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Via email to: <stephenfroling@cs.com>
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Stephen Froling, Chair
Hancock Planning Board
PO Box 6
Hancock, NH 03449

REF: Industrial Tower & Wireless, LLC - Facility Application at 160 Norway Hill Road

Dear Mr. Froling:

I am a Radiofrequency ("RF") Engineer and a former communications site landlord. I built my first computer when I was 14 and a year later gained dial-up access to the Dartmouth College mainframe computer, employing it to calculate RF propagation. I obtained my first Federal Communications Commission ("FCC") license in 1965, and currently hold lifetime General Radiotelephone Certificate PG0111356. I am a 39-year Senior Member of the Society of Broadcast Engineers ("SBE"), Certified (#1098) as a Senior Broadcast Engineer since 1977; I have served as Vice-Chair and Secretary-Treasurer of the Boston Chapter. I am a 12-year Member of the Institute of Electrical and Electronics Engineers ("IEEE") and the IEEE Microwave Theory & Techniques Society. I worked on the most recent revision of Standard 356 for the Wave Propagation Standards Committee of the IEEE Antennas and Propagation Society. Well versed in propagation, collocation and interference issues, I am the Accredited FCC Frequency Coordinator for Part 74 spectrum below 2 Gigahertz in the State of Vermont. Over 44 years I have prepared numerous FCC applications and demonstrated extensive experience in RF design and analysis. The Vermont Environmental Board submitted my RF study results - crucial to tower permit decisions - to the FCC in two Rulemaking proceedings. The National League of Cities and the National Association of Telecommunications Officers and Advisors cited my comments in one of these FCC proceedings to support their reply comments. I authored the chapter on RF exposure prediction and measurement for the book "Cell Towers: Wireless Convenience? Or Environmental Hazard?" published in 2001 (ISBN 1-884820-62-X). I have submitted evidence and testified as a Radiofrequency Engineer before municipal bodies, and state and federal courts. I work primarily for municipalities reviewing wireless facility applications, and have not accepted wireless site-acquisition work from any provider for over ten years.

I have reviewed predicted-coverage maps and related supporting material for the above-referenced application. In summary, Industrial Tower & Wireless, LLC ("ITW") has a significant gap in its coverage - including most of the Town of Hancock - for which the proposed facility is a necessary solution. In addition, the provision for collocation will almost certainly be utilized by providers such as Verizon Wireless.

I have the following detailed observations:

1. The Telecommunications Act of 1996 ("TCA") preempted some local regulation, but most land-use jurisdiction was specifically preserved by the Act for local bodies such as the Hancock Planning Board ("Board"). While it is acceptable to require demonstration of need and to employ rigorous review, the TCA requires action without undue delay, and forbids discrimination among providers or decisions that effectively prohibit personal wireless services. Adequacy of other providers cannot be used as a reason to deny, since the TCA states that local "regulation...shall not prohibit or have the effect of prohibiting the provision of personal wireless services."¹ (Emphasis added.) An underlying basis for the TCA was to encourage service competition, a position underscored last November by the FCC when it stated that,

"We [find] that where a State or local government denies a personal wireless service facility siting application solely because that service is available from another provider, such a denial violates Section 332(c)(7)(B)(i)(II). By clarifying the statute in this manner, we recognize Congress' dual interests in promoting the rapid and ubiquitous deployment of advanced, innovative, and competitive services, and in preserving the substantial area of authority that Congress reserved to State and local governments to ensure that personal wireless service facility siting occurs in a manner consistent with each community's values."²

2. ITW must adequately serve its FCC-licensed area that includes the Town of Hancock. According to the TCA, "the term 'personal wireless services' ["PWS"] means commercial mobile services, unlicensed wireless services, and common carrier wireless exchange access services."³ The ITW Specialized Mobile Radio ("SMR") services are a subset of Commercial Mobile (Radio) Services ("CMRS") which include the Cellular Radiotelephone Service, Broadband Personal Communications Service ("PCS"), and the Advanced Wireless Service ("AWS"). In addition to its services, ITW provides infrastructure for other CMRS/PWS providers. Within the past year, the FCC has discussed utilization of additional spectrum, which should confirm to the Board that other providers are likely to desire facility placement to serve the Town of Hancock:

