have backup facilities or contingency plans or are not sure. The media used for backup systems are listed in Table 10. Microwave is by far the most popular method of backing up for a failure.

Only 33 of the respondents reported time-sharing any of these facilities with other parties in their areas. They also report not using the backups too often. Each was asked how often the backup systems had been used in the last month, six months, and year. Here are the results:

Average Backup System Usage:

Past Month	1.60 times
Six Months	6.27 times
One Year	8.87 times

Table 10
Media Used for Backup Systems
(multiple answers permitted)

Medium	Stations	Pct.
Microwave	216	62%
Telephone Line	30	9
Cable Television	8	2
Other Medium	30	9
Not Sure	4	1

FREQUENCY CONGESTION

Each respondent was asked about the level of auxiliary frequency congestion. Table 11 gives the results.

The consensus of those responding to the survey is that all the bands are crowded, however the ENG and STL bands appear to have the worst problems. Adding both the "extremely congested" and "somewhat congested" answers 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 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 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).

Table 11
Degree of Auxiliary Frequency Congestion

STL Bands

Category	Stations	Pct.
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

Category	Stations	Pct.
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

Category	Stations	Pct.
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 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 in this study said that the current system cannot handle a greater bandwidth signal, although a large group is not certain.

Finally, each respondent was asked if they felt that advanced television quality would be needed on all, most, some, or few uses of auxiliary frequencies. Table 12 gives the results. A majority of the group said ATV quality would be needed on only some of the uses of television auxiliary frequencies.

Table 12
ATV Needs on Aux. Frequencies

Category	Stations	Pct.
All	14	4%
Most	74	21
Some	185	53
Few	70	20
Not Sure/No Answer	7	2

KNOWLEDGE LEVELS

Two other questions were added to the survey to determine how much knowledge these engineers felt they had about ATV and based on that knowledge, when they felt an ATV system would be available for broadcast use. The results are shown in Table 13.

The first question shows that many engineers do not believe they are that knowledgeable about advanced television. The largest group chose the "fair amount" answer and nearly 20 percent said they had no or very little knowledge about ATV.

While all but one of the respondents were certain that ATV will be available for broadcast use someday, the majority felt we are looking at five to ten years down the road. There was a nearly even split with the other respodents with approximately 20 percent saying a system will be approved by the FCC in two to five years with another 20 percent saying it will be more than ten years.

Table 13
How Much Do You Know About ATV

Category	N	Pct.
Great Amount	92	26%
Good Amount	68	19
Fair Amount	112	32
Very Little	29	8
Nothing At All	39	11
No Answer	10	3

When Will We Have Broadcast ATV?

Category	N	Pct.
Less than two years	14	4%
Two to five years	74	21
Five to ten years	185	53
More than ten years	70	20
Never	1	1
No Answer	6	2

SUMMARY

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 this 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 co-

ordinators, it is apparent that it will be difficult to easily accommodate a wideband (i.e., greater than 6 MHz) ATV system into an already crowded auxiliary frequency system.

FREQUENCY COORDINATORS SURVEY

The study of 67 frequency coordinators was designed by NAB Research and Planning in consultation with NAB Science and Technology. Interviews were conducted by members of the NAB Science and Technology Department due to their expertise in this field. Using a list provided by NBC, a total of 67 frequency coordinators from large and small markets across the country were contacted.

Due to the very small sample size, the results will be given only with the raw number of coordinators that selected each answer. With 67 total respondents, percentages are more likely to be misleading than illuminating. Some of the open-ended responses (answers other than the expected categories) will be listed after the initial table for each question.

What bands are heavily used for auxiliary television transmission in your area?

Band	N
2 GHz	64
7 GHz	52
13 GHz	34
2.5 GHz	12
6 GHz	3
18 GHz	2
12 GHz	1
23 GHz	1
40 GHz	1

Of those heavily used bands, would you say that the demand varies greatly by time of day?

Yes	46
No	17
Not Sure	4

A total of 47 respondents mentioned the heaviest time of day for usage was around local news times in their markets.

Does the demand vary by season?

Yes	18
No	47
Not Sure	2

What season of the year has the heaviest demand in your area?

Season	N
Summer	8
Fall	4
Spring	3
Winter	1
Other	3
None	48

Six respondents mentioned sports as a season for heaviest demand.

What bands pose the most coordination problems for you?

