APPENDIX B

DECLARATION

My name is Harry J. Pappas. I am the President, the Chairman of the Board of Directors, and the Chief Executive Officer, or the Managing General Partner, or the Managing Member, as the case may be, of the following corporations, general partnerships, or limited liability companies (as indicated) that hold licenses or construction permits from the Federal Communications Commission (the "Commission") to operate the full-power analog commercial television broadcasting stations set forth below:

Name of Licensee or Permittee:	Call Sign:	City and State:
Pappas Telecasting Incorporated	KMPH (TV)	Visalia, CA
Pappas Telecasting of the Midlands, a California Limited Partnership	KPTM (TV)	Omaha, NE
Pappas Concord Partners	KTNC (TV) KFWU (TV)	Concord, CA Fort Bragg, CA
Pappas Telecasting of Nevada, a California Limited Partnership	KREN (TV)	Reno, NV
Pappas Telecasting of Lexington, a California Limited Partnership	WBFX (TV)	Lexington, NC
Pappas Telecasting of Opelika, a California Limited Partnership	WSWS (TV)	Opelika, AL
Pappas Telecasting of the Carolinas, a California Limited Partnership	WASV (TV)	Asheville, NC
Pappas Telecasting of Sioux City, a California Limited Partnership	KPTH (TV)	Sioux City, IA
Pappas Telecasting of Iowa, L.L.C.	KPWB-TV	Ames, IA

Pappas Telecasting of Southern California, L.L.C.	New	Avalon, CA
Harry J. Pappas and Stella A. Pappas	WMMF-TV	Fond du Lac, WI

As the Commission is aware from previous submissions to it on my behalf, I have spent my entire career in the television broadcasting industry, beginning in the 1970's with the inauguration of KMPH (TV). I have been involved in a direct, "hands-on" manner in the planning, construction, development, acquisition, and operation of numerous television stations, and I have approximately 30 years of experience in this field.

Various of my companies have recently been engaged in refinancing their senior debt in connection with the acquisition of, and in some cases capital expenditures to improve, some of the stations listed earlier in this Declaration. In the course of my extensive discussions with our senior lenders, I have had occasion to discuss with them the prospects of financing the construction of digital television broadcasting ("DTV") facilities. One of the recurring concerns that has been expressed in those conversations is that from a lender's perspective, DTV -- at least initially and perhaps for an indefinite period of time -- is unlikely to enjoy sufficient audience support to attract a minimum base of advertising revenue to justify the capital costs to build out those DTV facilities. It has been made clear that a critical component in maximizing audience is to ensure that cable television subscribers (which, in some of my companies' markets, represent as much as a half or more than a half of the total available viewership of the stations) can and will have cost-effective access to the advertiser-supported programming of terrestrial DTV stations. Although we have not yet formally presented a proposal to our lenders for a financing commitment for the DTV construction costs of any of our stations, I am confident that in the absence of a certainty that cable television subscribers will have such cost-effective access, our lenders will be extremely reluctant, if not absolutely opposed, to financing those costs. I also believe that the sooner that such certainty can be had, the easier and faster it will be to arrange financing for the DTV facilities construction, which will enable my companies to implement their DTV build-out plans in advance of the schedules for the completion of the

construction of their DTV stations that have been established by the Commission.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 8th day of October, 1998.

Harry J. Pappas

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Carriage of the Transmissions	)	CS Docket No. 98-120
of Digital Television Broadcast Stations	)	
	)	
Amendments to Part 76	)	
of the Commission's Rules	)	

AFFIDAVIT OF H. DEAN HINSON

H. Dean Hinson, being duly sworn, deposes and says:

1. I am H. Dean Hinson, President and CEO of Morris Network, a small broadcast group which serves the following:

1) Macon, Georgia (NBC), market 123
2) Dothan, Alabama (ABC), market 173
3) Biloxi/Gulfport, MS (Fox), market 158
4) Little Rock, AR (NBC), market 57.

I make this affidavit in support of the position of the National Association of Broadcasters in the above-captioned proceeding and in support of must carry for digital television signals.

2. Cable operators presently control access to 70 percent of all television households. Once a household is attached to cable, stations that are not on cable are blacked out, and those households are lost to the stations that are not carried. If there is no must carry rule for digital signals, that would stop development of DTV in small markets. Because DTV is an incipient service, consumers will not be aware of the benefits of digital television. Consumers in the smaller markets such as ours would have very little reason to consider purchasing a DTV receiver without a carriage rule that ensures that they will have digital signals to display on those receivers. Even if broadcasters use their NTSC signal to promote the benefits of DTV, consumers will not respond since the signals will not be available to them over cable.

3. Complying with the FCC's mandate to convert to digital television is costly. I am not sure whether smaller market stations, whether network affiliates or not, can survive the economics of the conversion to digital television unless there is a must carry requirement for the digital signals during the transition. I do not foresee that small market stations will be able to successfully negotiate with cable systems for carriage of

their DTV signals. Unlike the situation with NTSC analog signals, where many stations were able to secure retransmission consent agreements, the DTV signals will not have established audiences that cable systems would offend by lack of carriage. Also, NTSC retransmission consent negotiations have all occurred in an environment where must carry rules apply. If cable has an entirely free hand, systems' willingness to negotiate will be much reduced.

4. Without the assurance of carriage that must carry will provide, it is likely that many small market stations will have great difficulty in meeting the FCC's construction timetable. Even if they do, the financial burden of putting a digital signal on the air without assured reception by the vast majority of television households may jeopardize the news, information, entertainment, and community service that free over-the-air television has provided to consumers.

5. For these reasons, I strongly urge the Federal Communications Commission to require cable systems to carry the digital signals of all television stations.

H. Dean Hinson

Sworn to and subscribed before me this 9 day of October, 1998.

JOSEPH W. WELCH NOTARY PUBLIC COMM. EXP 06-25-2001 PULASKI COUNTY, AR

Notary Public

STATEMENT OF DEAN VALENTINE

1. My name is Dean Valentine. I am President and CEO of the United Paramount Network ("UPN").

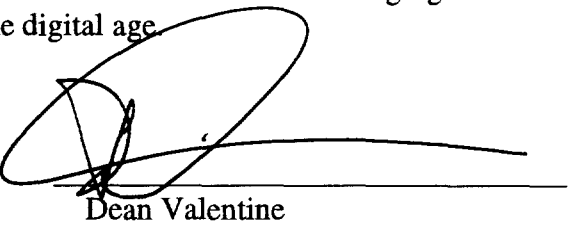
2. UPN is a network of broadcast television stations that was officially launched in January of 1995. The stations that are affiliated with UPN are largely stations that are smaller or less established than the stations that are affiliated with ABC, CBS, NBC or Fox. Together with another network that began operations at around the same time, UPN was the first major effort to bring competition to the established broadcast networks since the development of Fox. UPN has been successful in gaining adherence from viewers, and it is generally the fifth or sixth most watched signal on cable systems.

3. UPN's affiliates have generally been dependent on the must carry provisions of the Cable Act to ensure their carriage on the cable systems in their service areas. For these same reasons, UPN and its affiliates will need must carry rights in order to comply with the Federal Communications Commission's timetable for transition from analog to digital television service. Because UPN's affiliates are smaller and newer than the affiliates of the more established networks, the financial investment required to begin digital service will be more daunting to them. If there is no assurance that the digital signals of UPN affiliates will reach cable subscribers that make up two thirds or more of the television audience, it will be exceedingly difficult for UPN and its affiliates to meet the Commission's ambitious schedule for conversion to digital service. It is extremely important that the FCC prevent the erection of barriers like cable carriage problems which could impede the development of digital television – particularly for UPN's affiliates and other smaller television stations.

4. Most of UPN's affiliates are now carried on cable systems pursuant to must carry. Most cable companies for competitive reasons will not be motivated to negotiate carriage of UPN's digital programming on anything approaching reasonable terms. In addition, negotiations for carriage of digital signals would be difficult if some of the UPN stations chose to provide multiplexed services in order to help finance their conversion to digital.

