Appendix C: 'Lex Felker Issues'

Implementation Subcommittee Issues

1. How should additional capacity be assigned if not all existing broadcasters could be assigned an optimum amount of additional spectrum capacity for HDTV? Options explored might include: a) some type of comparative process; b) lotteries; c) auctions; d) assigning capacity to all licensees uniformly and allow stations to acquire additional capacity needed from others.

2. Ashbaker issues. Does the Commission have authority to award ATV broadcast permission to existing licensees without accepting applications from potentially new broadcasters? How is the necessity for such a decision affected by the four predominant scenarios -- i.e. -- 6, 9, 12, & 12-simulcast? Is the definition of "simulcast" an issue? Are statutory changes needed?.

3. In the event that a complete transition to ATV takes many years (e.g., a decade or more), what options are available for making productive use of spectrum other than the present freeze? For example, are there uses of the spectrum compatible with television broadcasting that could be implemented during the uncertain interim transitional time period? Could the freeze be scaled back or eliminated with little or no adverse consequences? What are the advantages and disadvantages of the flexible use scheme suggested by the FCC in its FNOI?

4. If different systems appear to be preferable for cable, broadcast, satellite, and/or VCR, would fostering convergence be beneficial ? How could this be accomplished ? What statutes or regulations could be used, or would have to be amended ? Same questions, if different ATV systems prove to have different strengths and weaknesses; would convergence to obtain the best of the different systems be beneficial, and if so, how can the result be pursued?

5. Some broadcasters have complained that any ATV system which will require a new antenna site will be impractical. How pervasive is this problem? What is the magnitude of the problem in dollars; number of stations potentially affected? Is this problem so severe as to rule out anything other than a six megahertz, compatible system?

Accommodation of a second antenna
Detailed breakdown into TOP-10 and subgroups

Answers for high-power antenna

ADI Market	yes	reinforce	no	don't know	n.a.	sum
New York	1	1	15	1	0	18
Los Angeles	7	1	10	0	0	18
Chicago	3	0	12	0	0	15
Philadelphia	4	0	11	0	0	15
San Francisco	4	0	13	0	0	17
Boston	0	5	10	0	1	16
Detroit	2	0	6	0	0	8
Dallas	6	0	6	0	1	13
Washington	2	3	7	0	0	12
Houston	7	0	5	0	0	12
total	36	10	95	1	2	144

Subgroup	yes	reinforce	no	don't know	n.a.	sum
SG 1	7	1	12	0	0	20
SG 2	4	1	15	0	0	20
SG 3	7	1	12	0	0	20
SG 4	7	2	11	0	0	20
SG 5	10	0	10	0	0	20
SG 6	4	1	15	0	0	20
SG 7	5	1	13	1	0	20
SG 8	5	3	11	1	0	20
SG 9	3	2	14	1	0	20
SG 10	5	0	15	0	0	20
total	57	12	128	3	0	200

Answers for low-power antenna

ADI market	yes	reinforce	no	don't know	n.a.	sum
New York	2	1	10	3	2	18
Los Angeles	10	0	6	2	0	18
Chicago	3	0	12	0	0	15
Philadelphia	5	0	3	7	0	15
San Francisco	10	0	4	3	0	17
Boston	0	3	7	5	1	16
Detroit	2	0	5	1	0	8
Dallas	6	0	6	0	1	13
Washington	2	0	5	5	0	12
Houston	9	0	2	1	0	12
total	49	4	60	27	4	144

Subgroup	yes	reinforce	no	don't know	n.a.	sum
SG 1	12	1	6	1	0	20
SG 2	10	1	9	0	0	20
SG 3	12	0	6	2	0	20
SG 4	10	1	8	1	0	20
SG 5	13	0	7	0	0	20
SG 6	6	1	8	5	0	20
SG 7	8	0	8	4	0	20
SG 8	8	2	6	4	0	20
SG 9	11	1	6	2	0	20
SG 10	10	1	6	3	0	20
total	100	8	70	22	0	200

Table DET_ANT.XLS

Attachment 1:

Specialist Group Report on ATV System Convergence

Report of Specialist Group

Question:

a. If different systems appear to be preferable for cable, broadcast, satellite, and/or VCR, would fostering convergence be beneficial ?

b. How could this be accomplished ?

General Discussion

It should be understood at the outset that even if one basic ATV system is embraced by all media, the detailed implementation must vary by media. This is a technical necessity because of the different modulation formats used (FM vs AM or Digital) and the different types of impairments which dominate different media. For example, FM modulation is generally used on satellite to achieve needed signal to noise. Subcarriers do not fare well in FM because of triangular noise, making MAC (Multiplexed Analog Components) formats desirable. Quadrature amplitude modulation, which might be used terrestrially, is not an option for satellite. Similar concerns arise for tape recording. It should also be understood that these differences may be innocuous, requiring only simple translation media to media and to a common decoder/display input. A "family" of formats with these sorts of differences exist currently for NTSC.

The question can be viewed in two ways since there are two types of convergence which can be defined:

1. "Convergence" intermedia - i.e., the ability of various media to handle signals originated in other media.

2. "Convergence" at the consumer hardware - the ability of the consumer appliance, with or without accessories, to display the signal delivered by various media.

Regarding the first interpretation, "Convergence Intermedia":

Some aspects of this are crucial and appear at the consumer level. For example, it will be necessary for cable to distribute broadcast signals to consumers, presumably in the broadcast format, regardless of any other ATV service cable undertakes. Basic consumer VCR's will have to record and play back ATV signals received from (at least) broadcast and cable media. These are obvious demands of the marketplace and require no other stimulus, although cable carriage of broadcast signals has a long, and likely to continue, regulatory history.

It is also necessary to assure a practical chain of delivery for terrestrial signals. Certainly, testing of all links of this chain of delivery (not necessarily including VTR's which may follow) should be completed before finalizing a terrestrial standard. The broadcast industry itself is in the best position to make technical judgments on these issues in ATV as it has for the NTSC chain of delivery. Capability of direct carriage of the terrestrial signal on cable and delivery of a suitable signal to the broadcast point by satellite or other medium is necessary as has been recognized by SS/WP4 in their statement of the process by which they intend to establish a recommended terrestrial standard.

These and similar considerations will exercise a strong influence on the freedom of choice of alternate media in selecting an ATV system, hence on the ultimate convergence of systems at the consumer.

