Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Revision of Part 15 of the Commission's Rules	)	ET Docket No. 13-49
To Permit Unlicensed National Information	)	
Infrastructure (U-NII) Devices in the 5 GHz	)	
Band	)	

COMMENTS OF TIME WARNER CABLE INC.

Marc Lawrence-Apfelbaum
Julie P. Laine
TIME WARNER CABLE INC.
60 Columbus Circle
New York, NY 10023

Steven N. Teplitz
Terri B. Natoli
TIME WARNER CABLE INC.
901 F Street NW
Suite 800
Washington, DC 20004

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Time Warner Cable Inc. ("TWC") hereby submits comments in response to the Notice of Proposed Rulemaking issued in the above-captioned proceeding.[1]

INTRODUCTION AND SUMMARY

TWC applauds the Commission's efforts to unleash additional spectrum in the 5 GHz band for Wi-Fi use. TWC has been a leader in deploying indoor and outdoor Wi-Fi networks in metropolitan and surrounding areas and has committed to expanding its Wi-Fi service offerings to afford its business and residential subscribers and other consumers greater convenience and value in gaining access to the Internet. To maximize the benefits of its Wi-Fi deployments, TWC has focused on large, high-traffic venues such as major downtown shopping areas, transportation centers, beaches, parks, and sports stadiums, including the Time Warner Cable Arena in Charlotte, North Carolina. TWC's Wi-Fi services also have proven to be a vital component of its response to major disasters such as Superstorm Sandy, when TWC was able to leverage its New York City Wi-Fi network, in conjunction with its deployment of multiple

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[1] *Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*, Notice of Proposed Rulemaking, ET Docket No. 13-49 (Feb. 20, 2013) ("NPRM").

mobile Wi-Fi access points in the hardest-hit areas, to provide much needed communications capability to all impacted citizens while other communications services were unavailable or undergoing repair. Wi-Fi is, and will continue to be, a vibrant and growing component of TWC's service offerings going forward, and it is essential that the Commission make additional Wi-Fi suitable unlicensed spectrum available to meet the rapidly growing demand for such services in the near term.[2]

For a variety of reasons, the 5 GHz band offers the best and likely only path for providing such additional unlicensed spectrum for Wi-Fi services at this time, most notably because it has the capacity to enable large channels of contiguous spectrum that could accommodate the newly-developed 802.11ac standard and its promise of gigabit Wi-Fi. Other potential spectrum bands either face imminent exhaustion of resources, *i.e.,* 2.4 GHz, or are unlikely to provide sufficiently large channels of unlicensed spectrum necessary to facilitate gigabit Wi-Fi. The deployment of ubiquitous publicly-accessible Wi-Fi networks that soon can offer gigabit capacity will strongly serve the public interest and advance the Commission's goal of broadly expanding broadband Internet access capabilities. The 5 GHz band offers the Commission the best opportunity to achieve that goal.

In furtherance of this critical goal, the NPRM proposes a variety of changes to the technical rules governing U-NII devices in the 5 GHz sub-bands currently authorized for commercial use, and, equally important, proposes to make additional 5 GHz spectrum available for unlicensed Wi-Fi-suitable use. As discussed in more detail below, TWC urges the

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[2] TWC also endorses the comments of the National Cable & Telecommunications Association ("NCTA") filed this same day in this proceeding. TWC is submitting these separate comments to describe in more detail its own Wi-Fi deployment and to discuss the particular public interest benefits that would flow from TWC's obtaining access to additional unlicensed spectrum in the 5 GHz band.

Commission to harmonize the rules for the U-NII-1, U-NII-3, and U-NII-4 bands to promote efficient deployment of gigabit-capable Wi-Fi services across much of the 5 GHz band. In particular, the current rules for the U-NII-3 band—with higher power levels than permitted elsewhere at 5 GHz, no indoor use restrictions, and no dynamic frequency selection ("DFS") requirements—have proven ideal for outdoor Wi-Fi deployments, a particular focus of TWC's. TWC therefore urges the Commission to conform its rules for the U-NII-1 and U-NII-4 bands to those in the U-NII-3 band to the greatest extent possible to facilitate the growth in outdoor Wi-Fi network deployment.