5. Although most of the UPN stations are not required to begin digital service until 2002, meeting that target will require investments in the near future in new equipment and facilities. It is important that they receive assurance as soon as possible that their digital signals will be carried on cable systems in order to make it possible for them to finance these investments. Development of any new technology like digital television is always difficult and expensive.

6. If must carry rights are not extended to the digital signals of UPN's affiliates and other stations affiliated with less established networks, the diversity of signals and voices available to television viewers in the digital age, particularly television viewers who are dependent upon over-the-air broadcast signals, will be substantially diminished. If the benefits of new programming sources that have been created over the past decade are to be maintained, it is essential that the stations who are local outlets for new and emerging networks have secure must carry rights in the digital age.



Dean Valentine

October 8, 1998

FOR THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

[Caption Omitted]

DEFENDANTS' JOINT SUBMISSION OF EXPERT AFFIDAVITS AND REPORTS IN SUPPORT OF MOTION FOR SUMMARY JUDGMENT

VOLUME II.A

* * * *

Dated: May 26, 1995

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

[Caption Omitted]

AFFIDAVIT OF LUCIE SALHANY

Lucie Salhany, being first duly sworn, deposes and states as follows:

1. My name is Lucie Salhany. I am the President and Chief Executive Officer of the new United Paramount Network ("UPN").

2. UPN is a new network of broadcast television stations, officially "launched" in January of 1995.

* * * *

8. Based on my experience in broadcasting, and in particular on my experience as President of UPN, I have a strong opinion about the importance of cable carriage to the viability of a new broadcast network, and about the importance of the "must carry" provision of the 1992 Cable Act to such carriage.

9. In order to be viable, a broadcast network such as UPN requires that its affiliated broadcast stations be carried by cable operators in their respective markets. That is so because over 60% of American TV households are served by cable, and many of those TV households no longer have an antenna capable of receiving over-the-air signals. Thus, if a broadcast station is not carried on the cable system in its market, that broadcast station would be deprived of a substantial portion of its potential audience.

10. Broadcast networks are dependent on advertising revenue for all of their operating revenue. Advertising

revenue, in turn, is solely dependent on the number and type of TV viewers who will potentially be exposed to the advertisement. The older U.S. TV networks (ABC, CBS and NBC) can reach virtually 100% of U.S. viewers through their affiliated stations; Fox, an eight-year-old network, reaches almost as many viewers through its affiliate system. Any broadcast network seeking to compete with those four networks would be at a competitive disadvantage if it reached fewer viewers. And, in my view, a network must reach at least 80% of the U.S. audience just to be viable in the national TV advertising marketplace.

11. To assure that a network advertiser is reaching the audience it seeks, it is important that as much of a network's coverage as possible be "in pattern" (i.e. broadcast at the same time on the same night in all local markets), particularly for a new network seeking to establish a "network" identity with advertisers. Thus, for such a network, simultaneous carriage by cable systems, is critical.

12. In general, cable operators are less likely to drop or refuse to carry an established broadcast station than they are to drop or refuse to carry a new or small broadcast station. For that reason, it is largely the newer or smaller broadcast stations who have utilized the "must carry" provision of the 1992 Cable Act; the older, more established broadcast stations have largely been carried voluntarily by cable operators pursuant to the "retransmission consent" provision of that Act.

13. When we thought about launching the UPN network, we quickly realized that many of the established broadcast stations were already affiliated with one of the four networks. This meant, in general, that the affiliate stations of UPN would consist largely of broadcast stations that were newer, smaller, weaker or less established than the affiliates of the existing networks.

14. This meant, as a consequence, that the potential affiliate stations for the UPN network were more likely to be dependent on the "must carry" provisions of the Cable Act for carriage on the cable systems in their respective markets. Put another way, absent the "must carry" rule, there would have been less assurance to those newer, smaller, or weaker stations (and thus to UPN and to the advertisers who might advertise on UPN) that those broadcast stations would be carried on the cable systems in their respective markets.

15. A critical consideration to us in the launch of the UPN network was the assurance provided by the "must carry" rules that potential affiliates of UPN could achieve broad cable carriage. In a very real and material sense, "must carry" has thus reduced the risk attendant to a new network start-up and thereby encouraged the entry of the UPN network.

* * * *

May 23, 1995

LUCIE SALHANY
/s/ Lucie Salhany

APPENDIX C

NCTA
NATIONAL CABLE TELEVISION ASSOCIATION

DECKER ANSTROM
PRESIDENT & CHIEF EXECUTIVE OFFICER

October 6, 1998

Mr. Edward O. Fritts
President and CEO
National Association of Broadcasters
1771 N Street, NW
Washington, D.C. 20036

Dear Eddie:

Thank you for your letter regarding digital television. The cable television industry shares your enthusiasm for bringing consumers the next generation of television, and cable companies are hard at work to ensure that the transition from analog to digital brings them the best TV has to offer.

Specifically:

- Cable companies will invest over $12 billion over the past two years alone to upgrade their systems to provide customers with the best digital television.
- The OpenCable digital set-top box being developed by CableLabs will ensure that cable customers can receive the full range of digital programming to be offered by cable and broadcast networks.
- Cable, working with the motion picture industry, is working with the electronics industry to nail down the final details of the IEEE 1394 ("firewire") connection that will ensure needed copyright protection.
- Cable networks like HBO, Discovery and Madison Square Garden Network are moving ahead with HDTV programming. Just this week, HBO placed orders with General Instruments for HDTV equipment.

As you know, cable companies are in detailed discussions with broadcasters about carriage arrangements—discussions that broadcasters have publicly said are constructive and promising. As broadcasters develop specific details on the programming they will offer, and as cable systems add needed capacity, we're confident they will carry digital broadcast programming consumers want to watch ... to do otherwise would be foolish.

1724 MASSACHUSETTS AVENUE, N.W.
WASHINGTON, D.C. 20036-1969
TEL: (202)775-3651 FAX: (202)775-3695

Of course, there continues to be a great deal of uncertainty about what some of these broadcast programming decisions will be. Just this past Sunday in the *New York Times*, Sinclair Broadcast Group President David Smith indicated he doesn't plan to offer HDTV and outlined very general ideas to divide each of his individual broadcast signals—64 so far—into five or six digital channels.

I'm sure you agree with us that the transition from analog to digital is an evolutionary, complex process that will take time to work out and is best resolved by the marketplace, not the government. And, as reported in last week's *Communications Daily*, CBS head Mel Karmazin said "it's 'hypocrisy' for broadcasters to push for deregulation in most areas while seeking digital must-carry."

Given your keen interest in the First Amendment, we're also sure you agree with us that cable network programming, like C-SPAN, deserves the same constitutional protection as broadcast programming.

We look forward to continuing our work with you on this critical collaboration to bring customers the broad range of analog, digital and HDTV programming they want.

Sincerely,

Decker Anstrom

OPEN MIKE

Cable's digital efforts

EDITOR: We were encouraged that your Aug. 31 editorial, "Grand Alliance II," reaffirmed the view that the transition from analog to digital television should be free of "the direct hand of government."

But we are mystified by your unsubstantiated opinion that the cable industry is not playing a constructive role in this transition. As you regularly report elsewhere in your publication, the facts demonstrate that cable is at the forefront of this transition.

■ Cable companies will have invested more than $12 billion over the past two years alone to upgrade their systems to provide customers with the best digital television.

■ The OpenCable digital set-top box being developed by CableLabs will ensure that cable customers can receive the full range of digital programming to be offered by cable and broadcast networks.

■ Cable, in conjunction with the motion picture industry, is working with the consumer electronics industry to nail down the final details of the IEEE 1394 ("firewire") connection that will ensure needed copyright protection.

■ Cable networks like HBO, Discovery and Madison Square Garden Network are moving ahead with HDTV programming.

■ Cable companies are in detailed discussions with broadcasters in the top 10 markets about carriage arrangements—discussions that broadcast networks have publicly said are constructive and promising.