"Wireless providers currently are in the process of deploying broadband networks which will enable them to compete with the services offered by wireline companies.⁴ For example, Clearwire is deploying a next generation broadband wireless network for the 2.5 GHz band using the Worldwide Inter-Operability for Microwave Access (WiMAX) technology.⁵ Clearwire asserts that its WiMAX network will "provide a true

¹ 47 U.S.C. § 332(c)(7)(B) Limitations: (i)(II). The relevant language of TCA Section 704 is attached as Appendix 1.

² FCC WT Docket No. 08-165, "Petition for Declaratory Ruling to Clarify Provisions of Section 332(c)(7)(B) to Ensure Timely Siting Review, etc.", ¶71, 11/18/09

³ 47 U.S.C. § 332(c)(7).

⁴ FCC WT Docket No. 08-165, "Petition for Declaratory Ruling to Clarify Provisions of Section 332(c)(7)(B) to Ensure Timely Siting Review, etc.", Footnote 113, 11/18/09: "The Petitioner has submitted a study which asserts that approximately 23.2 million U.S. residents and 42% of road miles in the U.S. do not currently have access to 3G mobile broadband services. It further estimates that approximately 16,000 new towers will need to be constructed and 55,000 existing towers will need to be augmented for both Code Division Multiple Access (CDMA) and Global System for Mobile communications (GSM) 3G broadband services to be ubiquitous to U.S. consumers. CostQuest Associates, Inc., U.S. Ubiquity Mobility Study, April 17, 2008 at 4, filed as attachment to CTIA Ex Parte, GN Docket No. 09-51, WT Docket Nos. 08-165, 08-166, 08-167, 09-66 (filed Aug. 14, 2009)."

⁵ Ibid., Footnote 114, 11/18/09: "*Sprint And Clearwire To Combine WiMAX Businesses, Creating A New Mobile Broadband Company*, News Release, Sprint Nextel and Clearwire Corp., May 7, 2008 ("*Sprint/Clearwire News Release*"). See Sprint Nextel Corp. and Clearwire Corp., Applications for Consent

mobile broadband experience for consumers, small businesses, medium and large enterprises, public safety organizations and educational institutions.”⁶ Similarly, we expect that the winners of recent spectrum auctions will need facility siting approvals in order to deploy their services to consumers.⁷ At least one Advanced Wireless Service (AWS) licensee with nationwide reach already is implementing its new network in the AWS band.⁸

Further indication of provider interest is that I have been retained in the past 18 months to review several applications in Antrim and Greenfield. From these and other applications, I draw two important conclusions: First, PWS providers are anxious to close coverage gaps along principal highways - in your case, Route 202 - as noted in Footnote 4. Second, providing in-building residential and business service is increasingly viewed as essential.

3. The initial applicant submission included the site plan, PCS coverage maps and cursory information about alternate-site viability. As you know, I wrote a memo to Kevin Delaney of ITW on July 27, 2010 requesting the following additional information:
 - a.) Coverage for ITW licensed SMR service,
 - b.) Coverage at alternate heights for both PCS and SMR, and
 - c.) More information about possible alternate locations, including the possibility of locating northwest of the proposed location.

Meanwhile, earlier meeting minutes revealed that moving closer to the top of Norway Hill had been proposed and was met with strong resistance due to visibility, notwithstanding possibly better coverage even with a lower structure. On August 9 I received Mr. Delaney's response, which addressed my questions and gave me sufficient data to complete my review.