Undoubtedly, some aspects of the Commission's 5 GHz reforms will require additional study, close coordination, and testing among interested users and incumbents to avoid harmful interference in a spectrum sharing environment. To that end, TWC is eager to work with the Commission and other stakeholders to promptly undertake such efforts to ensure seamless co-existence in the 5 GHz band while boosting the availability of additional unlicensed spectrum for Wi-Fi networks. In addition, rather than wait to resolve all the issues raised in this proceeding at one time, TWC urges the Commission to immediately address and resolve those issues it is able to in the near-term so that some measure of unlicensed-Wi-Fi spectrum relief can be realized while the more challenging longer-term issues are resolved.[3]

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[3] As Acting Chairwoman Clyburn recently noted, the expansion of spectrum in the 5 GHz band is an important component of the Commission's overall goal of increasing the opportunities for investment and innovation in unlicensed wireless services. *See* Prepared Remarks of FCC Acting Chairwoman Mignon L. Clyburn, CTIA 2013 Las Vegas, Nevada, at 2, *available at*: http://www.fcc.gov/document/remarks-fcc-acting-chairwoman-mignon-l-clyburn-ctia-2013?contrast=.

DISCUSSION

I. TIME WARNER CABLE HAS COMMITTED TO EXPANDING ITS WI-FI NETWORKS AS A CRITICAL COMPONENT OF ITS BROADBAND SERVICE OFFERINGS

Wi-Fi service using unlicensed spectrum represents a vital component of TWC's overall strategy to expand its broadband service offerings to consumers. TWC believes that a robust Wi-Fi capability provides an important complement to its existing wireline broadband network to enable its subscribers to access the Internet anywhere, anytime, on any device. Combining comprehensive wireless connectivity with TWC's cable broadband network allows TWC to offer its customers more value and convenience by providing both the capacity and the flexibility of access they desire. It also provides non-subscribers the ability to gain access to the Internet at convenient public locations outside their homes.

TWC continues to make significant investments in extending the reach of its Wi-Fi networks throughout its footprint and adding Wi-Fi access points to provide more robust capacity. From their inception in 2011, TWC's Wi-Fi networks have expanded to more than 10,000 access points by the end of 2012, and have grown to more than 15,000 access points to date, with plans to more than double this amount by year-end 2013 alone. TWC provides all its subscribers to its standard (and above) broadband Internet service tiers access to its Wi-Fi networks at no additional charge in order to increase the value they receive from their broadband subscriptions. TWC also enables public access to its Wi-Fi networks on a pay-as-you-need basis, *e.g.*, hourly or daily passes. To date, TWC has focused primarily on large, high-traffic venues, such as major downtown shopping areas, parks, transportation centers, and sports stadiums, including the Time Warner Cable Arena in Charlotte, North Carolina. In addition, TWC's CableWiFi partnership with other cable operators enables TWC's customers to

seamlessly access more than 140,000 Wi-Fi access points throughout the country at no additional charge.[4]

TWC's largest deployment to date is in the Los Angeles metropolitan area, where it has invested over $15 million and has been able to attain widespread coverage throughout the region.[5] TWC has deployed thousands of access points throughout the Los Angeles metropolitan area, including in major congregation centers such as the Brea Downtown shopping and entertainment district, the Richard Nixon Presidential Library, the Hollywood Casting and Film studio, and Casa Loma College. TWC also has entered into agreements to deploy Wi-Fi at the University of California Los Angeles, the Ronald Reagan Presidential Library, the Page Museum at the La Brea tar pits, and major marinas and harbors such as the Port of Ventura and Kings Harbor in Redondo Beach. TWC's successful and expanding LA deployment is a paradigm for its Wi-Fi deployment plans in other TWC markets, and TWC continues to expand its network in other cities within its footprint, including New York City, Charlotte, North Carolina, Austin, Texas, Kansas City, and Oahu, Hawaii.