The transition from analog to digital is an evolutionary process that is extremely complicated, will vary from market to market, and will be messy at times. What the cable industry is doing—and will continue to do—is to work steadily to bring our customers the range and quality of analog, digital and HDTV programming they want.—*Decker Anstrom, president, National Cable Television Association, Washington (via Broadcasting & Cable Online: www.broadcastingcable.com)*

POLICY

Legal Issues Head Digital Must-Carry

By TED HEARN

WASHINGTON — Buoyed by last year's court decision that preserved analog must-carry, the broadcasting lobby is starting to pressure the Federal Communications Commission to extend the same rights to digital signals.

Meanwhile, the cable industry, fearing the involuntary surrender of scarce channel capacity to the competition, is working the same FCC offices, urging support for a free-market solution.

Aides to FCC officials said they expect the agency to launch a rulemaking by the end of June, less than one year before affiliates of ABC, CBS, NBC and Fox are required to seed the airwaves in the top 10 TV markets with digital product.

"I think that this thing is headed for a major fight between the cable folks and the broadcasters," cable attorney Steve Ross said. "I don't see a reasonable resolution to this problem."

Yet Decker Anstrom, president of the National Cable Television Association, predicted a peaceful outcome if the FCC refrains from regulating.

"We have discussions going on with the broadcast networks, and we think that this is going to get worked out in the marketplace among sensible people," he said.

Attempts at a compromise have been going on for nearly one year. Some TV stations (no names have surfaced) have apparently used retransmission consent to secure carriage of their digital signals, making the outcome of the FCC rulemaking less of a concern.

"I have heard the same thing," said Stephen Effros, president of the Cable Telecommunications Association (CATA). "I think that it is experimental."

Ross said he advised cable clients to reject digital carriage agreements.

"I crossed it out and advised my clients not to agree to that in the last round," Ross said. "Most of the sophisticated operators were not going to buy that."

Inside the FCC, staff said that at least for now, they have more questions than answers on the complex subject of digital must-carry.

FCC chairman William Kennard has avoided tipping his hand. Cable sources said Kennard's posture is deliberate because FCC attorneys have advised him that digital must-carry may be constitutionally problematic.

As a legal matter, The National Association of Broadcasters claims that Congress, in the 1992 Cable Act, authorized the FCC to impose digital must-carry on cable operators.

For the next nine years, the NAB would have cable operators carry both analog and digital signals. Yet the NAB's dual-carriage rules would remain in effect beyond 2006 in those markets where fewer than 85 percent of households did not own or lease digital receivers or converters.

"Our position is that cable operators should be required to carry, without material degradation, everything within the 6 megahertz," an NAB source said. "Whether it's HDTV [high-definition television], or multiplexing, or some data, they should carry everything."

Broadcasting sources said fears that digital must-carry policies would be vulnerable in federal court were misplaced because the rationale for analog must-carry and digital must-carry was the same.

"The fundamental issues that the [Supreme Court] decided in the [1997 must-carry] case were that the cable industry is an important gatekeeper to broadcast signals and broadcast signals are an important aspect of American life," said Gerry Waldron, a broadcast attorney with Covington & Burling.

Cable industry lawyers said the Supreme Court's narrow holding to affirm must-carry provisions in the 1992 Cable Act pertained to analog signals and not to digital signals.

"Congress in 1992 left open the question about whether or not there should be [digital] must-carry and what kind of must-carry there should be. It's even more ambiguous than that," said Daniel Brenner, the NCTA's vice president of law and regulatory policy.

Cable leaders said they were confident that digital must-carry rules would be viewed by the courts as excessive, especially if a substantial number of cable networks are bumped to accommodate digital TV signals that are merely prettier versions of their analog twins.

"If the FCC imposes a broad must-carry that extends analog to digital, maybe the whole thing goes down next time," Anstrom said.

When cable tried to topple the analog must-carry rules, industry lawyers had to cope with an internal flaw in their argument: They told the courts that must-carry was a burden on channel capacity, while maintaining that must-carry was unnecessary because cable operators had been carrying 95 percent of local stations before they were forced to.

This led the courts to ask: How can must-carry be such a burden on operators when so few stations actually needed its protection?

Effros said cable's assault on digital must-carry would likely succeed because cable operators have no history of carrying digital TV stations, and they would have an easier time demonstrating harm to dropped cable networks.

"This is not a mirror of the old must-carry debate, and the broadcasters don't understand that yet," Effros said.

Cable industry leaders said they have solid consumer protection reasons for allowing carriage of digital TV signals to flow from negotiations with broadcasters, instead of from FCC fiats.

Until a cable system with no free channels can integrate incompatible digital broadcast and digital cable programming services at the headend, a cable subscriber will lose one analog cable network for each digital TV signal.

Under that scenario, cable subscribers in New York and Washington, D.C., for example, would face losing 14 cable networks.

"The transition to digital should not disenfranchise existing cable programming services," said Leo J. Hindery Jr., president and chief operating officer of Tele-Communications Inc. "There is no way to avoid the fact that digital must-carry would require cable operators to drop many existing services."

Anstrom said thousands of cable subscribers would lose multiple cable networks so that a few wealthy cable subscribers could view digital TV signals on their $10,000 HDTV sets.

"I think that you would see an uproar. That's what a [digital] must-carry requirement means in this transition," Anstrom said.

Broadcasters and cable operators conceded that the TV networks and their affiliates can use retransmission consent to guarantee cable carriage of their digital signals.

But broadcasters insisted that free-market negotiations failed to protect independent TV stations prior to enactment of the analog must-carry law in 1992 — a lesson worth remembering as the digital must-carry debate unfolds.

"The cable argument that these can be worked out in private negotiations is baloney. That's why Congress passed must-carry," an NAB source said. "The idea that every station in a market can work out carriage with the cable operator, to me, is really misleading." MCN

Anstrom: Must-Carry Madness

WASHINGTON — National Cable Television Association president Decker Anstrom called it must-carry madness. And that's the potential fate of the basic tier if cable operators are forced to carry digital-local-broadcast signals.

Under current law, a subscriber is required to buy the basic tier as a prerequisite to the purchase of cable programming services like Cable News Network and premium services like Home Box Office.

While operators may include popular cable networks on basic, many prefer to provide a low-cost basic tier consisting of local-broadcast and public-access channels.

It's entirely possible that the Federal Communications Commission, in order to expedite the transition to digital and to hasten the return of broadcasters' analog spectrum, will couple a digital must-carry requirement with a separate mandate that cable operators include digital-TV signals on the basic tier.

One result of that action could be higher cable rates. Subscribers would have to pay more not only for a duplicative set of local-TV signals, but also for a new set-top box that can display analog and digital signals on both analog and digital TV screens.

"It would make cable more expensive ... at the time when the FCC is worried about cable prices going up," Anstrom said, calling the digital basic tier scenario "must-carry madness."

Fusing must-carry to a basic tier carriage mandate would also force a shift in consumer spending: The more money subscribers need to buy basic, the less money they presumably have to buy cable programming services.

A National Association of Broadcasters official said that trade group supports basic-tier carriage of digital-broadcast signals.

And Gerry Waldron, a broadcast attorney with Covington & Burling, said his clients have not discussed whether to press for basic-tier carriage of digital signals. —*Ted Hearn*

Cable World Bandwidth Debate: Just How Much Will Be Enough?

By Jim Barthold

As long as there has been a cable industry, there have been dire predictions that there's not enough bandwidth to accomplish everything. Today, with the specter of must-carry high definition television (HDTV) looming and the increased popularity of high-speed data, cable telephony and even video-on-demand, the whispers are getting louder.

There just isn't enough bandwidth.

"I'll tell you what the determining factor is going to be. It's the amount of broadcast programming that the operator wants to put out, programming content that he just wants to spray all over the homes in his area. That's what really chews up the bandwidth," said David Grubb, marketing VP in General Instrument Corp.'s transmission network systems business unit.

