

almost all, presently authorized stations, there is no certainty at this point that taboos will ultimately not have to be taken into account, nor can it be said how large the resulting the resulting ATS service area will be. Several graphs indicating non-taboo spectrum availability are at Appendix A. However, the actual need for -- and degree of taboo protection -- and the size of the ATS service areas cannot be addressed prior to the testing of ATV systems. Therefore, during this reporting period, Specialist Group 6, dealing with Spectrum Analysis, and Specialist Group 7, dealing with Taboos, worked in tandem to develop and initiate studies to determine the impact on spectrum availability if, in fact, one or more taboos would have to be retained.

To this end, progress was made in four areas. First, a formal program for analyzing the impact of taboos was proposed (PS/WP-3, Doc.-0104). Second, a suggestion for reducing the number of computer runs needed to carry out the study was evaluated by means of analyses employing a data base of stations limited to the Northeast (PS/WP-3, Doc.-0105). Analysis of this approach is continuing. Third, the Specialist Groups took note of certain FCC staff studies that included evaluation of the impact of image taboos. Fourth, and very importantly, avenues for acquiring additional computer resources for carrying out the required spectrum studies were explored. Fortunately, the Broadcasters' Caucus of the Advanced Television Systems Committee (ATSC) has pledged the necessary resources to permit the additional analyses to be done without relying upon the already overburdened FCC staff.

In addition to the work of Specialist Groups 6 and 7, the Working Party during this reporting period created a new Specialist Group to deal with cross-border allotment issues. The creation of this Specialist Group was stimulated by the recognition that these cross-border issues had to be addressed before an ATV allotment plan could be recommended to the FCC. During the reporting period, two major efforts were undertaken with the support of Specialist Group 9. The first centered around defining and approving the tasks to be carried out by the Joint Canadian Advanced Broadcast System Committee (CABSC) and the FCC Advisory Committee on Advanced Television Services (FCC-ACATS) Task Force. The second centered around convening the first meeting of the CABSC/FCC-ACATS Task Force to coordinate the logistics and administrative requirements, exchange and review documentation of spectrum studies completed to date, outline the work to be undertaken by the group and establish a timetable for its completion. As reported in more detail herein, a great deal of progress has been achieved in these directions during this reporting period.

During the next reporting cycle, the Working Party, through the continued efforts of Specialist Groups 6 and 7, will work toward completing the taboo studies and toward developing the necessary computer programs for determining specific spectrum availability for different candidate ATV systems after their characteristics have been determined through the upcoming tests. Specialist Group 9 will continue to support the efforts of the

CABSC/FCC-ACATS Task Force and collect the necessary information for inclusion in the further spectrum studies of the Working Party.

During this reporting period, Specialist Group 3 continued its efforts to determine the impact of ATV Systems on spectrum allocations used to support broadcast allocations. More specifically, in conjunction with the National Association of Broadcasters (NAB), the Specialist Group initiated two surveys of broadcast engineers and frequency coordinators in order to more completely assess existing congestion in the bands used by broadcast stations for Studio-to-Transmitter Links (STLs), for Electronic News Gathering (ENG), and for Inter-City Relays (ICRs). The issue of how existing spectrum usage would be impacted by the emergence of ATV systems was specifically assessed. In brief, these surveys of engineers and coordinators in the top 50 television markets revealed significant levels of congestion with existing usage and indicated that the congestion could be seriously exacerbated by additional spectrum requirements associated with ATV systems. During the next reporting period, Specialist Group 3 will continue to study and analyze current and anticipated usage in the television auxiliary bands.

As previously reported, the work of Specialist Group 4 dealing with the possibility of accommodating ATS in spectrum above 1 GHz was deferred (a) following the FCC's Interim Decision of September 1, 1988 and (b) pending the completion of the planned propagation and channel characterization tests carried out by the Advanced Television Test Center. During the next reporting period,

Specialist Group 4 will review and analyze the results of these tests.