TWC's Wi-Fi networks also provide benefits to the broader community beyond TWC's (and other CableWiFi partners') own subscribers. For example, Wi-Fi proved to be an important component of TWC's response to SuperStorm Sandy in the New York City and surrounding areas. In the wake of the storm, TWC was able to leverage its existing Wi-Fi deployment in that area with approximately 50 additional mobile Wi-Fi stations on wheels to serve areas hit by the

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4 *See* http://www.cablewifi.com/ (last visited May 21, 2013); *see also* Chenda Ngak, *Time Warner, Comcast, Cablevision to Offer Free Wi-Fi Hotspots*, CBSNEWS.COM (May 22, 2012), *available at* http://www.cbsnews.com/8301-501465_162-57439268-501465/time-warner comcastcablevision-to-offer-free-wi-fi-hotspots/.

5 *See e.g.*, "Time Warner Cable Announces $15 Million Investment to Launch Los Angeles WiFi Network," (Sept. 9, 2011), *available at*: http://www.fiercetelecom.com/press-releases/time-warner-cable-announces-15-million-investment-launch-los-angeles-wifi-n.

storm where no other type of communication was available. TWC provided the public with free access to its Wi-Fi network in the impacted area for several weeks so that citizens could communicate with family or friends, or otherwise obtain important recovery information.[6] TWC also has made its Wi-Fi network freely available during non-emergencies. For example, during the 2012 Democratic National Convention, TWC offered promotional access to hundreds of indoor and outdoor access points in the greater Charlotte area, allowing anyone with a Wi-Fi-enabled device to access the Internet.[7]

As TWC has expanded its network deployment, usage of the network has expanded dramatically as well. In December 2012, the number of unique users accessing TWC's Wi-Fi network grew by over 720 percent, and data consumption per user grew by over 100 percent, compared to December 2011. In addition, the devices per user increased by 11 percent, and the average minutes per session increased by 81 percent. TWC's experience confirms that the strong consumer demand for ubiquitous Wi-Fi coverage will only continue to grow as users increasingly access Wi-Fi networks from portable devices such as laptops and tablets typically used in the home or office on a wired broadband connection as well as from smartphones and other mobile devices to off-load data use from their 3G/4G mobile broadband service plans.

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6 *See* Written Testimony of Brian J. Allen, Time Warner Cable, *Reliability and Continuity of Communications Networks, Including Broadband Technologies*, PS Docket No. 11-60, at 5-6 (filed Feb. 5, 2013).

7 *See, e.g.*, Celeste Smith, *Time Warner Cable Providing Free Wi-Fi During DNC*, Charlotte Observer (Aug. 3, 2012), available at: http://tinyurl.com/cs9hjax.

II. THE 5 GHZ BAND PROVIDES THE BEST OPPORTUNITY FOR THE COMMISSION TO UNLEASH THE BENEFITS OF ROBUST WI-FI SERVICE

As the NPRM recognizes,[8] and as reflected in the Spectrum Act,[9] the 5 GHz band represents a vital opportunity to obtain additional spectrum for wireless broadband use. The 5 GHz band is particularly well-suited to Wi-Fi because it includes a substantial amount of spectrum, and many Wi-Fi-capable devices are already configured to operate in the band. The 5 GHz band also offers the best opportunity in the near term to deploy the newly-developed 802.11ac Wi-Fi standard.[10] That standard will allow for a significant increase in data rates, with a link data rate of approximately 1 Gbps. To successfully implement this new standard when it becomes available, however, will require large channels. In particular, at least one contiguous 80 MHz channel will be required, and ideally, 160 MHz will be available to enable gigabit-capable Wi-Fi.

For a variety of reasons, the 5 GHz band provides the best opportunity to free up the large amount of spectrum needed for 802.11ac deployment. For example, the 2.4 GHz band already is nearing capacity exhaustion, which is already leading to high levels of congestion and interference in the many areas.[11] The 600 MHz band has very strong propagation characteristics and the upcoming broadcast incentive auction provides a promising opportunity to generate additional spectrum for wireless uses. However, it is as yet unclear how much spectrum will be allocated for unlicensed use, and there is no realistic prospect that the incentive auction will generate sufficient unlicensed spectrum for meaningful gigabit Wi-Fi deployment, if any Wi-Fi

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8 NPRM ¶¶ 15-20.