Paul Connolly, VP-marketing and network architecture with Scientific-Atlanta Inc.'s transmission network systems is equally alarmist.

"The biggest bandwidth hog is still obviously analog channels, if you assume with your business case that you're competing with direct broadcast satellite so you want a lot of analog channels," he noted.

So, how much bandwidth is enough?

"We think 20 GHz is what we want," joked Tony Werner, senior VP-engineering and technical operations for Tele-Communications Inc.

On a serious note, Werner, and other industry leaders, feel that the 750 MHz plateau on which the industry has settled, with some deviations to 450,

550 and 860, is a comfortable place to be.

"The issue isn't how much is enough. I think 750 is certainly enough," Werner said.

Of course, if 860 was available at the right price, what then?

"The analogy I use is if you're out buying a house and all you need is 3,000 square feet, but there's one over there that's 3,800 square feet for an extra $2, most people will opt for the extra 800-square feet, even though there's absolutely no requirement today or in the future," he continued.

That's because the way the industry looks at bandwidth has changed.

"Digital broke the paradigm of you upgrade to the next technology bandwidth, keep adding 6 MHz channels and when you run out, you run back to the vendors and ask, 'What can you do for me today?'" explained Alex Best, senior VP-engineering for Cox Communications Inc. "The only freedom you had to add more channels was to add more bandwidth. Now we have two additional degrees of freedom."

One of those is using digital compression more efficiently by moving from 64 to 256 QAM (Quadrature Amplitude Modulation). The second is subdividing fiber-fed nodes based on customer demand.

MediaOne is pursuing both routes, said senior VP-engineering and technology Jerry Wolfer.

"What we have going for us, versus what you might have had when you went to 450 or 550, is that we've moved to digital and digital has given us these modulation efficiencies," he explained.

This digital capability, he pointed out, lets systems compress two HDTV signals into a single 6 MHz slot - despite whatever format is used, effectively obliterating the must-carry threat.

"We're figuring 18 megabits per channel, and that's 1080i (interlaced), that's 720p (progressive), that's whatever you want it to be," Wolfer pointed out. "I built the plant here around 1080i, knowing that

there's some upside in that because not everyone is going to do 1080i."

If digital solves the HD problem, then node size does the job for contention-based services such as telephony, high-speed data and video-on-demand.

"If they're (data services) extremely popular and people are using high bandwidth services over them, we can subdivide our nodes to make them smaller," said Jim Chiddix, chief technical officer for Time Warner Cable. "If they're smaller, we get to re-use the frequencies. The same is true of video-on-demand. With just two or three 6 MHz slices we can serve a lot of video-on-demand customers and, if we need to subdivide those nodes, we can do that there as well."

While every engineer feels that 750 is plenty, Werner sees places where 450 or 550 will suffice.

"You have to have enough bandwidth to offer high-speed data, perhaps some telephony, which is likely to be embedded in the high-speed data under an IP (Internet Protocol) scenario," he explained.

Relinquishing two or three channels for those services still leaves 62 analog channels in a 450 MHz system, he noted. Werner would then take 12 of those channels and compress them into a digital tier, leaving a 50-channel analog offering.

"That's probably fairly competitive," he said.

It's also on the low end. Cox, for one, uses 650 MHz of its bandwidth for analog and devotes the rest to digital, telephony, high-speed data and whatever else is coming up in the future, said Best. He can also take the 50 MHz he has dedicated to near video-on-demand and switch it to pure VOD, if that becomes necessary, he said.

"We have 180 channels of video, 40 channels of audio, a (program) guide, high-speed data, telephony service and no obvious need today of saying we need to do something else," he said.

Impact

Best said that no matter how wildly popular high-speed data becomes, or how much bandwidth consumers

grab, Cox will be the last to feel the impact.

"Before I have a problem @Home (Network) is going to have a problem. Before @Home has a problem, the true Internet backbone infrastructure has a problem. Long before I have to allocate more 27 megabits channels for the Internet, @Home is going to have to beef up its backbone infrastructure," Best predicted.

"I can handle 10 of my 50 Internet customers trying to stream video down my cable system long before @Home can handle thousands of nodes of five people trying to stream video. And long before they have a problem the Internet is going to have a problem," he added.

That's because the cable plant is amazingly flexible, said Wolfer. For wildly successful services, he said, he'll just throw in block converters.

"At the node, when you block-convert you have all this fiber to return on," he said. "At each node we have 500 homes passed, but that usually represents four trunk lines ... running off there that have 125 homes per trunk on the coax. I have four 750 MHz shots going out of that node and I can block convert any single one of those.

"I just can't see where I'm going to run out of capacity on high-speed data because I have six fibers sitting at my node and I really have four 750 MHz equivalents on that node," he continued.

While most agreed that 750 MHz is more than enough, there were a few signs that if 860 or even 1 GHz became economically feasible, it wouldn't be ignored.

"If I can install a 1 GHz upgrade at a 5% premium to 750, I'll do it," said Best. "If they (vendors) want a 50% premium, I think I'll take my chances on 256 QAM and subdividing the nodes."

Wolfer agreed, but pointed to the time-to-market factor for MediaOne to deploy its passband networks versus other options, such as fiber-to-the-curb baseband models being proffered by telcos as a reason for not deviating from the 750 plan.

"My argument is I can get to market faster; I can get

to market with more bandwidth; and I can get to market with more reliable product," he contended.

(August 10, 1998)

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APPENDIX D

STRATEGIC
POLICY
RESEARCH

7979 OLD GEORGETOWN ROAD SUITE 700 BETHESDA, MARYLAND 20814 (301) 718-0111 (301) 215-4033 fax
EMAIL spri-info@spri.com

Cable System Capacity: Implications for Digital Television Must-Carry

John Haring
Harry M. Shooshan III
Joseph H. Weber*

Prepared for the
National Association of Broadcasters

October 13, 1998

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Executive Summary

This paper examines the issue of whether cable television systems are likely to have the capacity to carry the full digital signal of local television broadcasters during the transition to terrestrial digital television which has been mandated by Congress. In crafting a digital must-carry rule, it is important for the Commission to keep in mind that, in the absence of such a rule, the cable industry has little incentive to make it a smooth transition. The paper identifies three market failures which make it unlikely that reliance on "market forces and private agreements" (in the Commission's words) will be effective in achieving the statutory goals.

The paper discusses how the cable industry's rhetoric during litigation over the existing must-carry rules proved baseless and unpersuasive to the Supreme Court. Notwithstanding the repeated claims of cable operators and cable programmers, the sky did not, in fact, fall. Must-carry stations occupy a relatively small percentage of the capacity of most cable systems today, and cable program services (*e.g.*, C-SPAN and BET) continue to grow both in number of subscribers and in number of cable systems on which they are carried.

Cable channel capacity is constantly being expanded as system operators rebuild or modify their systems to incorporate the latest technology (*e.g.*, fiber optics, new modulation and compression techniques). In looking at the cable industry of today, we find that (1) channel capacity has been expanding significantly over time; (2) existing channel capacity is quite substantial, particularly in large markets where the Commission has required digital television service to be rolled out first; (3) significant unutilized channel capacity currently exists; and (4) the capacity occupied by local broadcast stations (those eligible for must-carry) is well below the 33 percent statutory ceiling. These data provide *conservative* measures on a variety of counts (*viz.*, they are historical data, capacity is being expanded, technical advances are constantly increasing the carrying capacity of given bandwidth, *etc.*). They suggest that there are no *technical* constraints limiting the carriage of digital broadcast signals as the digital transition commences. Existing unused capacity in most cases could easily support carriage of new digital broadcast signals when the initial stations begin operation later this year.

In looking ahead, we find that cable systems will be expanding capacity substantially over the course of the next five years during which the transition to digital television is expected to take place. This expanded capacity will come about as cable systems continue to expand the capacity of their analog plant and deploy their own digital capability. Given the technological opportunities and potential new service opportunities that the cable industry has already embraced, we determine that a number between 200 and 500 mixed digital and analog channels is readily within the reach of most operators within the next few years and is a reasonable number for the Commission to use in estimating the "burden" of full digital television must-carry.