## II. BACKGROUND AND INTRODUCTION

This document constitutes the Third Interim Report of the Spectrum Utilization and Alternatives Working Party (Working Party 3) of the Planning Subcommittee of the Federal Communications Commission's Advisory Committee on Advanced Television Service. As described in more detail in its two earlier reports, Working Party 3 (WP-3) was given the primary responsibility of providing the Planning Subcommittee and, ultimately, via the Advisory Committee, the FCC with advice concerning spectrum utilization and alternatives as related to the Advanced Television Service (ATS).

As previously reported, WP-3 divided its work into three fundamental parts. The first part was to deal with various alternatives for accommodating an Advanced Television (ATV) system within existing VHF and/or UHF television allocations. The second part was to deal with the issues surrounding the alternative of accommodating ATV in the region of the spectrum above 1 GHz. The third and final part dealt with the possible impact of ATS on the spectrum utilization of various broadcast support and non-broadcast services.

In order to effectively carry out its work in these three areas, the Working Party has further organized itself into Specialist Groups. During the current reporting period, Specialist Group 6 on Spectrum Analysis and Spectrum Group 7 on Taboos worked in tandem since the principal spectrum study requirement now

appears to be evaluating the impact of taboos on the availability of spectrum for ATV systems. The work of these combined Specialist Groups during the reporting period is described in Section III which follows. Specialist Group 3 continued its work analyzing the impact of ATV on broadcast support services and non-broadcast spectrum. By means of a cooperative effort by Specialist Group 3 and the National Association of Broadcasters (NAB), two surveys of broadcast engineers and frequency coordinators were developed. The NAB carried out the surveys. The combined results of these surveys are described in Section IV.

As noted in the Working Party's Second Interim Report, the work of Specialist Group 4 relating to identifying and analyzing the technical and other issues associated with accommodating ATV in the spectrum range above 1 GHz was scaled back to reflect the FCC's Tentative Decision and Further Notice of Inquiry of September 1, 1988. The further work of this Specialist Group is described in Section V. Finally, recognizing that there are a number of cross-border allotment issues that must be dealt with before an ATV allotment plan can be recommended to the FCC, the Working Party created Specialist Group 9, a new group to deal specifically with these issues. The results of their initial efforts are described in Section VI.

### **III. SPECTRUM ANALYSIS AND TABOOS (SPECIALIST GROUPS 6 AND 7)**

#### **A. Introduction**

Specialist Groups 6 and 7 have reported previously on the scope of their activities in identifying the spectrum available for

the terrestrial broadcasting of Advanced Television (ATV) and analyses of "taboo" mechanisms. During the period covered by this interim report to the Advisory Committee, Specialist Group 6 on Spectrum Analysis and Specialist Group 7 on Taboos worked in tandem since the principal spectrum study requirement now appears to be the impact of taboos on the availability of spectrum for advanced television systems. "Taboos" is the term applied to those interference effects which must be taken into account for the provision of relatively interference-free NTSC television reception. They include such factors as cross and inter modulation, sound and picture image, oscillator radiation, and intermediate frequency effects. (Adjacent channel interference is also sometimes referred to as a "taboo".) The Federal Communications Commission has protected UHF channels from these interference sources by requiring minimum separations between the protected station and other stations using channels critical to the taboos.

Spectrum studies previously conducted, considering only cochannel and adjacent channel interference, had shown that, without regard to taboos, accommodation of each existing station with additional spectrum for an augmentation or simulcast channel to be used for terrestrial broadcasting of ATV would require a system that is "friendly" to NTSC. That is, the system must have low potential for causing interference to NTSC reception, and should be relatively immune to interference from NTSC (and other ATV) stations. The studies previously reported showed that sufficient spectrum could be made available within the present

UHF/VHF television broadcast bands for all, or almost all, presently authorized television broadcast stations if the ATV system has the properties described. However, until the interference potential of ATV systems has been tested, no certainty can be attached to a conclusion that taboos will not have to be taken into account, nor can the expected ATS service areas be predicted.