9 *See* Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, § 6406, 126 Stat. 156, 231 (2012).

10 *See* NPRM ¶ 18.

11 *See* Rob Alderfer, CableLabs, *WiFi Spectrum: Exhaust Looms*, May 24, 2013; *see also* NCTA Comments at 7-9.

use of that band could be made at all. The Commission has initiated efforts to free up spectrum in the 3.5 GHz range,[12] but, again, it is unclear how much unlicensed spectrum suitable for outdoor Wi-Fi-type use might be made available and whether the regulatory framework for that spectrum would lend itself to widespread use by service providers like TWC. Moreover, the 3.5 GHz spectrum will require extensive new coordination with incumbent government users that have not previously had to share such spectrum, whereas the 5 GHz band already has a demonstrated history of successful coordination among Federal users and existing Wi-Fi use in the U-NII-3 band.

The 5 GHz band, in contrast to these other bands, includes substantial amounts of new spectrum that can be made available on a shared basis for unlicensed uses. Importantly, such uses include not only expanding consumers' broadband connectivity through Wi-Fi access points connected directly to TWC's cable broadband network, but also through providing the capacity for critical point-to-point links used to create TWC's mesh Wi-Fi networks in areas where TWC's cable plant is not directly accessible so that consumers in those areas are also afforded expanded Internet access capability. Moreover, in dense urban areas where many of TWC's Wi-Fi deployments are occurring, the 5 GHz band is better suited to handle increasing capacity requirements than lower frequency bands due to the higher penetration of access points necessary to blanket an area each having smaller coverage footprints. In addition, there is the immediate ability for the FCC to modify the rules for existing 5 GHz unlicensed use to make more Wi-Fi suitable spectrum available. This proceeding therefore presents a unique and possibly one-time opportunity to free up the necessary spectrum for wideband unlicensed Wi-Fi

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[12] *See Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Notice of Proposed Rulemaking and Order, GN Docket No. 12-354 (Dec. 12, 2012).

uses, in a spectrum band with a successful history of Wi-Fi deployment and co-existence among federal and non-federal users.

III. TIME WARNER CABLE STRONGLY SUPPORTS THE COMMISSION'S EFFORTS TO BRING NEW WI-FI-SUITABLE UNLICENSED SPECTRUM ONLINE AND ADAPT ITS RULES TO ENABLE MORE EFFICIENT AND INNOVATIVE USE OF THE 5 GHZ BAND

The NPRM proposes a variety of changes to the technical requirements for U-NII devices to harmonize the band and make an additional 195 MHz of spectrum available for unlicensed use. TWC applauds these efforts and looks forward to working with the Commission to create a robust Wi-Fi ecosystem in the 5 GHz band.

TWC strongly supports the NPRM's proposal to revise the technical rules for U-NII-1.[13] TWC also supports the proposal to add 25 MHz of spectrum to the U-NII-3 band and to study and ultimately open up the U-NII-4 band for unlicensed use in a fashion that achieves co-existence with other users of that spectrum, but enables the technical rules for U-NII-4 to accommodate outdoor gigabit Wi-Fi deployment.[14] These efforts will deliver tremendous public interest benefits by facilitating the growth of Wi-Fi networks in metropolitan areas around the country.

In amending the technical rules in the 5 GHz band, the Commission should strive to harmonize the U-NII-1, U-NII-3, and U-NII-4 rules to the greatest extent possible. Such harmonization across these bands will enable the use of the new 802.11ac standard in the U.S. by allowing providers to access 80 MHz or 160 MHz channels with consistent operating rules. Consistent rules also will allow cable operators and other providers to deploy Wi-Fi more efficiently and effectively, regardless of which standard they employ.

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13 NPRM ¶¶ 37-41.