It is technically quite possible that very different systems might be desirable for some media. The primary reason alternate media might opt for an ATV system different from that selected for terrestrial broadcast is to fully utilize the capability of a particular medium - in short, to deliver better pictures at the expense of bandwidth or cost, expecting a competitive advantage. A secondary reason could be to achieve signal security and addressability. If these media could command a large enough market to attract manufacturers of displays, they could proceed separately from any broadcast concern. On the other hand, it is very likely that TV manufacturers will choose to include the broadcast market for what must certainly be an expensive display. This provides strong technical and commercial reasons for the systems of other media to converge with the broadcast system, at least to the point of being "interoperable" or "friendly". The selection of a terrestrial standard of high quality will reduce the incentive for alternate media to choose a different system.

Thus, the best way to foster this convergence is to select (as rapidly as can be practically done) a terrestrial system which provides the highest possible quality and which accommodates tape recording, signal security, and which can be carried by cable etc. These are the stated objectives of SS/WP4 which is to recommend standards to the FCC through the FCC-ACATS.

Regarding the second interpretation, "Convergence at the Consumer Hardware":

Allowing for the possibility of different systems for different media, certain commonality must exist, of course, if the consumer is to be able to have access to different media in an uncomplicated way and without undue expense. The questions of implementation and interrelationship are being considered specifically by the ATV Receiver Interface Subcommittee of the EIA ATV Committee as well as PS/WP4, SS/WP4 and others. The EIA group is defining interface(s) at logical points within a receiver which can accommodate the needs of alternate media. Of course, this involves selection of parameters "friendly" to both terrestrial broadcast and other media. The completion of this definition must await selection of the terrestrial standard.

The EIA is the proper forum for such definition from both a technical and business perspective. They represent those who must make a business of manufacturing receivers and those whose business lies in alternate media delivery. The EIA should be looked to for technical definition of this interface whether the ultimate implementation is mandated or voluntary standards or the marketplace.

Conclusions:

Question a.:

If different systems appear to be preferable for cable, broadcast, satellite, and/or VCR, would fostering convergence be beneficial ?

Response:

Fostering convergence would be beneficial from a technical/economic perspective to the extent of assuring interoperability of the receiver/display with different media in an uncomplicated manner and without unnecessary cost. This means that interfaces should be defined which allow different media to utilize the maximum functionality of the receiver/display.

Definition of a terrestrial standard and appropriate display interfaces should bring sufficient commonality between media. It is too early to establish standards for alternate media delivery to consumers which does not involve broadcast. Even if regulation of these heretofore unregulated media is contemplated, a set of competing proposals specifically tailored to these media must exist before a standard definition is potentially needed.

Question b.:

How could this be accomplished ?

Response:

Several approaches for fostering convergence have been suggested. The following, for example, is abstracted from the FCC-ACATS second interim report:

> In this regard, consideration may be given to a variety of approaches including: establishing a "family" of standards, adopting standards governing the receiver display device, and developing a multiport receiver to accommodate different media."

The necessary activities to encourage and technically define the needed convergence are in place within the FCC-ACATS and in the industry in the form of EIA standard setting activity for interface and ATSC consideration of these same issues. The development of a receiver interface definition is needed for the technical reasons stated above. Expeditious selection of a high quality, well planned, terrestrial standard will allow this effort to be completed and interoperability established.

It is premature to consider a requirement for inclusion of various interfaces in the receiver. There are many possible methods of delivery, none of which have established industry standards for HDTV within the medium. Even after such definition, mandatory requirements should be approached with careful consideration of the economic ramifications. Requirements for inclusion of special interfaces across the board could increase the cost to many consumers unnecessarily. There are alternatives of voluntary standards or marketplace determination. Industry organizations such as EIA should provide guidance in these areas.

A "family" of formats will necessarily be developed to establish the "chain of delivery" for Terrestrial Broadcast ATV signals as has been established for NTSC. This requirement is a recognized part of the system selection process outlined by SS/WP4. If standards are to be developed, the broadcast industry itself is best qualified to define and implement these standards.

Attachment 2:

TV-station Survey - Final Report

FCC-IS/WP2
Doc. #
February 5, 1990

Survey of US Television Stations

By: Detlev Otto, PCEC

Executive Summary

A study was carried out to determine in detail the situation of the US television station in the matter of a potential upgrade to a two-channel ATV system. The study focused on transmission equipment (transmitter, antenna, tower) only. The first part consisted of a round of interviews with nearly 350 Chief Engineers, Technical Directors or Station Managers. The goal was to determine statistically significant information on the availability of antenna space on the existing towers and the possibility to erect additional towers if needed. For the second part cost and time estimates for this upgrade were developed.

The survey indicates that there exist some major markets which are likely to experience severe technical and political difficulties when trying to obtain additional tower space. The majority of TV stations in these markets share one or two (community-)towers in the midst of a heavily populated area. Expansion possibilities are limited and plans for new towers are often opposed by the local population and/or government. Examples for these markets are: New York (World Trade Center and Empire State building), Chicago (Sears tower and Hancock building), San Francisco (Mount Sutro) and Minneapolis-St. Paul (3 tower cluster for all stations). Boston, MA, is worth to be mentioned as well because of its strict radiation limits.

As for overall results, in case a full-power 2-channel ATV system would be selected approximately 28% of all stations would be able to accommodate the second antenna on their existing tower with no or only minor modifications. 7% could upgrade their existing structure. The remaining 65 % could either erect an additional tower at the existing site (30%) or would have to develop a new tower site (35%).
The percentages for an upgrade to a low-power ATV system are 50%, 5%, 19% and 26% respectively.

There is no statistically significant correlation between ADI rank and distribution of responses.

A well planned and exercised upgrade can be performed within 18 to 24 months as long as no legal action is required to settle zoning problems and/or citizens complaints against the new structure. Stations in densely populated areas are most prone to face this type of problems which not only will delay the process by up to several years but increase cost as well, in some cases by several million dollars.

1. Introduction

Some time earlier this year objections to a two-channel ATV system were expressed by several television stations which claimed that an upgrade would not be technically feasible due to existing restrictions concerning the availablility of additional antenna and tower space. This issue was brought before the Implementation Subcommittee ('Lex Felkner Issue' # 5, see Appendix A). It was decided to carry out a survey to clarify the severity of this issue and obtain factual information on the severity of this potential problem. The survey was conducted during October and November 1989 and reflects the situation at this time.