Working Party 3 has been charged with the following action items:

1. Preparation of document outlining WP-3 requirements for computer modeling of channel allotment.
2. Obtaining the FCC Program for computer modeling and soliciting computer time to run the problem.
3. Contacting NTIA to determine their efforts, if any, in this area of computer modeling for channel allotments.

Progress on the foregoing tasks is described in the following paragraphs.

#### B. Progress During the Current Reporting Period

First, the immunity of ATV systems to the need for taboo protection cannot be addressed prior to testing. Therefore, Working Party 3 is undertaking studies to determine what impact upon spectrum availability would be encountered if, in fact, one or more taboos would have to be retained. No computer program currently exists (including that at the FCC) permitting ready analysis of the entire range of taboo impacts. Accordingly, as a first step, a proposed program has been prepared (PS/WP-3, Doc.-0104).

This program consists of a maximum of 290 computer runs exploring the effect of both individual and multiple taboos on the availability of both 3 MHz augmentation channels and 6 MHz augmentation or simulcast channels. Recognition is given to the fact that, as the results of runs are received, some reduction of the total number of runs may be feasible. Since previous work had indicated that cochannel spacing in the order of 160 kilometers (100 miles) would be required for full, or nearly full, accommodation of all stations, that cochannel spacing is being assumed for all runs. However, for the taboo channels, multiple spacings will be studied.

Second, a suggestion was also made that perhaps the taboo impact could be determined with less effort than had been detailed in the program described in the previous paragraph. This was based on a belief that effects may be similar no matter what channel might have to be considered. Therefore, if the aim was to protect from image interference, half-IF interference, or any other mechanism, separate runs would not have to be made for each potential interference type. Such an analysis was made in support of that belief (PS/WP-3, Doc.-0105). The analysis employed a data base including 269 television assignments in the Northeast. For cochannel NTSC-to-ATV television stations, minimum spacings assumed were: 67.7 miles (109 kilometers) for UHF, 78.9 miles (127 kilometers) for low band VHF, and 87 miles (140 kilometers) for high band VHF. Land mobile spacings used were as set forth in Dockets 18261 and 85-172. Based on these assumptions, application of a

single taboo was found to have impact on a minimum of two to a maximum of twenty-five of the 269 assignments. No sensitivity test was undertaken for application of multiple taboos. A more thorough analysis of this approach will be necessary to establish the validity of a conclusion that the particular channel is not important in gauging the impact of taboos.

Third, during the current reporting period, the Working Party learned that the FCC staff has further refined its studies of spectrum availability. It was reported that this work, which previously took account of only cochannel and first adjacent channel considerations, has been extended to take into account the image taboos.<sup>1</sup> The FCC studies of spectrum availability based on cochannel and adjacent channel spacings largely confirm previously reported results but the finding of the impact of applying image taboos is new and interesting. These studies show that for the entire universe of United States assignments, and assuming NTSC-to-ATV spacing of 100 miles (160 kilometers), accommodation of 6 MHz supplemental channels decreases by two percent.

Fourth, avenues were explored for carrying out the additional spectrum studies within the limited resources of the FCC staff. Fortunately, a solution is now in hand. The Broadcasters' Caucus of the Advanced Television Systems Committee (ATSC) has pledged the resources to permit the additional analyses to be done. These

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<sup>1</sup>Eckert, Robert, Alan Stillwell, and Bruce Franca, Interim Report: Further Studies on the Availability of Spectrum for Advanced Television, Federal Communications Commission, Office of Engineering and Technology, OET Technical Memorandum FCC/OET TM89-1, December, 1989.

resources include a computer programmer to develop the necessary software not already available from the FCC, and the lending by NBC of a VAX computer that will be reinstalled in the Washington area. Availability in Washington, near the major number of members of the Specialist Groups, will expedite the work to be accomplished.

