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March 8, 2010

VIA ECFS

Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

RE: WT Docket No. 10-4

Dear Ms. Dortch:

I am the President and Founder of Wilson Electronics, Inc., which filed one of the five petitions that are the subject of the comments that have been submitted in the above-referenced proceeding. I am personally responding to the comments of Verizon Wireless and others regarding the use of radio signal boosters, repeaters, or amplifiers on frequencies licensed under parts 22, 24, and 27 of the Commission's rules. I will refer to such devices collectively as "signal boosters."

SUMMARY

When reviewing the comments of Verizon Wireless regarding signal boosters, the Commission should primarily consider what would be in the best interests of the public. Verizon Wireless (and other carriers similarly situated) is required to operate on these frequencies utilizing the best interests of the public. One of the most significant problems that all wireless carriers face is the phenomenon generally known as "dropped calls," and more recently the similar phenomenon of loss of data in connection with wireless internet transmission. Indeed, I believe it is fair to say that this is the biggest problem that cellular carriers have in delivery of their important service. This problem regularly occurs in rural areas.

It is estimated that approximately 65,000,000[1] are served in those areas generally referred to as "rural" where the problem is primarily a lack of adequate cell towers in order to support the signal in all areas. Short of requiring carriers to build thousands of additional cell towers in rural areas, the best solution to the problem of dropped or degraded calls and data transmission is to boost the incoming and outgoing signals in a way that mitigates, as much as reasonably possible, the interference that can be caused by signal boosters. Even though rural America is one of the main areas where dropped calls occur, there is no question that this problem also exists in areas of concentrated population where cell phone towers proliferate. For example, cell signals can and are significantly degraded by topographic features, but also by large buildings. Accordingly, the problem is not just in rural areas, it is also in urban areas as well. The issue facing the FCC is

[1] Per U.S. Census Bureau – estimate of 2010 population

how to best regulate and promote the use of signal boosters in order to balance the needs of the public to have reliable cell service, while recognizing the need to protect the cell frequencies from unreasonable interference.

Verizon Wireless and CTIA have adopted the position that use of signal boosters should only occur if they are licensed by the individual carriers.

Wilson Electronics has petitioned the Commission to regulate signal boosters uniformly, and adopt standards that will insure that manufacturers' products will adequately and reliably boost signals while having built-in protections that will minimize interference and degradation to the carrier's cell systems.

My comments are offered as support of the Wilson Electronics' Petition because the public's best interests will be best served by the competitive marketplace being able to use its best innovative capacities to invent and build signal boosters that enhance the public's ability to communicate.

To allow the carriers to set their own standards and give approvals is an invitation to destroy the ability of innovators to make and market signal boosters that work based upon scientific evidence, and not based upon the non-scientific concerns and motives of the carriers.

THE PROBLEM

Consideration must be given by the FCC of the underlying reasoning of Verizon Wireless and other similar carriers in supporting and retaining their own biased control over whether or not signal boosters can be sold independently of their approval. The major question, therefore, before the Commission is who should set the standards for signal boosters. On a technical level, Verizon Wireless has not worked with Wilson Electronics and does not understand the current technology that we offer to eliminate signal booster interference. They base their claims of interference on rare occurrences that older Wilson models may have caused. The current available technology proposed to be implemented in Wilson's rule making with the FCC will stop such interference.

Verizon's position that the CTIA petition, which seeks to terminate the use of such products unless and until they are licensed by the carriers, would not be in the best interest of the public because the carriers, and in particular Verizon, have shown no interest in approving or considering broadband amplifiers that can be designed with protection circuits that will not allow boosters to interfere with the cell sites. As discussed in more detail in the following pages, Verizon's conclusion that signal boosters cannot be designed to avoid unreasonable interference is not based upon scientific inquiry into the current status of Wilson's technology.

First, the Commission needs to know that the evolution of the technology in this area has proceeded at a rapid pace since 2005. Wilson Electronics believes that most of the problems that

are referred to in Verizon Wireless' comments would have been caused by earlier-generation products or by products that are prepared by manufacturers without adequate built-in protections. Wilson Electronics, for example, has been working hard to develop boosters which have protection to eliminate interference with base stations.[2]

For example, in early 2009, Wilson received a call from a customer reporting that Verizon had asked him to shut down his "in-building" amplifier. Wilson called the local Verizon engineer who was kind enough to allow testing at the affected cell site located in Bakersfield, California. The "broadband noise floor" problem was diagnosed and Wilson engineers, with the help of this local Verizon engineer, were able to determine the cut-off point for interference and therefore refined its algorithm for noise floor protection shut-off, which was developed in 2008. All current Wilson building amplifiers now have this feature, which resolves the problems known as "broadband noise floor," referred to in the Verizon Comments. By the summer of 2009, this adjustment was incorporated into its building amplifiers (signal booster). These kinds of helpful refinements would occur at an even more rapid pace with cooperation from the carriers.