Band	N
2 GHz	42
7 GHz	10
2.5 GHz	9
13 GHz	5
18 GHz	0
23 GHz	0
40 GHz	0
Other	12

Other answers given included 450 MHz and 950 MHz.

Is there a home channel plan in your market?

Yes	33
No	33
Not Sure	1

Each respondent that answered yes to the home channel plan question was asked to describe the plan. In general, these plans consisted of agreements between the major stations in the market to stick to particular channels, most notably in the 2 GHz band. Sometimes, these are "gentlemen's agreements" based on usage patterns in the market over past years.

Some of the advanced television systems that have been proposed would require an extra three megahertz of bandwidth. Under present conditions in your market, would the available broadcast auxiliary frequencies be capable of handling current demand with a nine megahertz system, consisting of one six megahertz channel and a second separate three megahertz channel?

Yes	32
No	28
Not Sure	7

Some of the advanced television systems that have been proposed would require an extra six megahertz of bandwidth. Under present conditions in your market, would the available broadcast auxiliary frequencies be capable of handling current demand with a twelve megahertz system, consisting of two separate six megahertz channels?

Yes	20
No	34
Not Sure	13

In characterizing broadcast auxiliary frequency congestion in your market, would you say that frequency coordination administration is very difficult, somewhat difficult, not very difficult, or not difficult at all?

Very Difficult	2
Somewhat Difficult	25
Not Very Difficult	20
Not Difficult At All	20

Those who answered very difficult or somewhat difficult to the previous question were asked the following question: What would you specifically recommend as a solution to frequency congestion in your market?

Additional spectrum	15
More efficient spectrum use	5
Fiber Optics	3
Other	14

The "other" answers tended to fall into the categories of better frequency coordination with better enforcement, more cooperation from stations, and not leaving transmitters on for extended periods.

Are you aware of any broadcast auxiliary use...STL, ENG, ICR, etc.,...of fiber optics that has occurred in your market?

Yes	21
No	43
Not Sure	3

Are you aware of any current or planned fiber optic capacity in your market that can be utilized for broadcast auxiliary use?

Yes	32
No	32
Not Sure	3

Are you aware of any non-video uses of the television auxiliary bands in your market?

Yes	15
No	51

Not Sure 1

When asked about the specific non-video uses, answers included data transmission, digital audio for radio stations, cable television usage, and other nonbroadcast users such as police and hospitals.

NAB TELEVISION BROADCAST AUXILIARY QUESTIONNAIRE

Please answer all the questions in the survey. If you don't know the answer to a specific question, please check off the "not sure" box or leave the question blank. If you need more space for an answer, use the margins or the back of any sheet, but be sure to let us know. When you are finished, please put the questionnaire in the enclosed postage paid envelope and drop it in the mail. If you have any questions, please call Ralph Justus or Lynn Claudy at NAB Science and Technology at (202) 429-5346 or Louis Libin at NBC at (212) 664-2748.

1. Does your station use broadcast auxiliary frequencies for studio to transmitter links (STL)?

☐ Yes
☐ No (GO TO 2)
☐ Not sure (GO TO 2)

1A. Does your station have more than one STL link?

☐ Yes
☐ No
☐ Not sure

1B. Please indicate how many STL links you have in each band.

___ 2 GHz

___ 2.5 GHz

___ 7 GHz

___ 13 GHz

___ 18 GHz

1C. How long is the complete STL path?

_____ Miles

1D. Do any STLs use one or more active repeaters?

☐ Yes
☐ No
☐ Not sure

1E. Does your station time-share its STL frequencies with another party in your immediate area?

☐ Yes
☐ No
☐ Not sure

1F. Does your station lease or use "excess" capacity (i.e., unused time or available subcarriers) on your STL frequencies for applications other than transmitting audio-video broadcast programming? (Select the best answer below)

☐ Yes - lease
☐ Yes - use for other applications ourselves
☐ Yes - lease *and* use for other applications ourselves
☐ No - neither lease nor use for other applications ourselves
☐ Not sure (please continue on back)

8. Please give us your best estimate on how many times these mobile ENG units have used television broadcast auxiliary frequencies in the past .... (fill in one below):

_____ Month _____ 6 months _____ Year

9. What is the typical duration of each ENG use of broadcast auxiliary frequencies?

_____ Hours _____ Minutes

☐ Other (please specify) _____

_____

10. Do you use relay sites for your ENG operations?

☐ Yes
☐ No (GO TO 11)
☐ Not Sure (GO TO 11)

10A. What method is used to return signals from the relay site? (please check all that apply)

☐ Telephone line
☐ Cable television
☐ Microwave (please specify frequency) ☐ 2 GHz ☐ 2.5 GHz ☐ 7 GHz ☐ 13 GHz ☐ 18 GHz ☐ 23 GHz ☐ 40 GHz
☐ Other (please specify) _____

10B. Are you planning to use any other methods to return signals from the relay site?