In addition to the above, the Working Party provided a comprehensive briefing to the ATV proponents on the interference considerations to permit co-existence of ATV and NTSC systems. An outline of the subjects briefed may be found in Appendix B.

#### C. Future Work

The immediate objective of the Specialist Group on Spectrum Analysis, beyond the taboo study, is to have the necessary computer programs ready for specific determinations of spectrum availability for the different ATV systems that are to be run through the tests specified by other Working Parties of the Advisory Committee and conducted by the Advanced Television Test Center. A product of the tests will be desired-to-undesired ratios for ATV-to-NTSC, NTSC-to-ATV and ATV-to-ATV systems. These ratios, and an understanding of what interference mechanisms are involved, will permit the development of planning factors. Associated analyses will determine the extent that terrestrial broadcasters can be accommodated with the additional spectrum required and what size the resulting ATS service areas will be.

In addition to further work on gross spectrum availability, including the effect of any necessary taboo protection, the computer programs to be developed will permit the construction of

a nationwide allotment table for recommendation to the FCC as a principal contribution of the Advisory Committee.

#### **IV. BROADCAST SUPPORT SERVICES AND NON-BROADCAST SPECTRUM (SPECIALIST GROUP 3)**

##### **A. Introduction**

Specialist Group 3 was charged with determining the spectrum impact of Advanced Television (ATV) on broadcast support allocations. In its first interim report, Specialist Group 3 identified those services, currently authorized by the FCC to transmit NTSC signals, which could potentially impact or be impacted by advanced television service. The FCC's Tentative Decision referred to these results and requested further comments and alternative suggestions on methods to accommodate wider ATV signals within existing bands.

The second interim report began to analyze the impact of ATV on each service and explore the adequacy of existing allocations and signal delivery mechanisms. The contribution, as well as the distribution portion of the path from program origination to studio to viewer were described.

In our continuing effort to precisely describe the impact of ATV on various broadcast support allocations, Specialist Group 3 initiated two surveys.<sup>2</sup> The first was to chief engineers in the top 50 television markets and the second was to the Society of Broadcast Engineers (SBE) frequency coordinators across the U.S.

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<sup>2</sup>These surveys were designed to analyze broadcast support-frequency congestion in the present NTSC environment and also obtain information on the potential for local frequency plans to accommodate the needs of advanced television.

Results of the surveys have been combined and are summarized in this section.

Information from the surveys was compiled from all of the frequency users and coordinators in the existing bands. This report attempts to quantify frequency congestion in these bands. Results of these studies indicate that the television auxiliary bands are crowded and more spectrum for ATV auxiliary use, as well as current auxiliary television use, is needed.

Specialist Group 3 will continue to study current and anticipated spectrum usage in these bands; computer studies may be initiated, if deemed appropriate to further explore possible impacts.

#### B. Survey Results

The surveys were conducted to assist in determining the level of congestion in the television auxiliary frequency bands. One study of top 50 market chief engineers detailed the level of usage in those bands shared by studio to transmitter links (STL), Electronic News Gathering (ENG), and Inter City Relay (ICR) bands (now TV relay stations). The respondents considered bands below 18 GHz to be congested, with the bands commonly used for STL and ENG purposes the most cluttered. In addition, requests for more frequencies in the near future in the three sets of band are likely from many of the stations responding.

In a companion survey of frequency coordinators, most respondents found the 2 GHz and 7 GHz bands to be heavily used with 2 GHz posing the biggest coordination problem. About half of the markets

had a home channel plan. About half also felt that a 9 MHz split channel ATV system could fit into the existing scheme, but only about one third felt that 12 MHz split channel ATV could work.

The two surveys were conducted by the NAB's Research and Planning Department to determine the level of congestion in the television auxiliary frequency bands. For the chief engineers study, 350 out of 457 responded. For the frequency coordinators, a total of 67 frequency coordinators across the country were interviewed by telephone.