The paper discusses how system upgrades to accommodate high-speed Internet access and voice telephony (as well as the potential for video telephony) provide cable operators with a window to deploy more than enough additional capacity to carry the new digital broadcast signals and add new cable services. Viewed from this perspective, the incremental costs to cable operators of meeting a full digital television must-carry requirement will be minimal.

The paper emphasizes that the Commission must act now so that broadcasters and cable operators can plan for the digital transition.

I. Introduction

The Commission's *Notice* solicits comment "on *whether* to amend the cable television broadcast signal carriage rules . . . to accommodate the carriage of digital broadcast television signals."[1] The Commission is directed by statute to establish requirements "necessary to ensure carriage" of digital television signals.[2] The Commission notes that it is directed (in the legislative history) to "conduct a proceeding to make any changes in the signal carriage requirements of cable systems needed to ensure that cable systems *will carry* [digital] television signals."[3] We respectfully suggest that, based on the analysis prepared by Jenner & Block for the NAB in this proceeding, the relevant policy question is not whether to amend, but *how* specifically to amend the cable carriage rules to meet statutory objectives.

The Commission notes that, in addition to the goal of "retention of the strength and competitiveness of broadcast television" (the goal whose achievement primarily underlies existing carriage requirements), Congress also seeks "the successful introduction of digital broadcast television and the subsequent recovery of the vacated broadcast spectrum."[4] Thus, given the critical role digital carriage requirements will play in the successful realization of this latter goal, an important *additional* public policy rationale in favor of digital carriage requirements has been enunciated for consideration in establishing such requirements.

In considering how to amend its existing must-carry rules to facilitate the transition to digital broadcast television, the Commission must bear in mind the economic reality that, in the absence of such rules, the cable industry has little reason to make it a smooth transition. In particular, cable system owners realize none of the external benefits that cable carriage produces for the 35 percent of television households that do not subscribe to cable. Moreover, as a local monopolist, each cable system has a substantial advantage in bargaining for carriage rights which renders a negotiated outcome consistent with statutory objectives all but illusory.

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1 *In the Matter of Carriage of the Transmission of Digital Television Stations*, CS Docket No. 98-120 (July 10, 1998), ¶ 2.7

2 *Ibid.*

3 *Ibid.* Reference in footnote 1.

4 *Ibid.*, ¶ 1.

While the Commission's *Notice* suggests a number of possible scenarios for new digital television must-carry rules, our analysis supports a full must-carry requirement, by which we mean a rule that requires every cable system to provide enough capacity to carry the full digital signal of every local broadcaster.[5]

[5] We recognize that the statute exempts from the carriage requirement any ancillary service that is offered on a subscription basis. However, as a practical matter, cable operators may well agree to carry such a service rather than incur the costs of stripping it out of the broadcast signal or otherwise blocking it. Our analysis shows that cable systems can be expected to have *the capacity* to carry the entire digital signal.

II. Focus of the Report

In its *Notice*, the Commission specifically states that "[d]etermining a cable operator's capacity when digital content is involved and therefore how many commercial television station signals must be carried" is an issue in this proceeding.[6] The Commission raises a number of questions regarding the appropriate definition of cable system capacity and how technical advances can be expected to affect system carrying capacities as the future unfolds. This report focuses on these questions and issues, and attempts to meet the Commission's need for good technical information.

The Commission seeks quantified estimates and forecasts of usable channel capacity as well as methods for forecasting usable channel capacity and potential broadcast needs, nationally, during the transition to digital broadcasting. We have assembled a variety of evidence that should provide the Commission with a good data base on which to base carriage policy.

The report is organized in the following manner: We start by briefly discussing several important economic considerations related to cable's role in the transition to digital television. We then examine the analogous set of issues as they were posed and resolved in the judicial proceedings that led to the Supreme Court's rejection of a constitutional challenge to the existing must-carry requirements. Notwithstanding complaints and dire predictions by cable system operators and cable programmers, the Supreme Court concluded that "the actual effects are modest" and that "[s]ignificant evidence indicates that the vast majority of cable operators have not been affected in a significant manner by must-carry."[7]

The Commission now asks "how the court's reasoning and conclusions would apply in the context of this proceeding."[8] We seek directly to provide an answer to this question. First, we provide a detailed picture of the actual capacity of existing cable systems utilizing one of the leading data sources on this topic. This snapshot picture of the (near) current state of play supplies a reality

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6 *Op cit.*, ¶ 58.

7 *Turning Broadcasting System v. FCC ("Turner")*, 117 S. Ct. 1174 (1997), at 1198. We note that we supplied the evidence upon which the Court primarily relied in reaching this conclusion. *See* Expert Declaration of Harry M. Shooshan in *Turner Broadcasting System, Inc., et al., Plaintiffs, v. Federal Communications Commission, et al., Defendants,* U.S. District Court for the District of Columbia, Docket No. C.A. No. 92-2247 (and related cases C.A. Nos. 92-2292, 92-2494, 92-2495, 92-2558) (TPJ), Expert's Report filed April 21, 1995; Expert Declaration filed May 25, 1995 ("Expert Declaration of Harry Shooshan").

8 *In the Matter of Carriage of the Transmission of Digital Television Stations*, CS Docket No. 98-120 (July 10, 1998), ¶ 2.7, *Op cit.*, ¶ 15.

check/factual grounding both on which to formulate policy and from which to extrapolate future trends. Cable plant is undergoing significant modification and expansion as system operators seek to capitalize on new business opportunities afforded by technology and evolving consumer demands.

We then go on to describe these changes and assess their implications for the system capacity issues posed in this proceeding. Our view of the future is analogous to a (rapidly) moving picture with cable capacity expanding based on new enterprise opportunities and changing customer needs such that at any given time the "burden" of digital TV must-carry can be expected to be *de minimus*. Any additional "burden" on cable operators will be temporary since, at the end of the transition period, broadcasters will have a single signal subject to the must-carry requirement. Moreover, since full digital TV must-carry can be expected to accelerate the transition (and, thereby, the return of the analog spectrum), imposing such a requirement will actually mitigate the "burden" on cable systems.

Based primarily on cable's announced plans to expand system capacity and on available technology, we conclude that capacity in the range of 200 to 500 channels is easily attainable by most systems over the next few years. What is needed is clear direction from the FCC to implement Congressional intent that there be full digital television must-carry.

III. Economic Considerations: Why Market Forces and Private Agreements Are Insufficient

We share the Commission's stated belief that "participation by the cable industry during the transition period is likely to be essential to the successful introduction of digital broadcast television and the rapid return of the analog spectrum to the Commission."[9] The Commission desires "an efficient and orderly structure that implements the law in a manner that, to the extent possible, permits market forces and private agreements to resolve issues and also respects the First Amendment rights of all participants as established by court precedent."[10]

While we certainly believe "market forces and private agreements" have a role to play, we think it is important for the Commission to recognize that there are three significant *market failures* that, on the one hand, undermine the ability of market forces and voluntary exchange to produce economically efficient results and, on the other, supply a compelling microeconomic rationale for government intervention to secure public interest objectives. The instant setting is one where, left to its own devices, a "spontaneous order" is not likely to prove either efficient or effective in realizing specified policy goals.

First, as the Commission itself has repeatedly been compelled by overwhelming evidence to conclude,[11] local cable television systems are multichannel video program distribution (MVPD) monopolists in their local markets. Cable's principal competitor, DBS, has achieved only minimal market penetration, does not now supply effective competition and is not likely to provide effective competition to incumbent cable monopolists during the digital broadcast transition.[12] Indeed, the market success of DBS has occurred primarily in areas unserved by cable.[13] Local cable MVPD

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9 *Ibid.*, ¶ 14.

10 *Ibid.*, ¶ 1.