☐ Yes
☐ No
☐ Not Sure

11. Does your station time-share its ENG frequencies with another party in your immediate area?

☐ Yes
☐ No
☐ Not sure

12. Do you lease or use "excess" capacity (i.e. unused time or available subcarriers) on your ENG frequencies for applications other than transmitting audio-video broadcast programming? (Select the best answer below.)

☐ Yes - lease
☐ Yes - Use for other applications
☐ Yes - lease *and* use for other applications
☐ No - neither lease nor use for other applications
☐ Not sure

13. Are you satisfied with the present technical quality of your station's ENG frequencies?

☐ Yes
☐ No
☐ Not sure

IF NO, please explain: _____

(please continue on back)

15G. Does your station lease or use "excess" capacity (i.e., unused time or available subcarriers) on your ICR frequencies for applications other than transmitting audio-video broadcast programming? (Select the best answer below.):

- ☐ Yes - lease
- ☐ Yes - use for other applications ourselves
- ☐ Yes - lease *and* use for other applications ourselves
- ☐ No - neither lease nor use excess capacity ourselves
- ☐ Not sure

16. Does your station use any of these methods for establishing an ICR? (Please check all that apply.)

- ☐ Telephone line
- ☐ Coaxial cable
- ☐ Fiber optics
- ☐ Other - please specify _____
- ☐ None of the above

IF YOUR STATION DOES NOT HAVE AN ICR, PLEASE GO TO QUESTION 19.

17. Are you satisfied with the present technical quality of your station's ICR?

- ☐ Yes
- ☐ No
- ☐ Not sure

IF NO, please explain: _____

18. Does your station use its ICR facilities on a full time or part time basis?

- ☐ Full time
- ☐ Part time
- ☐ Not sure

19. Do you think your station will need more ICR capacity in the future?

- ☐ Yes
- ☐ No **(GO TO 20)**
- ☐ Not sure **(GO TO 20)**

19A. How many other frequencies will you apply for in each band below?

____ 2 GHz _____ 18 GHz

____ 7 GHz Other: (please specify band) _____

____ 13 GHz

20. Does your station maintain or have contingency plans to arrange for backup communication facilities in the event of downtime of a primary facility (i.e., the usual method of signal delivery)? Select the best answer below:

- ☐ Yes - backup facilities maintained (i.e., "hot standby")
- ☐ Yes - contingency plans to arrange for facilities
- ☐ No - facilities not maintained *nor* does station have contingency plans to arrange for facilities
- ☐ Not sure

IF NO OR NOT SURE, GO TO QUESTION 21.

(please continue on back)

23. Some proposed advanced television broadcast systems require an extra three megahertz of bandwidth (i.e., 9 MHz). Based on current demand for auxiliary frequencies, do you believe there are enough auxiliary frequencies available in your market to handle a similar conversion for television auxiliary services if the required bandwidth is non-contiguous?

- ☐ Yes
- ☐ No
- ☐ Not Sure

24. Do you expect that advanced television quality will be required on all uses of auxiliary frequencies, most uses, some uses or only a few uses (e.g., news, sports, community events, etc.)?

- ☐ All (GO TO 25)
- ☐ Most
- ☐ Some
- ☐ Few
- ☐ Not Sure (GO TO 25)

24A. What kind of uses do you feel will not require advanced television quality? (List all that you can think of).

_____

_____

_____

25. How knowledgeable do you feel you are about advanced television systems? Do you believe that you know a great amount of information about them, a good amount of information, a fair amount of information, very little information, or nothing at all about advanced television systems?

- ☐ Great Amount
- ☐ Good Amount
- ☐ Fair Amount
- ☐ Very Little
- ☐ Nothing At All
- ☐ Not Sure

26. Based on what you do know, how long do you think it will be before an advanced television system is approved for broadcast use in the United States?