#### 1. Studio Transmitter Links

The vast majority of the stations in the study use broadcast auxiliary frequencies for their STLs, specifically 86 percent (302 stations). A total of 140 stations (46 percent) reported having more than one link. The heaviest amount of usage is by far in the 7 GHz band followed by 2 GHz and 13 GHz. The average link of an STL link was 14.4 miles; the most common link lengths were ten and twelve miles. Only 24 stations (eight percent) reported using an active repeater on any of their STL links.

Very few stations share time on any of their STL frequencies, specifically only 28 stations (nine percent). Very few lease any "excess" capacity on their STL frequencies. Only 12 stations (four percent) reported this practice, although 99 stations (33 percent) did say that they used their STLs for other applications involving their own stations.

Of course, other methods for delivering a signal to a transmitter exist. Each engineer participating in the survey was asked

if they used telephone lines, coaxial cable, fiber optic cable, or some other method of achieving an STL. A total of 79 stations or 22.6 percent of the total use other methods for at least one of their STL links.

All of those stations using STLs were asked about the technical quality of their STLs. Over 90 percent were satisfied with the technical quality they are receiving from the links. In addition, 87 percent use their STL facilities on a 24 hour per day basis.

Many stations will need more capacity for their STL needs. A total of 128 engineers reported that their stations will definitely need more capacity in the future and another 88 stations were not sure at this point. This total of 216 stations (62 percent) stated that either they will need or may need more capacity in the future.

Of those who said they will need more capacity, each was asked to tell how many frequencies they will apply for in each band. Again, 7 GHz is the most popular choice with 13 GHz second in desirability. Note that 18 GHz is gaining in popularity compared to current usage patterns and that the average numbers of frequencies to be requested in the 2 GHz and 18 GHz bands are larger than for other bands.

## 2. Electronic News Gathering

A total of 202 stations reported using broadcast auxiliary frequencies for ENG uses. Each one was asked how many portable microwave transmitters they use in each of the six main ENG bands.

The results appear in Table 1. The 13 GHz and 2 GHz bands are easily the most popular ENG bands.

TABLE 1

ENG Microwave Band Transmitters (N = 202)

<u>Band</u>	<u>Stations</u>	<u>Pct.</u>	<u>Avg. No. of Xmtrs</u>
2 GHz	191	95%	4.78
13 GHz	132	65	2.58
7 GHz	39	19	2.49
2.5 GHz	25	12	2.12
23 GHz	11	5	1.91
40 GHz	3	1	1.00

Each user of mobile ENG transmitters was also asked how many times the units have been used in the last month, six months, and year. The figures are as follows:

Average Number of Uses

Past Month	68.49
Six Months	335.63
Year	614.64

The average ENG mobile transmitter is operated approximately twice per day and while daily use was not measured, this is probably skewed more toward weekdays rather than weekend usage due to greater demand for news coverage during the week.

The typical station uses a relay site for ENG, specifically three out of four respondents. The vast majority use microwave (only a handful use telephone lines or cable television systems) and Table 2 shows the popularity of the different microwave frequencies.

TABLE 2

Microwave Bands Used for ENG Relay (N = 202)

<u>Band</u>	<u>Stations</u>	<u>Percent</u>
7 GHz	98	49%
13 GHz	91	45
2.5 GHz	52	26
23 GHz	24	12
2 GHz	16	8
18 GHz	5	2

Just over half of those stations that use ENG frequencies reported that they shared time on those frequencies with other parties in their markets. Some 181 engineers said they believed their stations would need more ENG capacity in the future and many plan to purchase more ENG transmitters in the short term.

The respondents were also asked how many ENG frequencies they will apply for in each of the bands. The results are displayed in Table 3. The 2 GHz band is the most popular followed by 13 GHz and 7 GHz.