2. Sample description

The samples were selected based on the latest information available from Warren Publishing, Inc, Washington DC (TV-factbook). A sample size of 300 to 400 was regarded as necessary to obtain statistically relevant data. The following sample plan was used:

- Only TV stations on the US mainland were selected (excludes also Alaska)
- The stations were sorted by
    1. ADI rank
    2. City of License
    3. Call sign
- For the top-10 ADI markets a 100% sample (152 TV stations) was selected.
- The remainder was split into 10 subgroups of equal size (118 stations each, except SG10 with 121 samples) and 30 call signs were randomly selected out of each group. After accounting for double selection of call-signs (random number generator) the first 20 call signs of each group were defined as sample of the according subgroup. The remaining samples were retained in case a 'runner-up' was needed. In case the prepared list was insufficient more stations were randomly drawn of the population and interviews conducted until the planned sample size of 20 per subgroup was reached.
- Special attention was given to stations which share space on a tower with other stations to allow for a separate analysis at a later point if necessary.

The interviews were conducted by phone, contact was made with either the Chief Engineer of the station or the Engineering Manager, Director of Engineering or VP Engineering & Operations.

The goal during the first round of interviews was to obtain attributes (primarily yes/no answers) to develop a global understanding of the tower/antenna situation as a whole.
In the second round the timeline and expenditure estimates were developed with input from broadcast engineering consultants and tower/antenna manufacturers.

In several cases the contact person could provide information on more than one television station. If this was a 'tower-sharing' situation with more than two TV antennas mounted (within the top-10 markets) at least one confirming interview was conducted. In case of satellite operation or having one station operate several others as well (very often the case with PBS) the information was obtained as well but not included in the tables of overall percentages to avoid any possible distortion of the results. For subgroup analysis all obtained results can be utilized.

As to be expected a certain learning process took place during the different interviews. The sample sizes for different questions are therefore not always equal to the total number of interviews conducted. The given percentages are adjusted accordingly.

3. Survey Results

3.1 Qualitative

One topic was mentioned frequently during the interviews:
The political situation seems to become more and more unfavorable for the TV stations. Especially in densely populated areas a growing awareness and concern of citizens and local governments leads to an increasing amount of complaints, restrictions and even lawsuits concerning the erection of new towers, antennas or modification thereof. Radiation hazard and unsightly appearance combined with negative influence on property values are the topics mentioned most frequently. Several states had introduced legislation restricting tower height and/or field strength. Tight local zoning laws result in lengthy and expensive 'convincing-processes' (up to several years) in addition to obtaining FAA and FCC clearances.
Since the political climate was not a direct part of the study the statistical validity of the above statements might not be given sufficiently. On the other hand there are strong indications that this 'political environment' is believed to become even more hostile over the next years (see also the growing discussion about harmful radiation from high-voltage power lines) and should be taken into account when developing the different transition scenarios.

There exist some major markets which are likely to experience severe difficulty when trying to obtain additional tower space. The majority of TV stations there share one or two towers in the midst of a heavily populated area and expansion choices are limited. Examples are: New York (World Trade Center and Empire State building), Chicago (Sears tower and Hancock building), San Francisco (Mount Sutro) and Minneapolis-St. Paul (3 tower cluster for all stations). Boston, MA, is worth to be mentioned as well because of its strict radiation limits.

3.2 Quantitative

The table 'TVSURVEY.XLS' in the appendix gives a detailed breakdown of the results. The answers to the most important question (accommodation of a second antenna on the existing tower) is broken down further and shown in the tables 'DET_ANT.XLS', out of which the graphical representations, which follow this table, were derived.

The major findings are:

- Tower ownership:
72.8 % of the stations own their tower, 25.7 % lease antenna space, 1.5% provided no answer or don't know. This compares to 87 % tower ownership according to the NAB survey.

- Tower loading:
Approximately 40% of all stations do not share the tower with either FM- or TV antenna(s). For the remaining 60% the answers range from 'no other antenna' to '60 2-way antennas' or '9 other TV stations on this tower'.

- Accommodation of a second TV antenna on the existing tower:
The question consisted of two parts:
a) Would your present tower support an additional full power TV antenna?
and
b) Would your present tower support an additional reduced power TV antenna (approx. 20 dB below NTSC)?

Since such a low-power TV antenna is not defined yet the percentage of 'don't knows' is much higher for b) than for a). The answer might furthermore be dependent on whether the station operates at VHF or a UHF. NTSC 'output power' has a different meaning in these cases.

Approximately 28% of all stations would be able to accommodate the second antenna on their existing tower with no or only minor modifications. 7% could upgrade their existing structure. The remaining 65 % could either erect an additional tower at the existing site (30%) or would have to develop a new tower site (35%).

The percentages for accomodation of a second low-power antenna are 50%, 5%, 19% and 26% respectively.

- Technical feasibility of erection a second tower on the existing site:
In case a negative response was received for accommodation of a second full power antenna inquiries were made about the tower site (210 usable responses).
Out of these 40% told that erection of a second tower would be technically possible, 48% gave a negative response, 5% did not know and 7% provided no answer.

- The accommodation of a second transmitter in the existing facility does not seem to be a major problem, 46.5 % of the respondents would have the space available, an additional 17.4 % would have to expand but indicated that such an expansion is possible. Under the assumption that for a new tower structure a new building will be erected the percentages calculate (for high-power ATV system) to 20% no or minor modification, 14.4% expansion, 65.6% new building. For a low-power system the figures are 35%, 19.7% and 45.3% respectively.

3.3 Statistical significance of the results

The statistical significance of the results is a function of sample and population size. A 90% confidence interval can be constructed with the formula (normal approximation)

$$CI = p \pm 1.67 * [(N-n)/(N-1) * p*(1-p)/n]^{1/2}$$

with

p := fraction (percentage) of sample having a certain attribute
n := sample size
N := size of population out of which sample is drawn.

For further details see Appendix B.

4. Expected duration of upgrade

The flow-chart below shows the different activities and the duration. Explanations to the diagram can be found on the next page.