14 *Id.* ¶¶ 27-28, 75-77.

The U-NII-3 rules, with no indoor use restrictions, higher power limits, and no DFS requirements, have proven very favorable in facilitating the deployment of fast, reliable Wi-Fi networks.[15] TWC's outdoor Wi-Fi deployment to date using the 5 GHz band has been exclusively in the U-NII-3 band[16] because that band allows outdoor Wi-Fi transmitters to operate at the necessary power levels, and has no DFS requirement—a requirement not considered suitable for outdoor Wi-Fi deployment due to the resulting complexity, cost, and adverse impact to the user experience.[17] In order to expand outdoor Wi-Fi deployment capability, TWC encourages the Commission to adopt comparable rules for the U-NII-1 and U-NII-4 bands, to make those bands equally functional for robust outdoor Wi-Fi networks, including providing increased capacity for the point-to-point links necessary to create mesh Wi-Fi networks. Although the NPRM seeks comment on whether to harmonize U-NII-1 with U-NII-2A,[18] TWC believes the Commission can best serve consumers and promote the public interest by harmonizing U-NII-1 instead with U-NII-3. Harmonizing U-NII-1 with U-NII-3 rules would provide far greater flexibility for outdoor Wi-Fi network operators to meet consumers increasing demand for Wi-Fi services by enabling the use of U-NII-1 spectrum for the Wi-Fi mesh links that are currently using U-NII-3 spectrum for that purpose (and consequently freeing up more U-

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15 *See* Comments of the National Cable & Telecommunications Association, ET Docket No. 13-49, at 14-18 (filed May 28, 2013) ("NCTA Comments").

16 To be clear, TWC deploys each of its access points (APs) with both 2.4 GHz and 5 GHz capability but increasingly its APs direct the client device to use the U-NII-3 channels due to the congestion existing at 2.4 GHz.

17 *See* NCTA Comments at Section IV.C. (explaining in more detail the impact that DFS requirements have on outdoor Wi-Fi).

18 NPRM ¶ 39.

NII-3 spectrum for the Wi-Fi access points), as well as the opportunity to combine non-contiguous U-NII-1 and U-NII-3 channels for 802.11ac outdoor gigabit deployment.[19]

With respect to the U-NII-4 rules, TWC strongly supports the NPRM's proposal that "the same framework and technical requirements … should apply across the expanded U-NII-3 and U-NII-4 bands."[20] By harmonizing the U-NII-3 and U-NII-4 rules, outdoor Wi-Fi providers will have the ideal ability to combine contiguous 80 MHz channels to provide gigabit Wi-Fi, thereby avoiding the additional complexity and cost associated with combining non-contiguous 80 MHz channels. In all three bands, the Commission should have no indoor use restrictions, should apply the highest feasible power levels (ideally 1 Watt), and should refrain from imposing DFS requirements.

Removal of the indoor use restriction at U-NII-1 will promote the ability of cable operators and other providers to operate outdoor hot-spot networks and create ubiquitous wireless networks across metropolitan areas.[21] Such rule changes also will create efficiencies by enabling devices to operate in a consistent manner without having to constantly detect whether the user is indoors or outdoors. Consumers now expect and demand far greater mobility with respect to their devices than they did in 1997, when the Commission established its rules for the U-NII-1 band. Because consumers now desire seamless connectivity both indoors and outdoors, the Commission should amend its rules to account for these changes in habits and expectations.

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19 Of course, were the Commission to harmonize the U-NII-1 rules with U-NII-3, and TWC was, nevertheless, to decide to deploy a contiguous 160 MHz Wi-Fi channel combining U-NII-1 with U-NII-2A spectrum should such a combination at the low 250 mW power level be deemed technically and operationally feasible, TWC acknowledges such combination would necessitate compliance with the U-NII-2A rules.

20 *Id.* ¶ 97.

21 *See* NCTA Comments at 16.