- ☐ Less than two years
- ☐ Two to five years
- ☐ More than five years to ten years
- ☐ More than ten years
- ☐ Never
- ☐ Not Sure

(please continue on back)

NAB/FCC ADVISORY GROUP FREQUENCY CO-ORDINATORS SURVEY

Information about frequency co-ordinator:

Name: _____

City: _____

Affiliation: _____

Phone Number: _____

Interviewer: _____

Date: _____ Time: _____

CALL THE DESIGNATED FREQUENCY CO-ORDINATORS ON YOUR LIST. IF ONE CANNOT BE REACHED, LEAVE A MESSAGE AND ASK THAT THE PERSON CALL YOU BACK. WHEN YOU REACH THE PROPER PERSON, READ THE FOLLOWING.

Hello, I'm _____ calling from the National Association of Broadcasters in Washington. We're conducting a survey about the use of broadcast auxiliary frequencies on behalf of the FCC Advanced Television Committee. According to our records, you are the frequency co-ordinator for the __(city)__ area. Is this correct? (IF NOT CORRECT, ASK FOR THE NAME, AFFILIATION, AND PHONE NUMBER OF THE FREQUENCY CO-ORDINATOR FOR THE CITY. THANK THE RESPONDENT AND TRY THE NEW NAME. OTHERWISE, CONTINUE WITH THE QUESTIONNAIRE.)

I'd like to ask you just a few questions about frequency co-ordination in your city.

1. What bands are heavily used for auxiliary television transmission in your area? (CHECK OFF AS MANY AS GIVEN...IF ANY ANSWERS ARE GIVEN, GO TO 1A, OTHERWISE GO TO 2)

- ☐ 2 GHz
- ☐ 2.5 GHz
- ☐ 7 GHz
- ☐ 13 GHz
- ☐ 18 GHz
- ☐ 23 GHz
- ☐ 40 GHz
- ☐ Other: _____

1A. Of those heavily used bands, would you say that the demand varies greatly by time of day?

- ☐ Yes
- ☐ No (**GO TO 1C**)
- ☐ Not Sure (**GO TO 1C**)

1B. What times of day have the heaviest demand?

_____

_____

1C. Does the demand vary by season?

- ☐ Yes
- ☐ No (GO TO 2)
- ☐ Not Sure (GO TO 2)

1D. What season of the year has the heaviest demand in your market?

- ☐ Spring
- ☐ Summer
- ☐ Fall
- ☐ Winter
- ☐ Other: _____

2. What bands pose the most co-ordination problems for you?

- ☐ 2 GHz
- ☐ 2.5 GHz
- ☐ 7 GHz
- ☐ 13 GHz
- ☐ 18 GHz
- ☐ 23 GHz
- ☐ 40 GHz
- ☐ Other: _____

3. Is there a "home channel plan" in your market for mobile operations?

- ☐ Yes
- ☐ No (GO TO 5)
- ☐ Not Sure/Don't Know (GO TO 5)

4. Briefly, how is it set up? (RECORD ANSWER VERBATIM)

_____

_____

_____

5. Some of the advanced television systems that have been proposed would require an extra three megahertz of bandwidth. Under present conditions in your market, would the available frequencies be capable of handling current demand with a nine megahertz system, consisting of one six megahertz channel and a second separate three megahertz channel?

- ☐ Yes
- ☐ No
- ☐ Not Sure/Don't Know

5a. Some of the advanced television systems that have been proposed would require an extra six megahertz of bandwidth. Under present conditions in your market, would the available frequencies be capable of handling current demand with a twelve megahertz system, consisting of two separate six megahertz channels?

- ☐ Yes
- ☐ No
- ☐ Not Sure/Don't Know

6. In characterizing broadcast auxiliary frequency congestion in your market, would you say that frequency co-ordination administration is very difficult, somewhat difficult, not very difficult, or not difficult at all?

- ☐ Very Difficult
- ☐ Somewhat Difficult
- ☐ Not Very Difficult (GO TO 7)
- ☐ Not Difficult At All (GO TO 7)
- ☐ Don't Know (GO TO 7)

6a. What would you specifically recommend as a solution to frequency congestion in your market? (RECORD ANSWER VERBATIM)

☐ Additional spectrum ☐ Fiber optics ☐ More efficient use of spectrum

Other: _____

_____

_____

7. Are you aware of any broadcast auxiliary use...STL, ENG, ICR, etc...of fiber optics that has occurred in your market?

- ☐ Yes
- ☐ No
- ☐ Not Sure/Don't Know

7A. Are you aware of any current or planned fiber optic capacity in your market that can be utilized for broadcast auxiliary use?