		Elapse time (weeks)
1.	Start	
2.	Eng. study/stress analysis	4
	New tower ? yes	
3.	search/select new site, option for purchase	6
4.	Initiate local zoning	
5.	FCC (incl EIS) / FAA	26
	Approvals FCC/FAA	
6.	Complete local zoning	??
7.	Equipment order	
8.	Site preparation	
9.	Tx building prepare construct/modify / Tower construct/ erect	39
10.	Tx install / Antenna install	
11.	Program test	
	File for licence	
	On air	

Overall time required: Approx. 18 - 24 months

Comments to activities:

to 1. Engineering study/stress analysis:
Determines whether a new tower is needed or whether the existing one can be used either as is or with reinforcement.

to 3.: New site: Consulting firm advises on area where to locate the new tower (if existing site does not support it), station lists with real-estate agents. Normally a purchase option is obtained since FCC and FAA approval is not given yet.

to 4.: Initiate local zoning: very often local zoning is handled easier when FCC and FAA approvals are granted, but can (and sometimes should) be initiated at this stage.

to 5.: FCC approval: needs 3..6 month plus preparation (2..3 weeks). Environmental Impact Statement (EIS) is needed in certain cases (tower in wildlife refuge, preserve, etc).
FAA approval: if the new tower is located within an antenna farm: approx. 2..3 weeks, if new approval needed: 75 days if no serious objections from aviation in the area, up to 6 months otherwise.

to 6.: Complete local zoning:
This is the most uncertain part (time and money). In approx. 70% of all cases of application for a new tower objections are raised. Approximately 10% require court action (with potential delays of up to several years), the remaining 60% can be settled out of court. the legal
to 7, 8, 9, 10: Equipment order .. Tx/Antenna install
Stations are advised not to order equipment before all approvals are granted. With proper planning the lead time for the components can be sensibly utilized for e.g. site preparation (soil test, access road, Tx building modification, etc.). Time estimate for lead time is 6 months, actual construction will take another 3 months. A potential for delay exist in the northern part of the country where actual construction is limited to the summer months.

to 11.: When the station is satisfied with the technical status of the completed installation the 'program test' can start, which is regular program broadcasting. The station has to file for the FCC licence within 10 days. Grant of the licence may take several months, but has no delaying effect since the station is already on the air.

5. Potential additional study topics:

- Combine the survey results with the cost estimates developed by SS/WP3 to determine an overall figure for the transmitter/tower/antenna upgrade cost for the different systems. Compare results with outcome of NAB survey and reconcile any discrepancies.
- Determine the existence of tower cluster and antenna farms and the particular situation there.
- Separate analysis and potential follow-up on shared towers.

Appendix A: 'Lex Felkner Issues'

Implementation Subcommittee Issues

1. How should additional capacity be assigned if not all existing broadcasters could be assigned an optimum amount of additional spectrum capacity for HDTV? Options explored might include: a) some type of comparative process; b) lotteries; c) auctions; d) assigning capacity to all licensees uniformly and allow stations to acquire additional capacity needed from others.

2. Ashbaker issues. Does the Commission have authority to award ATV broadcast permission to existing licensees without accepting applications from potentially new broadcasters? How is the necessity for such a decision affected by the four predominant scenarios -- i.e. -- 6, 9, 12, & 12-simulcast? Is the definition of "simulcast" an issue? Are statutory changes needed?.

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5. Some broadcasters have complained that any ATV system which will require a new antenna site will be impractical. How pervasive is this problem?
What is the magnitude of the problem in dollars; number of stations potentially affected? Is this problem so severe as to rule out anything other than a six megahertz, compatible system?

Appendix B: Statistical significance and confidence intervals on the results:

When determining attributes (yes-no) of a finite population by random sample a hypergeometric distribution will result.

Let p' be an estimator for the true fraction p of the population possessing attribute A, $p' = x(A)/n$, n = sample size, x(A) = number of responses possessing attribute A.

The standard deviation s due to random sampling (instead of census) is then given by

$$s = [(N-n)/(N-1) * p*(1-p)/n]^{1/2}, \quad N = \text{size of population.}$$

Since p is not known, p' is a good enough estimator when calculating s.

To construct the 90% confidence interval (an interval around p' which contains the true value p with 90% certainty) the normal approximation is used and the confidence interval is given by

$$CI = p' \pm 1.67*s$$

with both s and CI being a function of p.

Example 1: 104 out of 200 responses could accommodate a second transmitter without any problems. Therefore

$$p' = 104/200 = 0.52$$
$$s = [(1183-200)/(1183-1) * 0.52*(1-0.52)/200]^{1/2} =$$
$$= 0.00104^{1/2} = 0.0322.$$
$$CI = 0.52 \pm 1.67*0.0322 = I[0.4662, 0.5738]$$

This means that, with 90 % certainty, the true value of p lies between 46.62% and 57.38%

Example 2: For 8 out of 200 respondents it will be difficult or impossible expand the existing structure to accommodate a second transmitter. Therefore

$$p' = 8/200 = 0.04$$
$$s = [(1183-200)/(1183-1) * 0.04*(1-0.04)/200]^{1/2} =$$
$$= 0.000159^{1/2} = 0.0126.$$
$$CI = 0.04 \pm 1.67*0.0126 = I[0.0189, 0.0611]$$

This means that, with 90% certainty, between 1.9% and 6.1% of all stations will have difficulty expanding their transmitter building, but at the same time I am <u>95%</u> certain that <u>no more</u> than 6.1% of all stations will face difficulties expanding their building.

n.b. To achieve a sample accuracy of ± 2(1)% at p'= 50% with 95% certainty a sample size of 803(1058) (out of a population of 1183) would have been required.

Tower Ownership/lease of antenna space

	Top 10		Top 11 - 212		Total	
	#	%	#	%	#	%
Owned	70	48.6%	174	87.0%	244	70.9%
Leased	70	48.6%	25	12.5%	95	27.6%
Don't know	1	0.7%	1	0.5%	2	0.6%
No answer	3	2.1%	0	0.0%	3	0.9%
	144	100%	200	100%	344	100%

Tower loading/sharing among sample

Answers:	Top 10		Top 11 - 212		Total	
	#	%	#	%	#	%
No answer	3	2.1%	4	2.0%	7	2.0%
No other antennas	10	6.9%	17	8.5%	27	7.8%
Small misc., but no TV or FM	28	19.4%	84	42.0%	112	32.6%
1 FM, excl or with small misc., no TV	25	17.4%	48	24.0%	73	21.2%
>1 FM, excl or with small misc., no TV	5	3.5%	13	6.5%	18	5.2%
1 TV, excl or with small misc., no FM	11	7.6%	18	9.0%	29	8.4%
2 TV, excl or with small misc., no FM	14	9.7%	6	3.0%	20	5.8%
> 2 TV, excl or with small misc., no FM	12	8.3%	3	1.5%	15	4.4%
1 TV, >= 1FM, excl. or with small misc.	6	4.2%	6	3.0%	12	3.5%
2 TV, >= 1FM, excl. or with small misc.	3	2.1%	1	0.5%	4	1.2%
>2 TV, >= 1FM, excl. or with small misc.	27	18.8%	0	0.0%	27	7.8%
total	144	100%	200	100%	344	100%

Responses to : Could you accomodate
a) a second full power TV antenna on your existing tower?
b) a second reduced power TV antenna (20 dB below NTSC) on your existing tower?