4. According to the site plan,⁹ overall proposed structure height is 180' (feet) Above Ground Level (“AGL”). The site plan shows five “future carriers” but not the SMR antenna indicated in the August submission to be a Celwave PD10017 model. It has a 13' overall height and would normally be mounted at the top of the tower; the 180' base-mount height noted in the data from Mr. Delaney would effectively increase the tower height by roughly a dozen feet. This is because the Federal Aviation Administration (“FAA”) and FCC consider height to be the highest point including attachments. The FAA construction notice (at Tab 5 of the original application) is for 180' AGL, which is also the height limit set by the Town regulations.¹⁰ Therefore, overall height must be resolved. Also related to the site plan, the geographic coordinates and height appear to denote the site location correctly, and are consistent with my geo-referenced aerial photography and digital terrain data.

to Transfer Control of Licenses, Leases, and Authorizations, WT Docket No. 08-94 and File Nos. 0003462540 et al., *Memorandum Opinion and Order*, 23 FCC Rcd 17570, 17619 ¶128 (2008) (approving Clearwire and Sprint Nextel's plan to combine their 2.5 GHz wireless broadband businesses into one company).”

⁶ Ibid., Footnote 115, 11/18/09: “*Sprint/Clearwire News Release*. Clearwire's wireless broadband service is now available in 14 markets. *Clearwire Introduces CLEAR(TM) 4G WiMax Internet Service in 10 New Markets*, Press Release, Clearwire, Sept. 1, 2009.”

⁷ Ibid., Footnote 116, 11/18/09: “*See Auction of Advanced Wireless Services Licenses Closes: Winning Bidders Announced for Auction No. 66, Report No. AUC-06-66-F, Public Notice*, 21 FCC Rcd 10521 (WTB 2006); *Auction of 700 MHz Band Licenses Closes; Winning Bidders Announced for Auction 73, Public Notice*, Report No. AUC-08-73-I (Auction 73), DA 08-595 (rel. Mar. 20, 2008).”

⁸ Ibid., Footnote 117, 11/18/09: “*T-Mobile Comments at 2* (noting that unless it can expeditiously obtain approvals, its efforts to add high-speed services and expand coverage will be “significantly hampered”).”

⁹ Site Plan Sheet 4, dated 6/23/10.

¹⁰ Town of Hancock Telecommunications Facilities Regulations: Section VI - Height.

5. Before specific discussion of coverage submissions, you should note that this applicant requires two separate considerations: First and foremost, it is a PWS provider seeking to build out its coverage - in this case the western portion of Hillsborough County that includes Route 202. Second, ITW builds and maintains facilities for PWS providers and, as noted earlier, there will likely be demand for these other services. The Board has already heard from a Verizon Wireless representative of its collocation interest.¹¹ Although there is not a PWS co-applicant, I recommend treating the application as if that is the case. PCS coverage - applicable for AT&T, T-Mobile, Verizon Wireless and others - will be addressed first, since it is more demanding from the standpoint of RF propagation.
6. Regarding the signal level used on ITW PCS coverage maps, another PCS provider that uses the same level has claimed in recent reviews that,
 - “T-Mobile’s required acceptable lower design limit threshold is -84dBm.¹² This signal level is required to provide reliable in-vehicle coverage.

At levels below the -84dBm threshold, signal quality degradation would be expected and will result in areas of unreliable service to T-Mobile customers for both voice and data services.”¹³

Adequate coverage has not been directly defined by Congress or in the FCC Rules and Regulations, and Hancock’s regulation does not define it. However, the industry and some communities have defined adequacy between -96dBm and -90dBm, generally referring to “on-street” service. However, a -90dBm level in a yard or outside a vehicle will almost always result in a lower signal inside the vehicle and even less inside most buildings, due to greater signal losses compared with the outdoor environment. In its objection to the -95dBm adequacy level defined by the Town of Concord, Massachusetts, T-Mobile’s predecessor stated in relevant part:

“For VoiceStream’s network our receiver sensitivity specification for phone makers is -102dBm with 0 gain/loss at the antenna. Then 8db is accounted for with fading losses and 3dB is applied for head/body user loss. After factoring in the variables, this results in a value of -91dB[m] signal strength, which VoiceStream uses for on-street coverage.”¹⁴