11 *See In the Matter of Annual Assessment of The Status of Competition in the Market for the Delivery of Video Programming* ("Annual Reports"), various numbers.

12 Cable industry sales propaganda disparages the competitiveness of DBS offerings, calling attention to a variety of disabilities and shortcomings from a potential consumer's perspective.

13 National market share statistics thus overstate even the minimal level of competition that exists. In its 1997 Annual Report, the FCC reports that satellite subscribership ranges from 23.6 percent in Montana to 2.3 percent in New Jersey.

monopolists also exercise significant *monopsony* power.[14] Many video program channels seek access to local audiences, but there is generally only a single, economically dominant MVPD in each local market and, as a result, there is a significant imbalance in bargaining power. Where there is such a great imbalance of market power in cable's favor, negotiations unconditioned by assignment of carriage rights can hardly be relied upon to produce efficacious results, particularly where such a clear public interest stake in carriage of digital broadcast signals has been enunciated by Congress.

Second, in evaluating carriage decisions a cable system operator cannot be reasonably expected to take cognizance of the *external benefits* cable carriage of broadcast signals produces for *non-cable* subscribers. By increasing the potential audience for broadcast signals afforded carriage, cable carriage increases a station's advertising revenues. Such increases in revenue-producing potential, in turn, translate into increased investments in programming and, in consequence, a greater quantity and higher quality of over-the-air broadcast programming. The benefits of better broadcast programming redound to both cable subscribers *and* non-subscribers. Since cable system operators cannot appropriate a reward for helping to produce these external benefits, there will be a systematic tendency for them to undervalue the benefits of broadcast signal carriage relative to their actual level (*i.e.*, including the un-appropriable external benefits) and, hence, a tendency toward less than economically optimal broadcast signal carriage.[15]

Third, in addition to these external benefits to non-cable subscribers, there are also external benefits of carriage flowing from the successful introduction of digital broadcast television and the timely return of vacated broadcast spectrum. A variety of potential synergies in production and consumption have been identified by Congress and deemed worthy of pursuit through prudently crafted public policy. Again, cable system operators cannot be reasonably expected to assay these

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[14] The Commission's economic analysis of cable monopsony power is deeply flawed (*see* Annual Reports, *op cit.*). Focusing on concentration of multiple system ownership on a national basis, the Commission has failed to grasp that relevant markets are local (a finding it does make in analyzing cable's market power as a MVPD seller) and that cable's local "gatekeeper" status affords significant bargaining power. As Professors David Waterman and Andrew A. Weiss note (p. 154) in their scholarly treatise on *Vertical Integration in Cable Television* (The AEI Press, The MIT Press: 1997), "The FCC is simply wrong to apply the HHI standards or other benchmarks of firm concentration to the MSO case. . . . The rate at which an MSO can accumulate monopsony power has nothing to do with the standard interpretation of the HHI, because *virtually none of the cable system buyers compete with another for programs*" (emphasis added).

[15] Congress and the courts have also recognized the merit of promoting widespread dissemination of information from a multiplicity of sources. Broadcasting is thus afforded status as a "merit good" in economic terms. The merit benefits of broadcasting cannot be economically appropriated by cable system operators and they will thus ignore them in evaluating carriage alternatives.

external benefits (since they cannot be easily or feasibly economically appropriated) and they will, therefore, again systematically undervalue the benefits of digital signal carriage relative to the norm of economic efficiency (*viz.*, efficient internalization of external effects of private production and consumption decisions).[16]

Beneficial economic consequences of digital signal carriage are, of course, only one side of the story. In economic terms, the existence of market failures does not necessarily imply that government intervention will actually improve economic efficiency. Whether intervention proves economic-welfare-enhancing turns on the specific characteristics of the intervention.

Important in this regard are answers to factual questions about the capacity of cable systems and how capacity can be expected to evolve over time with changes in technology and the business focus of cable system operators, as well as the technical demands that are likely to be placed upon them as digital broadcast operations are brought on line. This paper supplies answers to those questions which suggest that full digital TV must-carry will not impose an undue burden on cable operators or foreclose carriage opportunities for cable program services. However, especially since monopoly system operators control how much capacity is available at any given time, we believe it is imperative that the Commission move quickly to adopt digital TV must-carry rules so that cable operators can plan accordingly.

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[16] There are a variety of "chicken-and-egg" problems that need to be overcome for successful introduction of digital broadcast television. For example, set penetration will depend on the attractiveness and availability of the program offerings, which depends on cable carriage decisions, which depend— in the absence of government intervention— on the consumer surplus cable system operators can expect to extract for providing access to digital broadcasts, which depends on set penetration, *etc.*

IV. If Past Is Prologue

As the debate is joined over digital must-carry, there is an unavoidable sense of *deja vu* in the arguments being marshaled by the cable industry (system owners and certain cable program services) in opposition to digital must-carry rules. Requiring cable operators to carry the broadcasters' new digital signals will allegedly swamp system capacity and force operators to drop certain marginal cable program services (*e.g.*, C-SPAN and BET).[17] This was, of course, precisely what the cable industry argued (unpersuasively, as it turned out) in its challenge to the must-carry provisions of the 1992 Cable Act.

It may be instructive, therefore, to recall how the facts and actual outcomes diverged from cable's rhetoric in the period between 1992 and 1995 (the relevant period for purposes of the Supreme Court's consideration). Then, as now, cable operators argued that the imposition of a must-carry requirement would place an undue burden on them. In fact, according to a 1995 survey of cable systems conducted by the FCC in the context of must-carry litigation, it was determined that, on average, must-carry stations occupied only 12 percent of channel capacity. Those stations added as a result of the 1992 Act took up an average of only 2 percent of system capacity.[18] For Time Warner, the second largest cable MSO, the average number of channels occupied by must-carry stations was only 4.2 or roughly 9 percent of system capacity on average.[19]

In an analysis we performed in 1995,[20] we noted that even these low percentages needed to be considered in the context of the rapid expansion of cable system capacity that had been occurring and has, of course, continued to occur. Indeed, we noted that the cable industry had added "enough channels *in less than two months* to carry all of the must carry requirements since the passage of the Act" (emphasis added).[21] At that time, the total universe of channels was increasing at a rate of over

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17 Strategic selection of "poster-child" examples of alleged harms is, of course, to be expected.

18 Another 10 percent of capacity was taken up by stations carried voluntarily under retransmission consent. Expert Declaration of Harry M. Shooshan,, ¶ 11.

19 *Ibid.*,, Exhibit A, ¶ 9.

20 *Ibid.*, ¶ 29.

21 *Ibid.*

3,000 a month and that rate was accelerating. We estimated that must-carry stations were using only about 6.7 percent of the capacity added since the 1992 Act was passed.[22]

While full digital TV must-carry will result in a significantly larger number of carried stations (during the transition period) than was the case following passage of the 1992 Cable Act, the "burden" created by such a requirement must be viewed in the context of the steady (and, in light of technical advances, likely accelerating) growth in the capacity of cable systems. This past experience is instructive (and probative) because it demonstrates that cable operators' previous claims about the impact of must-carry were grossly exaggerated and misleading. Notwithstanding the cable industry's repeated claims, the sky did not, in fact, fall.

Past experience also provides a ground for evaluating the claims by cable programmers that they are likely to be dropped by cable systems as a result of digital TV must-carry. Precisely these same arguments were made in the court challenge to the must-carry requirements of the 1992 Cable Act. C-SPAN, in particular, claimed that it had suffered significant harm from being dropped by cable systems which needed capacity to add additional must-carry stations.

The facts adduced in the course of the litigation showed otherwise. In fact, based on evidence submitted by the cable industry's own expert, nearly 95 percent of cable systems did not have to drop *any* programming service.[23] Based on analysis performed by SPR, cable operators carried *more than 99 percent* of the programming they were carrying *before* passage of the 1992 Act.[24] Moreover, during the period between 1992 and 1995, cable networks actually realized substantial increases in net subscribership.[25] The allegations made by the cable programmers involved less than 1 percent of cable systems.[26]

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22 *Ibid.*

23 *Ibid.*, ¶ 15.