Answers on second antenna

Full power -	reduced power	Top 10		Top 11 - 212		Total	
		#	%	#	%	#	%
no answer	no answer	2	1.4%	0	0.0%	2	0.6%
don't know	don't know	1	0.7%	2	1.0%	3	0.9%
don't know	yes	0	0.0%	1	0.5%	1	0.3%
no	no answer	2	1.4%	0	0.0%	2	0.6%
no	don't know	26	18.1%	20	10.0%	46	13.4%
no	no	61	42.4%	73	36.5%	134	39.0%
no	yes	13	9.0%	42	21.0%	55	16.0%
yes	yes	39	27.1%	62	31.0%	101	29.4%
total		144	100%	200	100%	344	100%

n.b.: the combination "yes - yes" includes the answer: 2nd antenna ok with structural reinforcement (8 stations)

Summary of comments when 2nd full power antenna cannot be accomodated

Answers:

	Top 10		Top 11 - 212		Total	
	#	%	#	%	#	%
Tower is loaded to capacity	27	26.5%	70	51.9%	97	40.9%
Space problem on the tower	5	4.9%	4	3.0%	9	3.8%
Both space and load problem	13	12.7%	8	5.9%	21	8.9%
Can't tell without engineering study	5	4.9%	5	3.7%	10	4.2%
2nd Antenna ok with tower reinforcement	7	6.9%	7	5.2%	14	5.9%
special case, see separate notes	29	28.4%	5	3.7%	34	14.3%
No comment on full power antenna	9	8.8%	14	10.4%	23	9.7%
no further comment	1	1.0%	13	9.6%	14	5.9%
other comments	6	5.9%	9	6.7%	15	6.3%
total	102	100%	135	100%	237	100%

Summary of comments when 2nd full power antenna can be accomodated

Answers:	Top 10		Top 11 - 212		Total	
	#	%	#	%	#	%
No or only minor modifications	12	30.8%	13	21.0%	25	24.8%
Sidemount 2nd antenna only	2	5.1%	12	19.4%	14	13.9%
Changes underway, new situation	6	15.4%	2	3.2%	8	7.9%
Tower sharing: not ok for all stations	1	2.6%	5	8.1%	6	5.9%
Not 100% sure, but should be ok	4	10.3%	5	8.1%	9	8.9%
Other comments	2	5.1%	4	6.5%	6	5.9%
No further comments	9	23.1%	16	25.8%	25	24.8%
Only with structural reinforcement	3	7.7%	5	8.1%	8	7.9%
total	39	100%	62	100%	101	100%

Comments on accomodation of a 2nd reduced power antenna

Problem: This antenna is not defined, the answers received are very vague. In addition
The answer might depend on whether the station is VHF or UHF (significant different P(out))

Comments out of "don't know" (60 of 414):

depends on weight, load, windload, etc.	15
Engineering study is needed	17
No answer	2
No specific comment on low power antenna	14
Other comments	12

Comments out of "yes" (181 of 344):

No specific comment	79
Sidemount only	25
Tower shared, not ok for every station	15
Changes will come, new situation for answer	7
Only with reinforcement	9
No answer	46

Further split-up would not yield in statistically relevant data

Responses to :
Could You accomodate a second transmitter in the existing facility/Tx building?

Answers:	Top 10		Top 11 - 212		Total	
	#	%	#	%	#	%
Space is available, no problem	51	35.4%	104	52.0%	155	45.1%
Expansion needed, possible	17	11.8%	42	21.0%	59	17.2%
Expansion needed, difficult or impossible	14	9.7%	8	4.0%	22	6.4%
Expansion needed	5	3.5%	8	4.0%	13	3.8%
Depends on the size of the Tx	13	9.0%	2	1.0%	15	4.4%
Space will be a problem	6	4.2%	4	2.0%	10	2.9%
Don't know	8	5.6%	2	1.0%	10	2.9%
Other	2	1.4%	2	1.0%	4	1.2%
n.a.	28	19.4%	28	14.0%	56	16.3%
total	144	100%	200	100%	344	100%

Responses to :
Would the present tower site technically support the erection of a second tower?
(Question was asked if 'no' was the answer to accomodation of 2nd full power antenna and reinforcement was not mentioned as a possibility).

Answers:	Top 10		Top 11 - 212		Total	
	#	%	#	%	#	%
Yes	23	24.2%	64	50.0%	87	39.0%
No	58	61.1%	53	41.4%	111	49.8%
Don't know	7	7.4%	4	3.1%	11	4.9%
not asked, no answer	7	7.4%	7	5.5%	14	6.3%
total	95	100%	128	100%	223	100%

Accommodation of a second antenna
Detailed breakdown into TOP-10 and subgroups

Answers for high-power antenna

ADI Market	yes	reinforce	no	don't know	n.a.	sum
New York	1	1	15	1	0	18
Los Angeles	7	1	10	0	0	18
Chicago	3	0	12	0	0	15
Philadelphia	4	0	11	0	0	15
San Francisco	4	0	13	0	0	17
Boston	0	5	10	0	1	16
Detroit	2	0	6	0	0	8
Dallas	6	0	6	0	1	13
Washington	2	3	7	0	0	12
Houston	7	0	5	0	0	12
total	36	10	95	1	2	144

Subgroup	yes	reinforce	no	don't know	n.a.	sum
SG 1	7	1	12	0	0	20
SG 2	4	1	15	0	0	20
SG 3	7	1	12	0	0	20
SG 4	7	2	11	0	0	20
SG 5	10	0	10	0	0	20
SG 6	4	1	15	0	0	20
SG 7	5	1	13	1	0	20
SG 8	5	3	11	1	0	20
SG 9	3	2	14	1	0	20
SG 10	5	0	15	0	0	20
total	57	12	128	3	0	200