- ☐ Yes
- ☐ No
- ☐ Not Sure/Don't Know

8. Are you aware of any non-video uses of the television auxiliary bands in your market?

☐ Yes
☐ No (GO TO END OF QUESTIONNAIRE)

8A. What non-video uses are you aware of? (RECORD ANSWER VERBATIM)

_____

_____

Thank you for your time.

Report on the NAB 2 GHz TV Auxiliary Facilities Survey

Kelly T. Williams
Manager, Television Engineering
NAB Science and Technology

Brenda Helregel
Manager of Financial & Management Research
NAB Research & Planning

January 7, 1992

National Association of NAB BROADCASTERS®

Executive Summary

In June 1991, NAB conducted a study to examine and characterize television broadcasters' use of the 1990-2110 MHz ("2 GHz") TV auxiliary band. Specifically, the study quantifies the installed equipment base of 2 GHz transmitters and receivers and the economic investment made by broadcasters in 2 GHz equipment. Data was collected using a 2 GHz ENG Facilities Questionnaire mailed to all licensed television stations (excluding satellite stations) numbering approximately 1,180. NAB received 635 completed and usable questionnaires representing a response rate of 53.8%. The data was analyzed with respect to TV market size (ADI) in order to determine if a correlation exists between market size and the amount of equipment owned.

The results of the study indicate that 79.1% of the broadcast stations surveyed own and operate 2 GHz microwave equipment. Twenty-five percent operate at least 2 transmitters while another 25% operate 6 or more. Additionally, one-quarter reported owning or operating at least 2 receivers and another quarter own or operate 4 or more. The average number of 2 GHz transmitters per station is 4.52. The average number 2 GHz receivers per station is 3.59. Overall, the average investment, per station, in 2 GHz equipment is $169,806. In the top 50 ADIs, the average equipment investment per station exceeds $200,000. In total, the stations surveyed have invested $85,083,300 in 2 GHz microwave equipment.

Three conclusions can be drawn from the data presented in this study: (A) A majority of the TV stations (79.1%) use 2 GHz microwave equipment; (B) use is consistent across all ADIs; (C) broadcasters have made a substantial financial investment to 2 GHz facilities with the largest investment made by stations in the top 50 ADIs.

Report on the

NAB 2 GHz TV Auxiliary Facilities Survey

I. Introduction

This report presents the results of a study conducted by NAB in June 1991. The study examines and characterizes television broadcasters' use of the 1990-2110 MHz ("2 GHz") TV auxiliary band and specifically, quantifies the installed equipment base of 2 GHz transmitters and receivers and the economic investment made by broadcasters in 2 GHz equipment.

The data was collected using a 2 GHz ENG Facilities Questionnaire (attached as appendix A) mailed to all licensed television stations (excluding satellite stations) numbering approximately 1,180. NAB received 635 completed and usable questionnaires for a response rate of 53.8%.

The questionnaire asked for information on the number of 2 GHz transmitters and receivers owned or operated and whether those transmitters are permanently installed in ENG vehicles, configured as portable units, or installed at fixed locations.

The data was analyzed with respect to TV market size or ADI rank[1] to determine if a correlation exists between market size and the amount of equipment owned.

---

[1] ADI: Area of Dominant Influence. Term used by the Arbitron Company to describe a U.S. television market. A TV Market's ADI ranking is determined by the number of television households in that market. ADIs 1 through 50 are considered large markets, 51-100 medium markets, 101+ are small markets. Non-ADI stations are located in Hawaii, Alaska and Puerto Rico, parts of the U.S. that are not measured as television markets.

II. Data Analysis

Of the 635 responses to the questionnaire, 79.1% (502 stations) report that their station owns 2 GHz microwave equipment. All of the stations that reported owning 2 GHz microwave equipment own or operate both transmitters and receivers. Table 1 outlines the percentage of responding stations in each ADI grouping that reported owning 2 GHz microwave equipment.