T-Mobile’s reasoning its use of -84dBm was confirmed by the U. S. Court of Appeals for the First Circuit¹⁵ in a decision last November. At a minimum, principal highways should have adequate in-vehicle coverage. Moreover, in 2005 the U. S. District Court for New Hampshire¹⁶ confirmed the importance of in-building/in-home service:

“In evaluating the extent of a gap in coverage, courts have considered the availability of both in-vehicle and in-building service. See, e.g., Sprint Spectrum, L.P. v. Willoth, 176 F.3d 630, 643 (2d Cir. 1999). Therefore, the [Dunbarton] ZBA’s conclusion,

¹¹ Minutes of the Hancock Planning Board Meeting of July 21, 2010; p. 2.

¹² The dBm is a power level expressed as decibels (“dB”) above one milliwatt. The dB is a logarithmic unit used to characterize a ratio (difference). In the case of RF power, if the second level is twice as much power as the first, it is 3dB higher; if the second level is ten times that of the first, it is 10dB higher; if the second is a million times the power of the first, it is 60dB higher. As can be seen, the use of decibels enables describing very large power ratios with modestly sized numbers. Note the use of negative numbers: -84dBm is 10dB stronger than -94dBm.

¹³ Affidavit of T-Mobile RF Engineer Scott Heffernan, supporting a T-Mobile application in Mansfield (MA); 9/2/09.

¹⁴ “VoiceStream’s Protest Memorandum Relative to §7.8.2.2. ‘Adequate Coverage’ as Defined in its Bylaw.” Submitted to the Town of Concord (MA), 5/17/01.

¹⁵ Omnipoint Holdings, Inc. v. City of Cranston, 586 F.3d 38 (1st Cir. 2009); 11/3/09.

¹⁶ U.S.C.O.C. v. Dunbarton, 04-CV-304-JD; 04/20/05.

based on town counsel's representation, that in-home service was not pertinent for purposes of satisfying the requirements of the TCA was legal error and was also inconsistent with the evidence of record.¹⁷

So while ITW is basing its need on -84dBm coverage, other PWS providers will almost certainly make a case in the future for a stronger level for better in-building coverage.

7. Vegetation negatively impacts RF propagation and, although signals that graze tree-tops and blocked paths do not mean affected areas will have no communication, ideally this will be mitigated by careful (usually higher) antenna placement closer to the problem area. Scientist Henry L. Bertoni cites the research of Vogel and Goldhirsh¹⁸ when he writes that "[t]he leaves and branches of trees offer significant attenuation to UHF and microwave signals. Measurements of transmission loss at 869MHz for low elevation angles through the canopies of large isolated trees found attenuations of 10 dB and more."¹⁹ Since foliage will exacerbate losses from locating antennas at a lower height, overall height and other collocation provider levels should be considered. Keeping in mind the previous discussion regarding the deleterious impact of foliage, here is the advice in one engineering text: "Antenna height clearance, as a rule of thumb, is fifteen feet above clutter."²⁰ Hindering our ability to quantify the effect of moving antennas close to trees is the seasonal change in foliage expected in some areas. According to one of the foremost authorities on the subject, William C. Y. Lee, "In summer the foliage is very heavy, but in winter the leaves of the oak and maple trees fall and the pine leaves stay. In addition, when the length of pine needles reaches approximately 6 in., which is the half wavelength at 800MHz, a great deal of energy can be absorbed by the pine trees."²¹ I have recently reviewed several applications submitted by Clearwire for WiMAX services that use even higher 2600MHz spectrum. Using the standard 10-foot antenna vertical separation allowance for each set of provider antennas, a 180' tower will place the bottom-most antenna center-line ("C/L") height at 110' or 120' AGL, which should be more than sufficient for tree-canopy clearance. Vegetation will nonetheless negatively impact coverage as antennas are lowered, and this can be seen in the coverage plots at lower heights.
8. Returning to consideration of PCS (1900MHz) performance, in addition to the adverse impact of vegetation, distance will quickly attenuate radio signals. Although it has a height advantage, the Crotched Mountain antenna farm in Franconia is more than three miles from the nearest point on Route 202 in Hancock. In the ITW Existing Coverage map²² the PCS coverage from Crotched Mountain does not extend much beyond the junction of Routes 202 and 137. A site without the height advantage will likely cov-