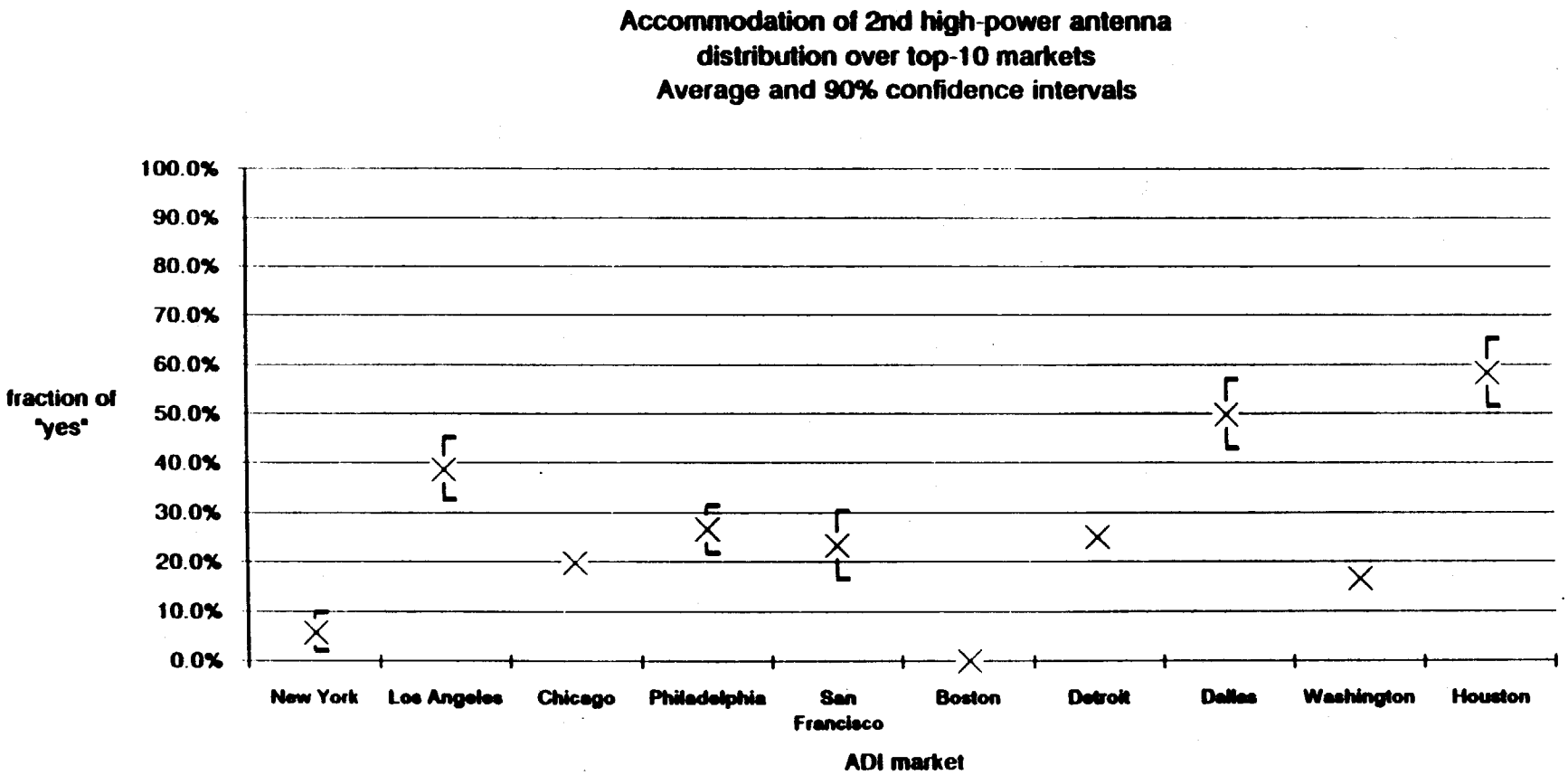
Answers for low-power antenna

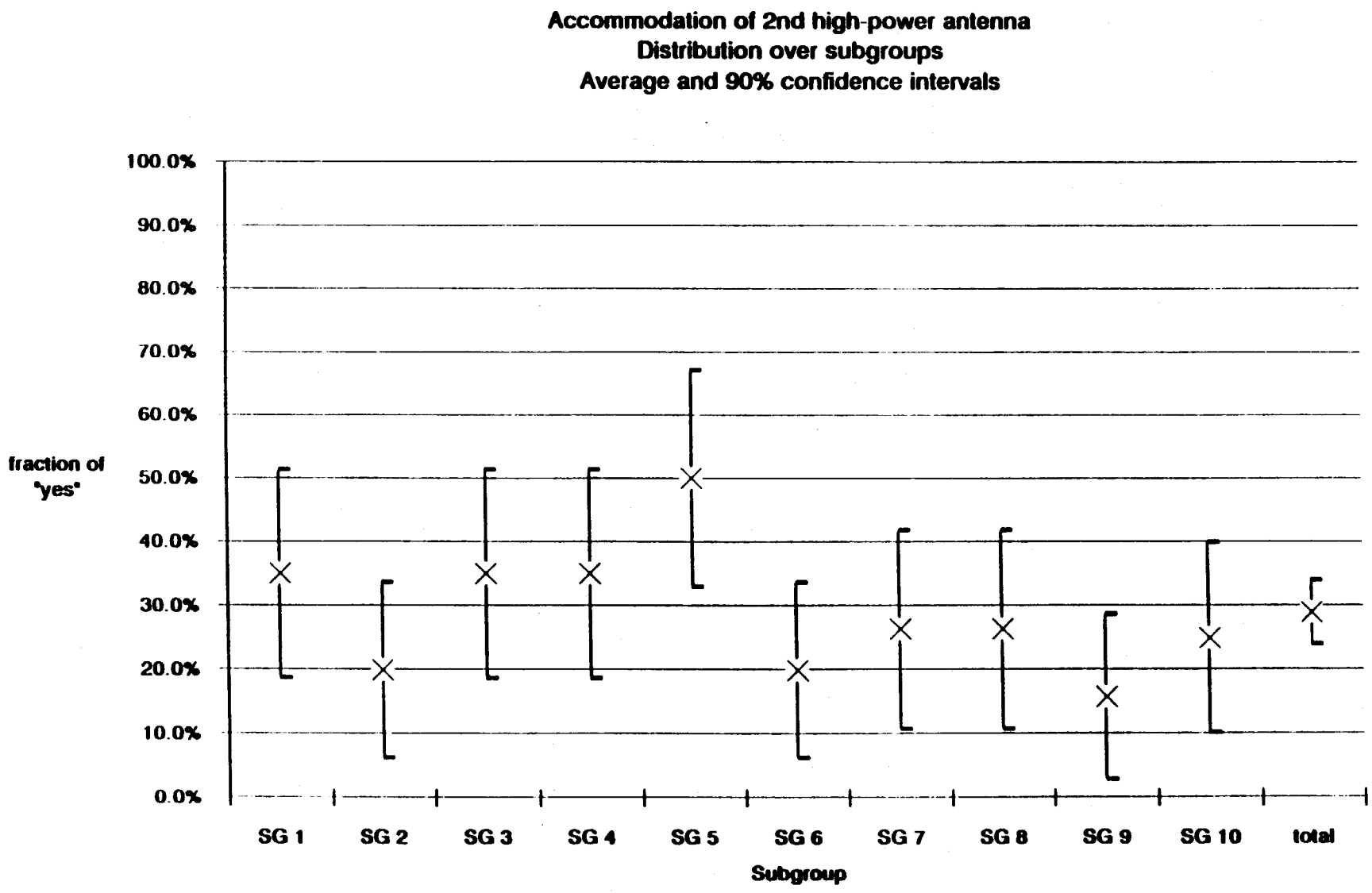
ADI market	yes	reinforce	no	don't know	n.a.	sum
New York	2	1	10	3	2	18
Los Angeles	10	0	6	2	0	18
Chicago	3	0	12	0	0	15
Philadelphia	5	0	3	7	0	15
San Francisco	10	0	4	3	0	17
Boston	0	3	7	5	1	16
Detroit	2	0	5	1	0	8
Dallas	6	0	6	0	1	13
Washington	2	0	5	5	0	12
Houston	9	0	2	1	0	12
total	49	4	60	27	4	144