On page 7 of Verizon Wireless' comments, there are bullet-point summaries of data collected by Verizon in support of their position that signal boosters cause interference. First of all, Verizon characterizes the problems of system interference by signal boosters as "common," when in fact the total number of incidents from the 3 regions selected were the relatively small numbers of 71 in the Pacific Northwest region over a 3½-year period, 22 for mobile boosters, 53 incidents from the Mountain Region over a 4+ year period (only 10 of which were identified as mobile signal boosters), and 9 "confirmed incidents" in the Georgia/Alabama region of repeater interference over a 1½ -year period. Considering the volume of calls made by the public during these times, these numbers are very small, especially when you consider the relatively small number coming from so-called mobile boosters, the reality of the millions of dropped or degraded calls experienced on a daily basis by the public, and the number of years Verizon used in its reporting sample. Indeed, had the protections that Wilson Electronics requested in its proposed rule making been in place, I believe that 99% of the interference incidents would have been eliminated.

In my experience, most of the mobile signal booster interference would likely have been caused by oscillation (other problems would be unlikely due to the low gain of the units). Wilson's oscillation protection has been in place since 2006. Implementing the proposed rule to institute oscillation protection would solve most incidents of interference in mobile boosters.

Also, the particular incidents stated by Verizon are not stated with any factual particularity. In the few cases where they are claimed to have been able to identify the specific product that caused system interference, they offer no specifics of how these devices caused interference. For example, Wilson Electronics first heard of these when Verizon filed its

[2] To protect against booster oscillation, adjacent channel noise rise, base station receiver overload, and noise floor increase, Wilson has invented circuitry that protects the base station from these interferences. These protections have evolved as problems have been found from 2006 to the present.

comments. Without particulars and cooperation, including the opportunity to examine specifically which model is in question and to examine the model itself and test it, it is impossible to determine the reliability of these claims. Most significantly, with cooperation, specific situations can be cooperatively tested and solutions crafted, just as occurred in the Bakersfield Verizon example discussed above. It does appear clear, however, that the reported dates of these incidents (January 2009 and March 2009) would have had to have been before the latest upgrade for "reverse link noise protection based upon forward link sensing" which was introduced in the summer of 2009. It is also well to note the relatively small number of them involving Wilson products (2 are mentioned specifically; 4 are alluded to without specifics).

I do understand that poorly designed boosters can cause interference to a CDMA system. This does occur on a limited basis. Wilson's position, however, is that with recent technological advances in these products, such interference would be far less than that which is reported by Verizon. Indeed, it is Wilson's policy, as soon as it learns of any system interference caused by its products to immediately seek and find an engineering solution. Wilson has received no guidance from U.S. carriers at the corporate level in this effort.

The very reason that Wilson's engineers have worked hard to invent upgrades to its boosters is to deal with actual issues that they have found over the years to make sure that its equipment does not interfere. Unfortunately, many manufacturers of similar products have not done this, and their products have the potential to cause interference. Wilson agrees that standards need to be adopted that will eliminate as much interference as is reasonably possible, and has so stated in Wilson Electronics' proposed rule making.

Verizon basically concludes, on page 19 of its comments, that "design standards alone are not sufficient to protect against harmful interference." Essentially, Verizon argues, without technical substance, that Wilson's boosters cannot be made interference free to their CDMA system. The truth is that Wilson has sought, on numerous occasions, to meet with Verizon's technical people to demonstrate and to test its products.