Table 1
Owners of 2 GHz Equipment
by ADI

	ADI Grouping			
	1-50	51-100	101+	Non-ADI
Percentage of Stations Owning 2 GHz Microwave Equipment	78.0%	82.8%	78.5%	60.0%
Number of Stations	245	180	195	15

The remaining analysis is based only on the 502 stations that reported owning 2 GHz microwave equipment. These stations reported that they own or operate between 1 and 30 transmitters. One-quarter reported owning or operating at least 2 transmitters while a quarter own or operate 6 or more. The majority, 90%, own or operate between 1 and 9 and the average number of 2 GHz transmitters per station is 4.52. The stations reported that an average of 1.7 transmitters are permanently installed in ENG vehicles, 1.48 are portable units and 1.55 are installed in fixed locations. Table 2 outlines the average number of transmitters by ADI grouping.

Table 2
Average Number of 2 GHz Transmitters Owned by ADI

	ADI Grouping			
	1-50	51-100	101+	Non-ADI
2 GHz Transmitters Owned	6.17	3.94	3.13	2.89
Permanently installed in ENG vehicles	2.81	1.37	0.73	0.44
Portable units	2.27	1.28	0.75	0.78
Installed in fixed locations	1.51	1.37	1.76	1.78
Number of Stations	191	149	153	9

The stations owning 2 GHz microwave equipment reported that they own or operate between 1 and 18 2 GHz receivers. One-quarter reported owning or operating at least 2 receivers and a quarter own or operate 4 or more. The majority, 90%, own or operate between 1 and 7, while the average number 2 GHz receivers per station is 3.59. The stations reported that an average of 2.77 receivers are installed at fixed locations while 0.82 are portable units. Table 3 outlines the average number of receivers by ADI grouping.

Table 3
Average Number of 2 GHz Receivers by ADI

	ADI Grouping			
	1-50	50-100	101+	Non-ADI
2 GHz Receivers Owned	4.48	3.09	2.99	3.22
Installed at fixed locations	3.27	2.36	2.55	2.67
Portable units	1.21	0.77	0.41	0.56
Number of Stations	191	149	153	9

III. Economic Analysis

The data analysis shows that TV stations own an average of 4.52 2 GHz transmitting facilities and 3.59 2 GHz receive stations. The estimated value of a typical transmitting installation is approximately $19,300[2] and a typical receive installation is worth approximately $23,000.[3] Thus, the total average, per station investment in 2 GHz equipment is $169,806. In large markets, the average equipment investment exceeds $200,000. Table 4 shows the average, per station investment in 2 GHz equipment by ADI grouping.

Table 4
Average, Per Station Equipment Investment by ADI

	ADI Grouping			
	1-50	51-100	101+	Non-ADI
Transmission Equipment	$119,081	$76,042	$60,409	$55,777
Receiving Equipment	$103,040	$71,070	$68,770	$74,060
Total	$222,121	$147,112	$129,179	$129,837

[2] Transmission system consists of a Microwave Radio Corporation (MRC) model Prostar 2T2 transmitter - $9500, PA2000 power amplifier - $7500, Prostar 2A20 antenna - $3000, and coiled transmission line - $2000.

[3] Receiving system consists of an MRC Prostar receiver - $12,500, Microscan 2 Quadpole receiving antenna - $13,200, DB40/PC100 antenna control system - $9200, and 200 ft of transmission line - $600.

The total number of transmitters reported in the survey was 2,261 and the total number of receivers reported was 1,802. This represents a total financial investment in 2 GHz microwave equipment by the responding stations of $85,083,300.

IV. Conclusions

Three conclusions can be drawn from the data presented in this study.

A. A significant majority of the TV stations (79.1%) use 2 GHz microwave equipment.

B. That use is consistent across all ADIs. Even in small TV markets, 78% of the stations own and operate 2 GHz microwave equipment.

C. Broadcasters have made a substantial financial investment in 2 GHz facilities with the largest investment made by stations in the top 50 ADIs. The resonding stations have invested over $85 million and considering that only 53.8% of the broadcast stations surveyed responded, the actual industry investment in 2 GHz microwave equipment is nearer $158 million.

ATTACHMENT B

SCFCC, Inc.

The Southern California Frequency Coordinating Committee

June 4, 1992

Mr. John Moreno
National Association of Broadcasters
1771 N Street, N.W.
Washington, D.C. 20036

Dear Mr. Moreno:

I am the current Chairman of the 2 GHz Subcommittee for the Southern California Frequency Coordinating Committee (SCFCC). Working with the Society of Broadcast Engineers, I am also the Chairman of the Steering Committee for the All Industry Part 74 Coordination Group. I was also the founding Chairman of the SCFCC itself which began its operations in 1976.