Subgroup	yes	reinforce	no	don't know	n.a.	sum
SG 1	12	1	6	1	0	20
SG 2	10	1	9	0	0	20
SG 3	12	0	6	2	0	20
SG 4	10	1	8	1	0	20
SG 5	13	0	7	0	0	20
SG 6	6	1	8	5	0	20
SG 7	8	0	8	4	0	20
SG 8	8	2	6	4	0	20
SG 9	11	1	6	2	0	20
SG 10	10	1	6	3	0	20
total	100	8	70	22	0	200

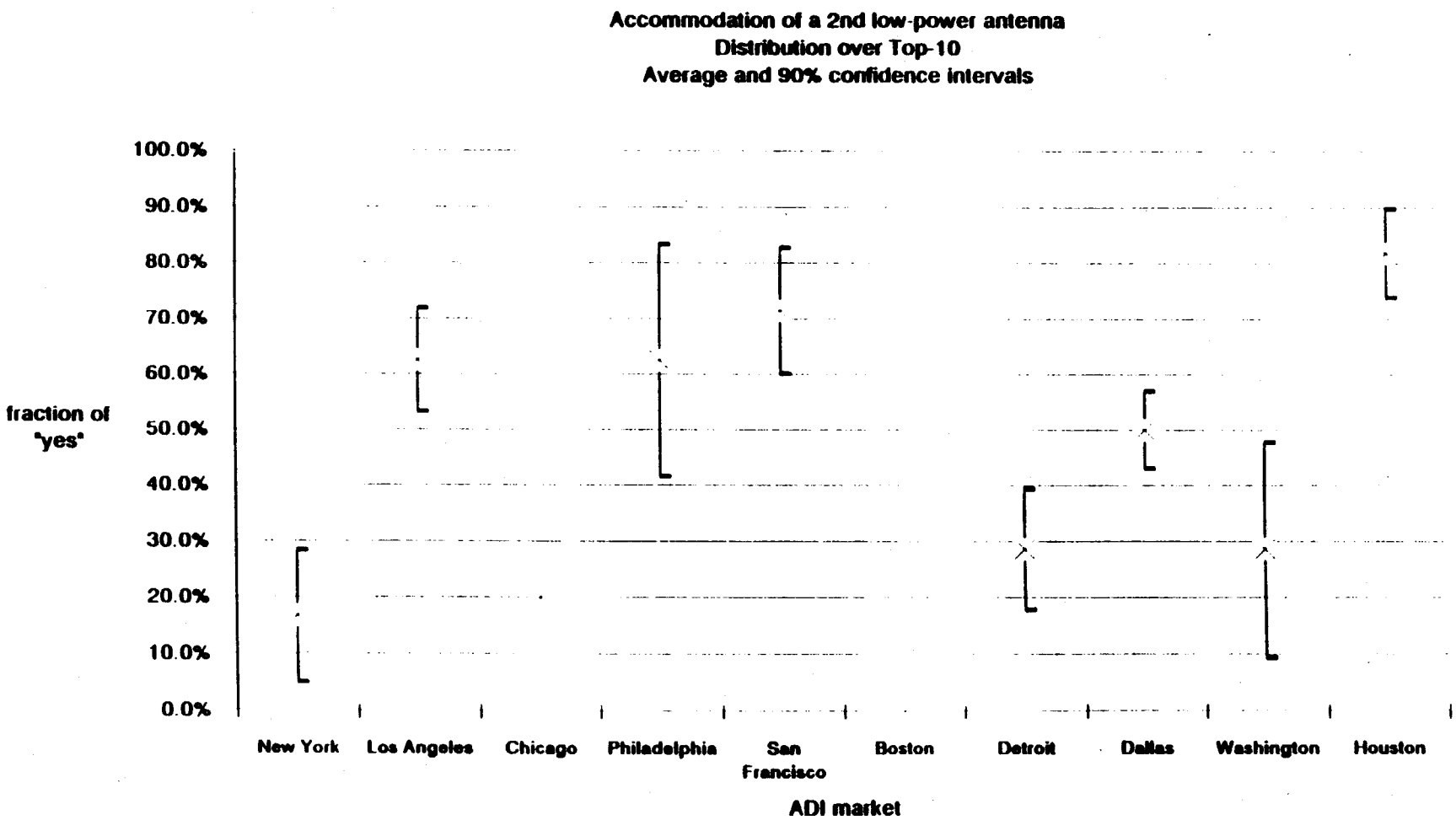
Table DET_ANT.XLS

AVE_HP1.XLC

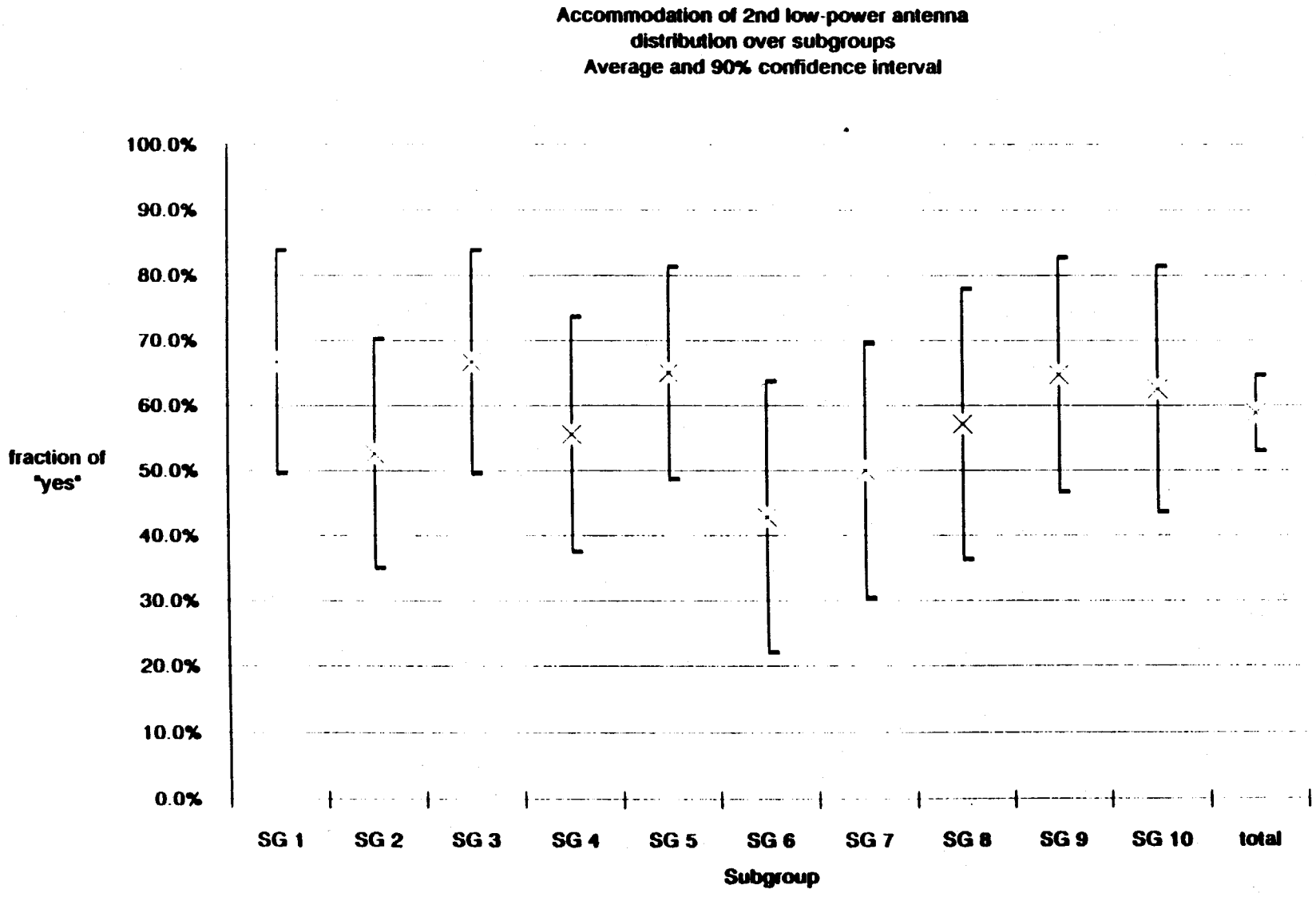

Accommodation of 2nd high-power antenna
distribution over top-10 markets
Average and 90% confidence intervals
fraction of "yes"
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
New York
Los Angeles
Chicago
Philadelphia
San Francisco
Boston
Detroit
Dallas
Washington
Houston
ADI market


Accommodation of 2nd high-power antenna
Distribution over subgroups
Average and 90% confidence intervals
fraction of "yes"
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
SG 1
SG 2
SG 3
SG 4
SG 5
SG 6
SG 7
SG 8
SG 9
SG 10
total
Subgroup

AVE_LP1.XLC


Accommodation of a 2nd low-power antenna
Distribution over Top-10
Average and 90% confidence intervals
fraction of "yes"
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
New York
Los Angeles
Chicago
Philadelphia
San Francisco
Boston
Detroit
Dallas
Washington
Houston
ADI market

AVE_LP2.XLC


Accommodation of 2nd low-power antenna
distribution over subgroups
Average and 90% confidence interval
fraction of "yes"
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
SG 1
SG 2
SG 3
SG 4
SG 5
SG 6
SG 7
SG 8
SG 9
SG 10
total
Subgroup

Attachment 3: **DRAFT**
November 3, 1989

IS/WP1 REPORT ON ATV TRANSMISSION STANDARDS

I. Introduction and Summary

Working Party 1 of the Implementation Subcommittee investigated the legal and policy basis for the establishment by the Federal Communications Commission of a transmission standard for a new terrestrial broadcast advanced television (ATV) system. Specifically, the Working Party sought to determine (1) whether the Commission has legal authority to mandate a transmission standard, (2) if so, whether it would be beneficial for the Commission to establish a transmission standard, and (3) the process by which a particular transmission standard should be adopted.

The Working Party has determined that the FCC has the legal authority to choose a single ATV transmission standard for terrestrial broadcasting, provided that the Commission observes lawful procedures and that its choice has a rational basis. The Working Party believes that the choice of a single ATV transmission standard for terrestrial broadcasting would serve the public interest, and that the choice should be based on comprehensive testing and consensus among ATV participants. The Working Party further concludes that, in order to promote competition among system developers and to facilitate the process of developing a broadly based consensus, the FCC should, at the earliest opportunity,