¹⁷ Decision, Footnote 2: "It is true, however, that '[w]here holes in coverage are very limited in number or size (such as the interiors of buildings in a sparsely populated rural area, or confined to a limited number of houses or spots as the area covered by buildings increases) the lack of coverage likely will be de minimis so that denying applications to construct towers necessary to fill these holes will not amount to a prohibition of service.' Willoth, 176 F.3d at 643-44. In this case, the ZBA rejected all evidence of gaps in service to homes and did not find that any such gaps were merely de minimis."

¹⁸ W. J. Vogel and J. Goldhirsh, Tree Attenuation at 869 MHz Derived from Remotely Piloted Aircraft Measurements, *IEEE Trans. Antenna Propagation*, vol. AP-34, pp. 1460-1464, 1986.

¹⁹ Henry L. Bertoni, Ph.D., *Radio Propagation for Modern Wireless Systems*, ¶7.3 Modeling the Effects of Trees; Prentice Hall, 2000.

²⁰ Kyoung Il Kim, Ed., *Handbook of CDMA System Design, Engineering and Optimization*, A.4.1 Candidate Site Selection; Prentice Hall, 2000.

²¹ William C. Y. Lee, *Mobile Cellular Telecommunications, 2nd Edition*, ¶4.4 Foliage Loss; McGraw-Hill, 1995.

²² ITW Application, Tab 4; filed 6/30/10.

er less than half the distance, as can be seen with the Peterborough 2 coverage to its north. Any potential sites in Antrim, Bennington, and Greenfield will have similar poor performance without the Crotched Mountain ground elevation advantage. The proposed site (Existing/Proposed coverage map)²³ fits quite well in terms of closing the gap along Route 202. Unfortunately, much of its coverage benefits Greenfield and not Hancock, which is why I had earlier questioned the viability of moving northwest. The other issue is height, and the supplemental material compared performance at antenna C/L heights of 170', 140' and 110' AGL.²⁴ Two gap areas along Route 202 begin to open up at 140' and have become quite obvious at the 110' level. Where there must be adequate coverage is another point of FCC and Congressional ambiguity. Over ten years ago, court decisions indicated there must at least be adequate coverage on principal roads such as Route 202. The Third Circuit Court offered this guideline in its Ho-Ho-Kus decision:

"We think it matters a great deal, however, whether the 'gap' in service merely covers a small residential cul-de-sac or whether it straddles a significant commuter highway or commuter railway. Unlike a utility such as electrical power, cellular service is used in transit, so a gap that covers a well-traveled road could affect large numbers of travelers--and the people who are trying to communicate with them. Over the course of a year, the total disruption caused could be quite significant."²⁵

These gaps are not very large; nonetheless, my concern is that using the higher signal level for in-building service will increase the gap size and adversely impact residential service in this portion of Hancock.

9. The SMR coverage maps²⁶ demonstrate that use of the lower-frequency (937MHz) spectrum is not as critical and, as can be seen, this location enables coverage along Route 202 pretty much from Hillsborough to Peterborough. However, ITW prediction is at -94dBm, which is 10dB lower than the level shown on the PCS maps; this lower level also accounts for the apparent better coverage. Another difference is that the applicant SMR mapping does not indicate substantive difference with lower antenna C/L heights.
10. The alternatives analysis is quite complete, since coverage maps were submitted for sites that appeared to be available, assuming a willing owner. As I originally suspected, the location closer to the top of Norway Hill not only covers Route 202 but also a much larger portion of Hancock. The problem with most of the alternatives is that Norway Hill itself actually gets in the way unless the location is near the top, and becomes a terrain block to coverage along Route 202. The advantage to the proposed site, and any nearby parcel, is that proximity to Route 202 gives good line of sight up and down the road. The ground elevation at the proposed site is not as advantageous, explaining why the original site only required a 140' C/L height.
11. I have previously reviewed plots made with the ITW propagation software and have found its predictions comparable to my own. Nonetheless, for corroborating analysis I employed the widely accepted Okumura²⁷ RF propagation model, with high-resolution terrain data, to spot-check coverage.