24 *Ibid.*, ¶ 5.

25 As we note in Section VI, cable operators, on average, are projected to add more than enough capacity to accommodate digital TV must-carry stations and add new cable services without having to displace existing services.

26 It was by no means clear that, even in the relatively few cases where there appeared to be a problem, cable operators were not behaving strategically; that is, citing must-carry as the reason for withholding or removing channels (*i.e.*, terming systems as "channel-locked") which they intended to use for other purposes (*e.g.*, pay-per-view). *See* Expert Declaration of Harry Shooshan.

Overall, notwithstanding claims made by cable programmers, cable networks prospered by virtually any measure during the 1992-1995 period. Total subscribers to all cable networks grew by 9 percent, license fee revenues grew by 47 percent and advertising revenues increased by 52 percent.[27]

Individual cable networks also experienced substantial growth during this period. Black Entertainment Television (BET) was carried on 1,951 cable systems in 1992 and on 2,471 systems in 1995. BET subscribership grew in the same period from 29.7 million to 36.4 million. C-SPAN was available to 53.6 million cable subscribers in 1992 (4,253 cable systems) and to 62.4 million subscribers in 1995 (5,200 cable systems). C-SPAN 2 experienced even more substantial growth in subscribers, going from 24.3 million (933 cable systems) to 37 million (1,357 cable systems).[28]

Again, we point to the past record because it demonstrates that the cable industry, notwithstanding its claim of incapacity and suffering, was unable to substantiate claims of *actual* harm to the satisfaction of the Court. Thus, it behooves the Commission to take with a grain (pound?) of salt the industry's predictions of *potential* harm, especially in the face of the excess system carrying capacity that exists today and the substantial additional capacity that cable can reasonably be expected to add during the digital TV transition (subjects to which we now turn).

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[27] *See* Expert Declaration of Harry Shooshan.

[28] *Ibid.*, Exhibit A, p. 721. We note that current system carriage numbers for these three cable networks are: BET — 2,616; C-SPAN — 6,114; C-SPAN 2 — 1,688. Source: *Cablevision Magazine* on-line (10/5/98).

V. Cable System Capacity: Recent Trends and Current Status

A core issue for establishing an economically efficient digital must-carry regime is the ability of cable systems to satisfy new signal carriage requirements (*i.e.*, additional signals). To get an empirical handle on this issue, we begin with an analysis of cable systems' current channel-carrying capacity. Channel capacity is, of course, constantly being expanded as system operators rebuild and modify their systems to embody the latest and greatest technology. Current capacity is thus only a starting point and a quite conservative measure of channel carrying capability.

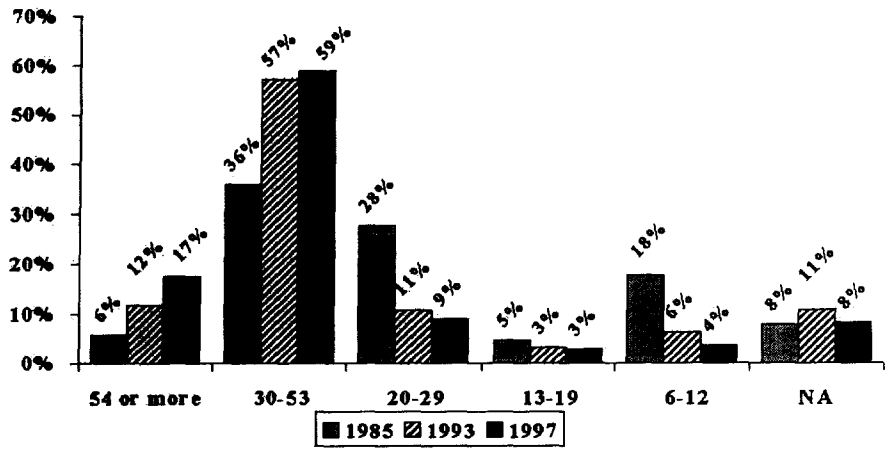
Our benchmark analysis is based on a leading database on U.S. cable system operations.[29] In our view, this database is one of the most complete and reliable available, and provides a sound basis on which to proceed.

A. National Trends

These data and analogous data collected by the same firm in previous years provide a picture of how cable system capacity has been growing over time. Figure 1 shows the number of cable systems within particular ranges of channel capacity for the years 1985, 1993, and 1997 (the most recent published data available). Figure 2 shows the percentage of cable subscribers in those three years served by systems in these same capacity ranges.

[29] Cable system data were obtained from Warren Publishing, Washington, D.C. publishers of *TV and Cable Factbook*, an annual compilation of the television and cable industries. The data included in this database are obtained through surveying all cable systems. In the database supplied to NAB, 26 percent of tier subscriber data are from 1997 or later, and 51 percent are from 1995 or later. This database appears to be the most thorough and dependable publicly available source of such information, although because it is somewhat dated, if provides conservative measures of the current state of play.

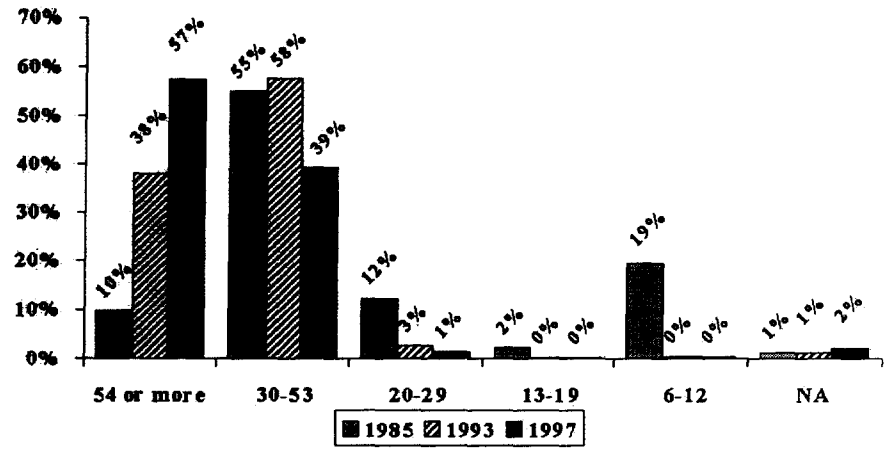
Figure 1
Percent of Systems by System Channel Capacity:1985, 1993, 1997



Source: Warren Publishing, Inc., *Television & Cable Factbook, Cable & Service Volume No. 53, 1985, p. 1385; Services Volume No. 65, 1997, p. I-81; Services Volume No. 66, 1998, p.F-2*

Prepared by Research & Planning Department, National Association of Broadcasters.

Figure 2
Percent of Subscribers by System Channel Capacity:1985, 1993, 1997



Source: Warren Publishing, Inc., *Television & Cable Factbook, Cable & Service Volume No. 53, 1985, p. 1385; Services Volume No. 65, 1997, p. I-81; Services Volume No. 66, 1998, p.F-2.*

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Figure 1 shows a steady increase in the number of systems with higher capacity during this period. By 1997 over three-quarters (76 percent) of all systems had 30 or more channels as compared to less than half (46 percent) in 1985. The increase is even more dramatic with regard to systems serving larger numbers of subscribers. Figure 2 shows that over 96 percent of all subscribers in 1997 were being served by systems with 30 or more channels. Interestingly, the number of subscribers served by systems with capacity of between 30 and 53 channels actually decreased between 1993 and 1997. Obviously, virtually all of these subscribers are now being served by systems with 54 or more cable channels.

B. Classification of Cable Systems

To respond to the FCC's queries, we undertook an analysis of the cable system database by combining systems within various groupings. In particular, we looked at systems in markets of different sizes, systems with different subscriber counts, and systems owned by large multiple system operators.