Higher power limits also will promote robust Wi-Fi networks by allowing for better range of coverage (and hence fewer access points to cover an area), as well as higher throughput.[22] TWC has been operating at the highest power allowed in the U-NII-3 band to provide the fastest available service and broadest available coverage to its users. The lower power limits in the U-NII-1 band, by contrast, would have rendered that band totally unusable for outdoor Wi-Fi deployment, even if the indoor use restriction had not existed. Based on its experience to date with co-existence in the 5 GHz band, TWC believes that a 1 Watt power limit can be implemented in the U-NII-1 and U-NII-4 bands without causing undue interference to other users in these bands, particularly by coordinating with incumbent users and avoiding their operations.

TWC is prepared to work with other users of the 5 GHz bands to determine the most effective way to avoid interference for all stakeholders. In the U-NII-1 band, TWC believes that ongoing work the industry is undertaking in examining a sharing environment will result in a co-existence solution that allows for higher power levels while providing co-channel interference protection for Globalstar's feeder links.[23] In addition, TWC is prepared to work with the Intelligent Transportation Service ("ITS") community to ensure that Wi-Fi can co-exist successfully with future planned ITS operations in the U-NII-4 band.[24] In all events, the Commission should strive to set the power limits at U-NII-1 and U-NII-4 at the highest feasible level in each to permit Wi-Fi network operators the flexibility to use such power levels wherever possible.

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22 *See id.* at 15-16.

23 *See* NPRM ¶ 38.

24 *See id.* ¶¶ 92-93.

Similarly, TWC urges the Commission to refrain from imposing DFS requirements in the U-NII-4 band (or the U-NII-1 band).[25] DFS requirements significantly increase the complexity and cost of Wi-Fi deployment (as evidenced by the fact that TWC is not aware of any outdoor Wi-Fi deployment in the U.S. using the U-NII bands having the DFS requirement). DFS also presents additional hurdles of obtaining appropriate certifications and degrades the user experience by causing delays and interruptions to service of more than a minute at a time.[26] DFS requirements may be necessary in the U-NII-2 bands to protect incumbent government users, and TWC does not seek to upset those requirements in that portion of the band, but in the other U-NII bands, TWC believes it is feasible to achieve interference protection without incurring the burdens that DFS requirements impose on Wi-Fi providers and end users, and is committed to work with the Commission to achieve such an end.

Finally, the Commission also should ensure that to the extent it modifies the current technical rules for the U-NII-3 band as proposed in the NPRM, that it continue to allow for the type of unlicensed point-to-point wireless links used by TWC in its mesh Wi-Fi network deployments. Wireless backhaul is critical to enabling cable operators to deploy mesh Wi-Fi networks where the access points are not close enough to the cable network to be directly connected. Moreover, the channel configurations associated with using 5 GHz spectrum for point-to-point mesh link purposes will minimize interference concerns, even apart from TWC's commitment to work with other stakeholders to ensure harmonious co-existence more generally.

CONCLUSION

TWC applauds the Commission's efforts to unleash additional spectrum in the 5 GHz bands for Wi-Fi use and urges the Commission to harmonize the rules for additional Wi-Fi

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25 *See* NCTA Comments at 21-23.

26 *See id*. at 21-22.

suitable spectrum with the current U-NII-3 rules to the greatest extent possible. Unquestionably, some aspects of the NPRM's proposals will require additional study and analysis and thus may take longer to resolve than others. This should not, however, result in the Commission waiting to provide some relief at the earliest possible time. And TWC acknowledges the need for close coordination with all potentially affected Federal and non-Federal users to harmonize operations in the 5 GHz bands and to manage interference concerns to enable co-existence in a shared spectrum environment. TWC is eager to work with the Commission and other interested users of the 5 GHz spectrum to ensure seamless co-existence in the 5 GHz spectrum and to free up additional outdoor 5 GHz spectrum as soon as possible.

Respectfully submitted,

/s/

Steven N. Teplitz
Terri B. Natoli
TIME WARNER CABLE INC.
901 F Street NW
Suite 800
Washington, DC 20004

Marc Lawrence-Apfelbaum
Julie P. Laine
TIME WARNER CABLE INC.
60 Columbus Circle
New York, NY 10023

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