The SCFCC and ABC successfully coordinated Part 74 activity for the 1984 Olympic Games. We pioneered a real-time sharing arrangement known as **The Home Channel Plan.** After the Olympics, we implemented this plan for day-to-day use. This plan addresses the challenge of sharing limited spectrum among many users. If a user exceeds the capabilities of their assigned Home Channel, they contact the ENG control point of another user. Permission is given by the entity called if they are not using the channel. The "guest" user "lights up" only for the duration of their feed.

The Plan depends in part on trained operators, frequency agile split channel transmitters, use of the 4.8 MHz audio subcarrier, and "Silhouette®" antennas rather than inefficient "rod" antennas for ENG trucks. Many Los Angeles ENG players have significant investments in multiple ENG receive sites. The total cost of one shared ENG receive site can approach one million dollars. We work around the nearby ISM (microwave oven) band, and the daily pressures exerted by the following news schedule:

	AFFIL.	AM NEWS	MIDDAY NEWS	AFT NEWS	4-6 PM NEWS	8-10 PM NEWS	11 PM NEWS
1.	KCBS	YES	YES	NO	YES	NO	YES
2.	CBS	<<<<<<<<<<NET FEEDS CAN OCCUR AT ANY TIME>>>>>>>>>>>>>					
3.	KNBC	YES	YES	NO	YES	NO	YES
4.	NBC	<<<<<<<<<<NET FEEDS CAN OCCUR AT ANY TIME>>>>>>>>>>>>>					
5.	KTLA	YES*	YES	NO	YES	YES	YES
6.	KABC	YES	YES	NO	YES	NO	YES
7.	ABC	<<<<<<<<<<NET FEEDS CAN OCCUR AT ANY TIME>>>>>>>>>>>>>					
8.	KCAL	YES*	YES	YES	YES	YES**	NO
9.	KTTV	YES	YES	NO	YES	YES	NO
10.	FOX	<<<<<<<<<<NET FEEDS CAN OCCUR AT ANY TIME>>>>>>>>>>>>>					
11.	KCOP	YES	YES	NO	YES	NO	YES
12.	CNN	<<<<<<<<<<NET FEEDS CAN OCCUR AT ANY TIME>>>>>>>>>>>>>					

* Programs extended news blocks weekday mornings
** Programs extended news block during each evening

NOTES:

1. The SCFCC 2 GHz user group extends beyond broadcasters. The City of Los Angeles is licensed in the 2.5 GHz band for a helicopter video platform for surveillance. The County of Los Angeles is licensed for a restoration "T" carrier radio system in the 2.5 GHz band.
2. The chart shows the band is in heavy use for live or delayed broadcast feeds from 5 a.m. until 11:30 p.m.
3. Delayed feeds by ANY user for non-news events and for delayed news broadcasts can occur at any time!
4. Use by non-LA "visiting" broadcasters is accommodated routinely, even during emergencies.

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During the recent civil unrest in Los Angeles, stations and networks cancelled normal programming to cover the rapidly changing story. ENG facilities were stretched to their limits. Yet, everyone lived up to their agreement to abide by the terms of the **The Home Channel Plan**. Interference was minimal. The level of cooperation that literally kept the entire band from coming unglued was exceedingly high. The SCFCC received not one serious interference complaint for the entire period of riot coverage.

After the bullets, bricks, and banditry of civil unrest subsided, TV ENG coverage played a vital role to show citizens that the so-called "*response*" phase of the emergency has ended and that we were in the "*recovery*" phase. **Reassurance** to citizens that life is returning to normal after major emergencies (like riots and earthquakes) has been cited by psychological experts as playing a major role to help mitigate effects of post-event traumatic stress. People must see proof that normal conditions are really returning.

2 GHz ENG is an indispensable and integral part of day-to-day news coverage in Los Angeles as well as the rest of the country. We are aware of no replacement for it at this time, *using proven yet cost-effective techniques and technology*. To jeopardize TV ENG operations through spectrum reallocation would mean a partial return to the "Film at Eleven" era of TV news coverage in the considered opinion of those of us who are closest to the situation. This condition will exist until we have those proven, cost-effective, technological solutions.

Several other markets have implemented or are now considering the **Home Channel** concept to cope with an ever-increasing number of uses and users. This is added testimony to the continuing efforts of broadcasters and coordination groups to eke out every possible bit of efficiency from the limited spectrum available for Part 74 ENG.

Sincerely yours,

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