²³ ITW Application, Tab 4; filed 6/30/10.

²⁴ ITW Application Supplement, Tab 1; 8/9/10.

²⁵ Cellular Tel. v. Zoning Bd. of Adj. of Ho-Ho-Kus, 197 F.3d 64 (3rd Cir. 1999).

²⁶ ITW Application Supplement, Tab 1; 8/9/10.

²⁷ "Field Strength and Its Variability in VHF and UHF Land-Mobile Radio Service," Yoshihisa Okumura, et al., *Review of the Electrical Communications Laboratory*, Vol. 16, No. 9-10, Sept.-Oct., 1968.

"The Okumura approach is probably the most widely quoted of the available models. It takes into account not only urban, suburban, and rural environments, but also describes the effects of different kinds of terrain. All phenomena and effects can be computed well in practice."²⁸

An empirical model with decades of utilization and refinement, Okumura performs pertinent reliability factoring, which takes into consideration seasonal variation due to foliage. My calculations at several points largely corroborate ITW modeling. For example, at the junction of Routes 202 and 137 (Bennington Road) Okumura 95% modeling predicts -88.1dBm from Crotched Mountain, which is consistent for a point just at or beyond the edge of the -84dBm threshold predicted by ITW. On Peterborough Road just north of its intersection with Link Road, Okumura predicts -82.0dBm, quite close to the -84dBm expected at the edge of the ITW prediction from a Peterborough cell at 442 Hancock Road. Therefore, I conclude that the ITW methods and maps are a credible representation of both PCS and SMR coverage.

12. The FCC Rules and Regulations address RF interference, primarily between licensees. Interference is unlikely beyond the calculated blanketing zone which is just a few feet for the power levels anticipated, although it is impossible to state with certainty that there will never be interference to nearby electronic equipment. Nonetheless, the Town's authority to regulate interference was effectively preempted by the refusal of the U. S. Supreme Court in 2000 to hear the Freeman case.²⁹ In addition, licensees must comply with FCC RF radiation exposure requirements for the general population, as well as for any employees and contractors who have access to the antennas. The August supplement included an analysis by Dr. Donald L. Haes, Jr.³⁰ to demonstrate likely compliance with FCC guidelines regarding Maximum Permissible Exposure ("MPE") to RF radiation. Dr. Haes calculated the exposure from a fully loaded facility, and concluded that even additional collocation will still result in ground-level exposure significantly below MPE. (Some of his assumptions are addressed by the Local Official's Guide³¹ published by the FCC.) Note that the FCC usually considers calculations adequate to demonstrate compliance for this type facility. Accessibility is the key to MPE compliance, and restrictive measures are necessary for both compliance and to meet the Town regulation.³² Beyond addressing accessibility, the Board cannot regulate the placement of the facility based on "environmental" or health concerns, although it can seek demonstration of compliance using guidelines of the FCC Office of Engineering Technology Bulletin 65.

13. I would like to review my conclusions:

a.) ITW has shown inadequate coverage of the Town of Hancock for both its licensed Specialized Mobile Radio services and for potential Personal Communications Service providers. The inadequate service includes most of the principal

²⁸ *Radio Propagation in Cellular Networks*, p. 261; Nathan Blaunstein, Ph.D.; Artech House Publishers, 2000.

²⁹ Freeman, et al., v. Burlington Broadcasters, Inc. et al., Petition for Writ of Certiorari to the U. S. Court of Appeals for the Second Circuit; denied October 2, 2000.