TABLE 3

Applications for ENG Frequencies

<u>Band</u>	<u>Stations</u>	<u>Pct.</u>	<u>Average Frequencies</u>
2 GHz	102	29%	3.10
13 GHz	52	15	1.52
7 GHz	35	10	1.80
23 GHz	33	9	1.55
2.5 GHz	26	7	2.23
18 GHz	19	5	1.47
40 GHz	3	1	1.33

3. Intercity Relays

A total of 223 stations reported using television auxiliary frequencies for ICRs including satellite dish to studio links and originating station to repeater links. This represents 65 percent

of the sample. Of the 223 stations, 173 or 78 percent have multiple ICRs. The average respondent had just over five ICRs.

The average length of an ICR path was reported to be just over 28.5 miles. The most common value was ten miles. A total of 37 percent of the stations using television auxiliary frequencies for ICRs that they used one or more active repeaters.

Those respondents using television auxiliary frequencies for ICRs were asked how many ICRs they have in each band. The totals are shown in Table 4. The most popular frequencies are 7 GHz and 13 GHz. A few respondents noted that their stations were also using the 23 GHz band for ICRs.

TABLE 4

ICR Usage By Band (N = 202)

<u>Band</u>	<u>Stations</u>	<u>Pct.</u>	<u>Average ICRs</u>
7 GHz	157	70%	2.58
13 GHz	120	54	2.67
2 GHz	55	25	1.98
18 GHz	9	4	1.89

As with STLs and ENGs, respondents were asked about time-sharing. In the case of ICRs, 45 stations or 20 percent of those using television auxiliary frequencies for ICRs reported time-sharing of these frequencies with other parties in their areas. The survey shows that a majority of all stations in the top 50 markets may require more ICR frequency space.

#### 4. Frequency Congestion

Each respondent was asked about the level of auxiliary frequency congestion. Table 5 gives the results.

TABLE 5

## Degree of Auxiliary Frequency Congestion

## -- STL Bands --

<u>Category</u>	<u>Stations</u>	<u>Percent</u>
Extremely Congested	163	46%
Somewhat Congested	115	33
Not Very Congested	33	9
Not Congested At All	18	5
Not Sure/No Answer	21	6

## -- ENG Bands --

Extremely Congested	184	53
Somewhat Congested	99	28
Not Very Congested	19	5
Not Congested At All	8	2
Not Sure/No Answer	40	11

## -- ICR Bands --

Extremely Congested	121	35
Somewhat Congested	105	30
Not Very Congested	40	11
Not Congested At All	17	5
Not Sure/No Answer	67	19

The consensus of those responding to the survey is that all the bands are crowded, however the bands most commonly used for ENG and STL appear to have the worst problems. Adding both the "extremely congested" and "somewhat congested" responses together shows that approximately 80 percent of the respondents are faced with congestion problems in those bands, while approximately two-thirds of the respondents face similar problems in the ICR bands.

To determine the impact of wideband advanced television on these frequencies, we asked two questions. One question asked if enough auxiliary frequency capacity existed in the respondent's market to handle an extra six megahertz of bandwidth if the

bandwidth were non-contiguous (i.e., two non-contiguous 6 MHz channels in a 12 MHz bandwidth system). The other question asked about three megahertz of bandwidth on a non-contiguous basis (i.e., a 6 MHz channel and a non-contiguous 3 MHz channel in a 9 MHz bandwidth system).

The overwhelming answer is that there is "no room at the inn" for any expansion of that kind. Only 38 respondents (11 percent) felt there was room for six extra megahertz, although 86 were not sure (25 percent). At three megahertz, 45 respondents (13 percent) felt there was room and 112 (32 percent) were not sure. Most of the engineers taking part in the study said that current systems cannot handle a greater bandwidth signal, although a large group was not certain.

In general, the television auxiliary bands in the top 50 markets are crowded and there will be greater demand for these frequencies in the near future. The engineers that responded to the survey are not convinced that the current system can handle the demands of wideband advanced television. Combining the results of this study with the survey of frequency coordinators, it is apparent that it will be difficult to accommodate a wideband (i.e., greater than 6 MHz) ATV system into an already crowded auxiliary frequency system.