In addition to providing the average of channel capacity and other relevant measures for each of the groups analyzed, we have also provided a weighted average (based on the relative value of each cable system's basic subscriber count in each group examined). In our view, this weighted average is an important measure to consider, as it provides the most revealing picture of the carrying capacity of the typical cable system.

Before examining the market-size breakout results, we first report the results for the nation as a whole. The weighted average[30] channel capacity is 59.5 channels for all cable systems for which data were provided on channel capacity. For these 7,453 systems, the weighted average of unused channels is 4.3.

Nationally, the unweighted average channel capacity, across all systems for which data are available, is 40.8, and for unused capacity is 9.4 channels. This lower value for the unweighted average indicates that many small cable systems (*i.e.*, those with fewer subscribers) have less channel capacity, a point we directly demonstrate below.

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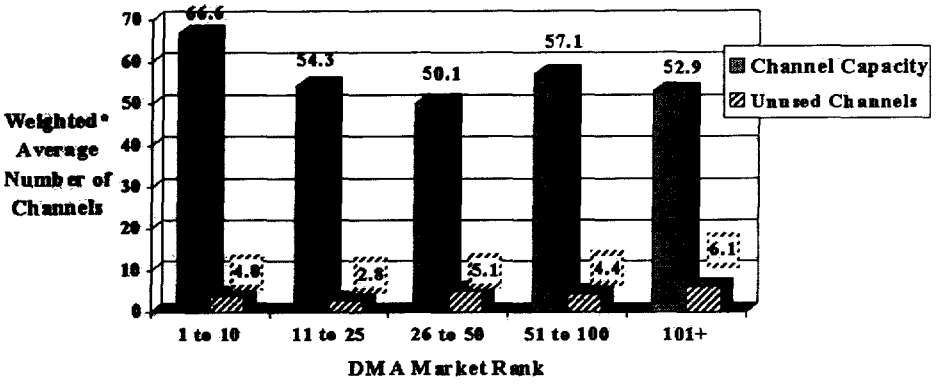
[30] Only those systems that had reported cable subscribers channel capacity and unused channels were included in these weighted-average calculations. To investigate if excluding those 2,153 systems reporting channel capacity but not reporting unused channel capacity biases the results, we compared the weighted average of that larger set with those reported and found little difference. The weighted average of channel capacity for the larger set was 58.6, very close to the weighted average of 59.5 for the systems reporting complete data.

1. Classification by Market Size

Figure 3 shows the weighted average of channel capacity and unused channels for cable systems in five different market size groupings. Generally, as one moves to smaller markets (*i.e.*, higher DMA ranks), the average channel capacity is lower, although the lowest average is for the mid-sized market groupings (DMAs ranked 26-50). As for unused channels, while there is no linear relationship between that value and market size, there do appear to be slightly more unused channels in the smaller markets. These data show that, in the largest television markets (where the Commission has required the earliest introduction of digital television service), the current capacity

Figure 3
Channel Capacity By DMA Rank



*Weighted by number of subscribers within each group

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cable systems to carry the new signals is the greatest.

Table 1 shows the unweighted averages of both channel capacity and unused channels for these five market size groupings. These channel-capacity averages are all lower than the weighted averages reported above because the larger systems have greater channel capacity in terms of the number of subscribers. Yet, the unweighted averages of unused channels are all higher, indicating that the smaller cable systems in these market size groupings tend to have more unused channels than the larger systems. Like the weighted averages, the unweighted averages for the smaller markets tend to have less channel capacity and more unused channels.

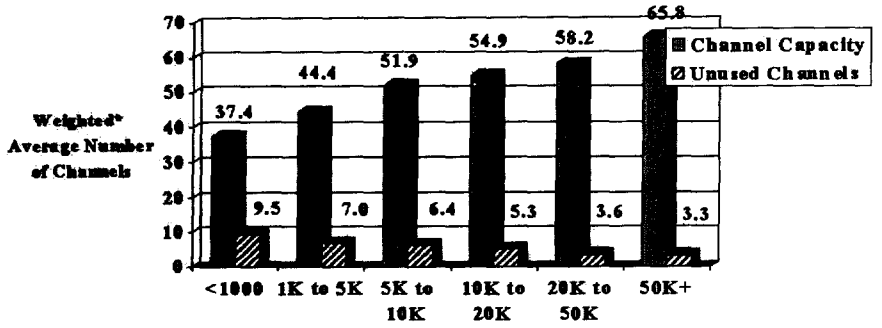
Table 1 Unweighted Average Channel Capacity and Unused Channels by DMA Rank			
	Unweighted Average		
DMA Rank	Channel Capacity	Unused Channels	Number of Systems
1-10	52.10	6.67	963
11-25	42.18	9.42	1,350
26-50	40.62	8.44	1,533
51-100	38.63	9.70	3,235
101+	37.41	10.10	3,636

2. Classification by System Size

That systems with fewer subscribers have smaller capacities and more unused channels is clearly borne out by the averages among different groupings of systems ranked by number of subscribers. Figure 4 shows the weighted averages for six groupings of system-subscriber levels. Table 2 shows the unweighted averages for these same six groupings.[31]

[31] Since the weights for the cable systems are based on relative subscriber counts, the weighted and unweighted averages are very similar for these groupings of cable systems by subscriber count.

Figure 4
Channel Capacity By System Subscribers



*Weighted by number of subscribers within each group

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Table 2
Unweighted Average Channel Capacity and Unused Channels by System Subscribers

	Unweighted Average		
System Subscribers	Channel Capacity	Unused Channels	Number of Systems
<1,000	35.58	11.35	4,567
1,000 - 5,000	43.28	7.30	1,696
5,000 - 10,000	51.06	6.43	484
10,000 - 20,000	54.23	5.30	354
20,000 - 50,000	57.42	3.70	301
50,000 +	65.70	2.51	196

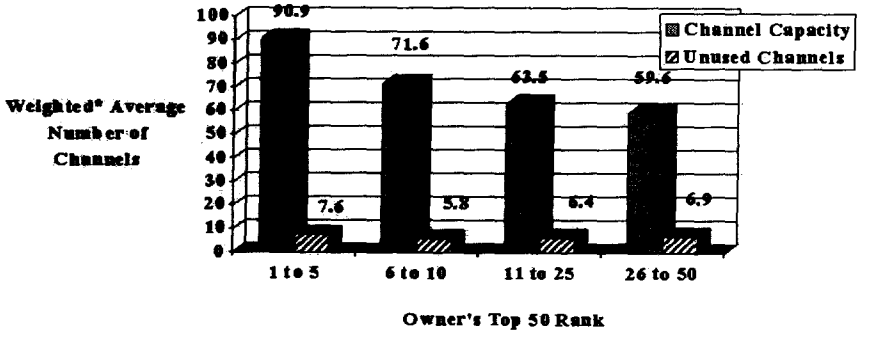
3. Classification by System Owner Size

Another question raised by the FCC is whether large multiple system operators (MSOs) tended to have larger capacity systems. The database provides information on whether a cable system owner is part of the Top 50 MSOs and its actual rank. The 4,733 systems owned by the Top 50 MSOs for which we have complete data tend to have much larger systems measured in terms of

channel capacity and more unused channels. The weighted average for this group is 81.7 channels for capacity and 7.0 unused channels.[32] The remaining 2,927 systems not owned by any of the top 50 MSOs (for which we have complete data) show a weighted average of 52.9 channels in capacity and 5.9 unused channels.[33]

Figure 5 and Table 3 show the weighted and unweighted average channel capacity by ownership Top-50-rank grouping. We note that the five largest MSOs account for 60 percent of cable subscribers. The weighted-average channel capacity decreases as one moves to the smaller MSOs; there is no readily apparent trend with respect to unused capacity.

Figure 5
Channel Capacity by MSO Top 50 Rank



*Weighted by number of subscribers within each group

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32 The unweighted averages for this group are 42.5 channels for capacity and 8.1 channels unused.

33 The unweighted averages for this group are 37.2 channels for capacity and 11.4 channels unused.