³⁰ RF exposure study by Donald L. Haes, Jr., Ph.D., CHP, dated 8/6/10.

³¹ *A Local Official's Guide to Transmitting Antenna RF Emission Safety: Rules, Procedures, and Practical Guidance* (June 2, 2000), available at http://wireless.fcc.gov/siting/FCC_LSGAC_RF_Guide.pdf (The LSGAC is a body of elected and appointed local, State, and tribal government officials appointed by the Chairman of the FCC. It provides advice and information to the Commission on key issues that concern local and State governments and communicates State and local government policy concerns regarding proposed Commission actions.)

³² Town of Hancock Telecommunications Facilities Regulations: Section VI - Security Fencing.

roads in Hancock, particularly U. S. Route 202. This constitutes a substantial gap in coverage for which the proposed facility is a necessary solution.

- b.) Independent propagation modeling has corroborated the validity of ITW mapping and coverage claims.
- c.) Existing or planned facilities outside the Town are unable to provide satisfactory coverage relief. In addition, ITW has examined a number of alternate locations and demonstrated that they are not available or not viable from a coverage standpoint.
- d.) Coverage is clearly compromised by locating antennas closer to vegetation and, given the probability of collocation interest, the height request is reasonable to provide adequate coverage of Route 202 and nearby residences. At least one other provider has come before the Board to express interest in the facility as proposed.
- e.) Notwithstanding the reasonable height request, there is no compelling evidence that enforcement of the Town 180-foot height limit would result in a denial of service to any provider. Because the FAA and FCC consider height as the highest point including attachments, the tower should be built without attachments that would exceed 180 feet overall height.
- f.) ITW has demonstrated that it will comply with FCC RF exposure guidelines.

Please let me know if you have any questions or need additional information.

Sincerely,

[ORIGINAL SIGNED]

Mark F. Hutchins

APPENDIX 1

Section 704 of Telecommunications Act of 1996: Text from 47 U.S.C. § 332(c)(7)

(7) PRESERVATION OF LOCAL ZONING AUTHORITY.

(A) GENERAL AUTHORITY. Except as provided in this paragraph, nothing in this Act shall limit or affect the authority of a State or local government or instrumentality thereof over decisions regarding the placement, construction, and modification of personal wireless service facilities.

(B) LIMITATIONS

(i) The regulation of the placement, construction, and modification of personal wireless service facilities by any State or local government or instrumentality thereof

(I) shall not unreasonably discriminate among providers of functionally equivalent services; and

(II) shall not prohibit or have the effect of prohibiting the provision of personal wireless services.

(ii) A State or local government or instrumentality thereof shall act on any request for authorization to place, construct, or modify personal wireless service facilities within a reasonable period of time after the request is duly filed with such government or instrumentality, taking into account the nature and scope of such request.

(iii) Any decision by a State or local government or instrumentality thereof to deny a request to place, construct, or modify personal wireless service facilities shall be in writing and supported by substantial evidence contained in a written record.

(iv) No State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's regulations concerning such emissions.

(v) Any person adversely affected by any final action or failure to act by a State or local government or any instrumentality thereof that is inconsistent with this subparagraph may, within 30 days after such action or failure to act, commence an action in any court of competent jurisdiction. The court shall hear and decide such action on an expedited basis. Any person adversely affected by an act or failure to act by a State or local government or any instrumentality thereof that is inconsistent with clause (iv) may petition the Commission for relief.

(C) DEFINITIONS.-- For purposes of this paragraph

(i) the term "personal wireless services" means commercial mobile services, unlicensed wireless services, and common carrier wireless exchange access services;

(ii) the term "personal wireless service facilities" means facilities for the provision of personal wireless services; and

(iii) the term "unlicensed wireless service" means the offering of telecommunications services using duly authorized devices which do not require individual licenses, but does not mean the provision of direct-to-home satellite services (as defined in section 303(v)).