-band rejection on the lower third and fourth adjacent channels compared to the upper adjacent channels under certain conditions was discovered at a second stage of laboratory testing (performed for a peripheral purpose) and the performance of the receiver in that regard is also documented in the report. This unexpected behavior has not been fully investigated or explained by BTL and we look forward for further input on the subject. Moreover, in an email from Chris Duncan to Mark Aitken on October 13, BTL showed its clear understanding of the nature of the field tests and its equipment's role in that field test and reaffirmed the out-of-band performance of its equipment (35 dB), concluding that bandpass filtering was problematic for the field trials envisioned in the United States:

" ... If you have a digital carrier of a certain power level across the whole 6 MHz channel, then you have an adjacent analog carrier of certain power level which exceeds the power level of a digital channel by approximately 35 dB's then this will cause the MER to fall to 20 and the QEF. Generally speaking as an adjacent carrier power starts to exceed the digital channel power by 20 dB's the MER will begin to fall.

There are a few options to restrict the impact of other carriers, basically to include bandpass filtering and if carriers are adjacent then to ensure they are of a suitable amplitude. This may be of course difficult when receiving from one distant Tx while close to another Tx transmitting in band. I assume this is one of the reasons for SFN. Another option is to add an attenuator to the input of the receiver (we have supplied a 20 dB pad with the unit we are returning to you). What this will do is to reduce the overall input level and therefore reduce the effect of the Rx AGC. However, you need to ensure that the digital carrier is still at a reasonable input level to provide a good MER measurement.

Of course in reality the receiver is providing the information based on live conditions and as far as reception trials are concerned this information is required. The main issue to ensure that the receiver input is not overloaded by inband carriers in attempting to ensure the digital signal is kept at an artificially high level."

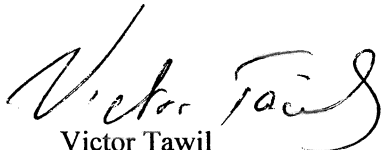
As you know, the measurement vehicles were already equipped with variable attenuators to adequately deal with the issue of in band overload discussed above, thus eliminating the need for the 20 dB pad you proposed.

Your January 22 letter states that "a new version of the DTVM2000, with selective input has been under development. This unit would have been infinitely more suitable for the trials that have recently been undertaken." Clearly, however, this unit was not available in the Spring when equipment for the testing was selected. If these tests were to be repeated, no doubt receiver improvements for both systems would produce different and hopefully better results. This field test program was intended to be a snapshot in time, with the best COFDM receiver that was available to us compared to the best 8VSB receiver that we could acquire. We firmly believe we met this goal and that the BTL receiver was indeed the best receiver that could have been selected at the time, based on the responses received to the solicitations made. That it was not perfect and that improvements will come is understandable. Attempts to claim that BTL or the DVB community didn't understand the requirements of this test sadly misrepresents the course of events that took place.

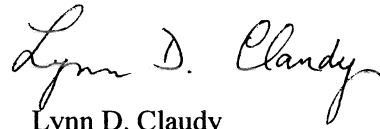
The issue in the United States over the DTV modulation scheme has been resolved. Not only has the broadcast industry come to a consensus on reaffirming support for the VSB standard, the Federal Communications Commission has now firmly stated that it has no basis for reopening the issue of the DTV standard. Again, we thank you for your generosity and collegiality in loaning equipment to our project.

One last housekeeping item, Mark Aitken from Sinclair asked that the equipment be returned to him. If that is agreeable with you, I will ship him the remaining equipment. He is probably the right person since he was involved with the initial shipment and dealt with the paperwork and the US Customs Office.

Sincerely,



Victor Tawil
Senior Vice President
Association for Maximum Service Television



Lynn D. Claudy
Senior Vice President
National Association of Broadcasters

Attachment

May 15, 2000

Mr. Ian Kilgour
Sales and Marketing Director
Broadcast Technology Ltd.
Sopwith Park, Royce Close
West Portway Industrial Estate
Andover Hampshire SP10 3TS United Kingdom

Dear Dr. Kilgour:

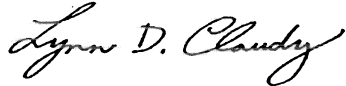
NAB and MSTV are cooperatively managing a field test project to evaluate performance of digital terrestrial television systems using different RF modulation systems. While the U.S. has adopted a technical standard using the 8-VSB modulation method, there is interest in the broadcast industry to gather scientific comparative data on the performance of 8VSB compared to different implementations of COFDM technology. This project has the full support of our organizations and our respective Board of Directors.

We have been in discussion with several suppliers of DVB-T modulators and demodulators for equipment loans that can be configured for the 6 MHz channel U.S. environment. These discussions have been positive and currently available DVB-T equipment is being made available to us. However, before beginning our evaluation program we want to make sure that we have explored all alternatives for equipment, as a matter of due diligence. Consequently, we are asking if you have field-testable 6 MHz-capable DVB-T equipment for use in the US. If so, we would like to know if you would be able to provide appropriate performance specifications and to let us know if it would be possible to borrow such equipment for our evaluation program.

Our goal is to complete these evaluations in the fall of this year. Accordingly, we are seeking to receive the necessary modulators and demodulators in the U.S. on or before June 1, 2000. Because of the parallel nature of the testing program, we will require at least 4 modulators and demodulators.

We thank you in advance for your assistance in this important matter. Please feel free to contact us by email (LCLAUDY@NAB.ORG or VTAWIL@MSTV.ORG) if you have any questions. If you wish to participate in loaning equipment, we ask that you respond to this request by May 22, 2000.

Sincerely,



Lynn D. Claudy
Senior Vice President,
Science and Technology
National Association of Broadcasters



Victor Tawil
Senior Vice President
Association for Maximum Service Television