We take note of the current proceedings in the U.S. House of Representatives on H.R. 2965, Representative Dingell's and Representative Markey's Bill to reallocate 200 MHz of spectrum to the private sector, from the Federal Government. It is felt that this

may provide relief for the users of television auxiliary spectrum; compatible with the ATV implementation timetable needed for the enhanced requirements of the broadcast support spectrum.

There are many possible solutions to the problem of frequency congestion in the broadcast auxiliary bands. Some of these solutions will begin to relieve the congestion problems even before ATV implementation. Fiber-optics, for example, is a viable STL replacement where cost permits.

V. ACCOMMODATING ATS IN SPECTRUM ABOVE 1 GHZ (SPECIALIST GROUP 4)

A. Introduction

The scope of the work of Specialist Group 4 (SG-4) was described in the opening paragraph of the First Preliminary Report in the spring of 1988:

The charge given the fourth Specialist Group (SG-4) of Working Party 3 was to examine the spectrum above 1 GHz to identify blocks of spectrum that might possibly be used to establish an advanced television service, in the event that an ATV system cannot be accommodated in the VHF/UHF television broadcasting bands. Any system considered would be for a "simulcast" service, that is, an operation in parallel with an NTSC station, with no thought of providing an "augmentation" signal in this area of the spectrum.

The report limited its review to frequencies above 1 GHz and below 13 GHz; considered in general terms propagation and other technical issues; described the philosophy of channel allotment plans; considered in some detail four specific microwave bands -- including two (federal) Government bands; and suggested a very preliminary generic channel allotment plan. The report noted the planned propagation and channel characterization tests by the Advanced

Television Test Center (ATTC), indicating that the results of the test should provide useful information on the feasibility of ATV broadcasting in the microwave region of the spectrum.

In its Second Interim Report in the spring of 1989 the SG outlined its future activities as follows:

- a) a review of the results of the propagation and channel characterization tests to be conducted by the ATTC
- b) pressing for a more serious study of the possibility of sharing some Government/Non-Government spectrum
- c) refining the generic channel allotment plan

Since items (b) and (c) are dependent on the test results of item (a), it was decided to defer any further activities of the Specialist Group, pending a review of these test results.

#### B. The ATTC Tests

The ATTC has now completed its propagation and channel characterization tests which involved almost 1,000 hours of measurements in the Washington, D.C. and northern Virginia area, made in accordance with the test plan that was included as Appendix 7 in the Second Interim Report of Working Party 3. The data has been recorded on computer discs and a software program is being developed that will allow for appropriate analysis of the tremendous amount of data. The data should provide information helpful in determining the feasibility of terrestrial broadcasting in the microwave region of the spectrum.

### C. Possible Use of Government Spectrum

With respect to the possibility of more serious study of the possibility of sharing some Government/Non-Government spectrum the SG noted in its Second Interim Report:

With respect to the shared Government/Non-Government allocations the Specialist Group is, of course, aware of the highly sensitive nature of many of the government services, but from what it knows of actual usage believes that sharing with ATV might be possible without any detrimental effect on current usage. Given the importance that the government -- the Commission, Department of Commerce, the Department of Defense and the Congress -- has placed on the establishment of a United States ATV industry, it is apparent that the relative merits of all users of the spectrum must be considered.

The SG has noted the intended overall spectrum study by NTIA and the bill introduced by Representatives John Dingell and Edward Markey that would reallocate 200 MHz of prime spectrum from the federal Government to the private sector for commercial purposes (H.R. 2965). It is recognized that any such activity would take many years before it might lead to any spectrum activation. However, depending upon the long-term transition to ATV service both scenarios could prove compatible. In addition to actual broadcast spectrum, Specialist Group 3 has outlined the many possible requirements for broadcast-support spectrum, which might also be met by the availability of additional spectrum for private sector use.

### D. Possible Channel Allotment Plan

The analyses of the ATTC propagation and channel characterization tests, as indicated above, should provide useful information on the feasibility of microwave terrestrial broadcasting. The data

should also prove useful in deciding on allotment planning factors that would be needed to refine, or re-do the very preliminary allotment plan outlined in the SG's First Initial Report. In addition to channel spacing, many other factors would have to be developed for a full channel allotment plan, including: transmitter power and antenna height, desired signal-to-noise ratio, appropriate receiving antenna and receiver characteristics, time and location signal availability, etc. (A full discussion of planning factors for a VHF/UHF service is described in WP3 Doc. No. 0052. Many of these same considerations would apply for service in other bands.)

E. Future Activities

The principal future activity of SG 4 will be a review and analysis of the propagation and channel characteristics test results being prepared by the ATTC.

**VI. UNITED STATES - CANADIAN CROSS-BORDER ISSUES (SPECIALIST GROUP 9)**

A. Introduction

For the past two years, the U.S. Federal Communications Commission Advisory Committee on Advanced Television Services (ACATS) and the Canadian Advanced Broadcast System (CABSC) have been investigating the facts and circumstances surrounding the introduction of terrestrial advanced television service in North America. During this period, studies undertaken by both the CABSC Technical Subcommittee's Working Group on Spectrum Requirements and the FCC's ATV Planning Subcommittee Working Party 3 have reported on the availability of spectrum for ATV along the U.S./Canadian

border for a number of different spectrum scenarios and operating assumptions. These studies, while preliminary in nature, have concluded that the availability of additional spectrum for ATV depends to a large extent on the operating assumptions of the ATV system as well as the order in which that additional spectrum is assigned along the border. These findings suggest the need for closer coordination and collaboration between the United States and Canada in this area if one hopes to achieve an optimum or near-optimum ATV allotment plan along the U.S./Canadian border.

**B. SPECIALIST GROUP 9**

Recognizing that there are a number of cross-border allotment issues that need to be addressed before an ATV allotment plan can be recommended to the FCC, Working Party 3 established a new Specialist Group to examine these issues. The new Specialist Group, SG-9, is tasked with investigating cross-border allotment issues as well as representing Working Party 3 in the newly-formed joint U.S./Canadian task force dealing with ATV spectrum issues along the border. The Task Force, entitled "Joint CABSC/FCC-AC Spectrum Specialist Group," was established to explore ways to optimize the assignment of spectrum for ATV along the border and assist in the resolution of cross-border allotment issues.

**1. SG-9 Activities**

Two major efforts were undertaken during this reporting cycle. The first effort centered around defining and approving the tasks to be carried out by the joint CABSC/FCC-AC Task Force. The second centered around convening the first meeting of the task force to

coordinate the logistics and administrative requirements, exchange and review documentation of spectrum studies completed to date, outline the work to be undertaken by the group and establish a timetable for its completion. A great deal of progress has been achieved during this reporting cycle. Specifically, the Task Force agreed to undertake the following tasks:

- Analyze and compare the results of the spectrum studies completed to date in both the United States and Canada.
- Perform joint spectrum studies to determine the availability of spectrum for ATV under the various spectrum scenarios.
- Develop joint spectrum scenarios for introducing advanced television systems.
- Propose technical planning factors for an ATV service for the different spectrum scenarios.
- Propose technical guidelines for sharing of the VHF/UHF spectrum for ATV along the U.S./Canadian border.

Agreement was also reached on exchanging broadcast data bases for the purpose of creating a common or "reference" data base that would be used to conduct all future joint studies. In addition, to ensure that each organization's software can provide compatible results, it was agreed that once the reference data base is established, a number of identical studies would be conducted to assess each organization's methodology. The purpose of this exercise is to ultimately select a single methodology to carry out future studies.

Significant progress has also been achieved in identifying potential technical issues or problems that will require special