Over an 18-month period, Wilson made good faith efforts to communicate with Verizon to have Verizon examine its 801201 mobile dual band booster on a true-testing basis. Wilson has found that in the case of Verizon, they simply will not even allow a dialogue to occur at the engineering level. For example, after numerous attempts to obtain meaningful communication at the engineering level, Wilson received an email from Verizon's attorneys indicating several generalized issues with mobile boosters. In response, Wilson produced a video with an expert addressing every point of Verizon's email. In the video, an independent (RF) expert (myself and Wilson's engineers), answered all of the objections to mobile booster usage on CDMA systems. Wilson sent the DVD to Verizon. Verizon's response was that they could not get the video to work on their DVD. In response, Wilson sent 2 new DVDs on about October 2008, and we have not since heard back from Verizon regarding the DVD. Verizon was also sent a written report which stated the same technical data, which also has not been responded to.

At a certain point in 2009, Verizon's attorneys refused to allow any conversation with their technical people, and instructed Wilson to contact an independent laboratory Intertek to have their products tested. Wilson complied and contacted the independent lab, who responded

that they could not test it because Verizon has no mobile booster standards to test against. The independent laboratory then referred Wilson to a specific engineer at Verizon and a dialogue was initiated. Wilson was pleased that this particular engineer had agreed to have a telephone meeting. When the date and time came for the telephone conference meeting, the engineer failed to show up for the telephone conference. Several days later, Wilson got an email stating that he was instructed by Verizon's attorney to not communicate with Wilson.

It is clear that that Verizon has made the decision that they are not going to consider appropriate standards for signal booster devices; that they have wrongly concluded, without scientific support, that there are no design standards that are sufficient to protect against harmful interference (*see* page 19 of Verizon's comments).

An analysis of Verizon's logic begins at page 14 of its comments, where it states, "Device standards for boosters are not sufficient to prevent harmful interference."

First, based upon a claimed interference by Wilson products employing "Smart Tech" technology, they claim that there is interference, not giving any details of the cause of the interference, or without any knowledgeable understanding if the particular device that was claimed to have caused the interference was one that has the most current technology or not.[3]

When they do finally talk about some specifics by way of example, they refer to claims of adjacent-channel noise rise, referring to the "classical near-far" problem in cellular networks. They describe this example of a situation where a cell provider is being served by a far-away station and the subscriber uses maximum transmit power to be heard by the network. The problem, therefore, is that the signal itself, when received by a nearby cell site, can cause adjacent channel interference to the other service provider's base station. While this phenomenon can occur, Verizon entirely ignores or does not know the fact that Wilson's latest models contain power limiting at +30dBM on the CDMA reverse link, which will not damage the nearby cell site.

Wilson's technology offered in support of its rule making also features broadband reverse-link noise protection based on forward-link sensing, which cures the broadband noise floor problem referred to by Verizon. Fundamentally, any additional noise floor generated that affects a nearby cell site is cut-off almost instantaneously by this protection device. Verizon totally ignores this feature of the Wilson technology, which solves this problem. Attached to the Wilson Electronics' Comments are more detailed technical specifications which explain the relative technical criteria for all the interference issues raised by carriers, including Verizon.

On page 17 of the Verizon Memo, they state that signal boosters can also cause problems for a CDMA base station that is actively serving that subscriber. I agree that the boosters, without proper gain control, can cause interference to cell site receivers if the cell phone power control loop cannot sufficiently reduce the reverse link power output of the booster. Wilson Model 801201 or 801101 employs the same broadband reverse-link power control using

[3] The Smart-Tech name is a Wilson brand first marketed in 2006 when Wilson added oscillation protection to its product. Other inventions have followed (*see* footnote 3 above). Without identifying the vintage of the product, or the claimed specific interference, it is impossible to determine what may have caused interference.

forward-link sensing referred to above. Essentially when the cell site commands to transmit minimum power, the booster reduces its gain to zero (shuts the signal booster off) so it reverts to the cell phone alone, communicating without the power of the booster. Again, Verizon is making assumptions of problems that are already dealt with by Wilson's technology.

Finally, at pages 18 and 19, Verizon claims that it thoroughly considered Wilson's request to approve its mobile signal booster for use on its network. As has I have already shown, Wilson's 1 1/2-year battle to obtain an audience that would view their product from a scientific basis has been stonewalled, resulting in an inability to talk to any of Verizon's technical people, in order to have any kind of active scientific discussion about their concerns. Had those discussions occurred between knowledgeable experts with an eye toward fairly viewing the current features of the Wilson products, I believe that Verizon would have determined that Wilson mobile boosters have protections to prevent significant interference to the cell site. The truth is that the Wilson technology does eliminate interference, and to the extent that there is an occasional technical deficiency (for example a defective or damaged booster), the benefit to the public of having rural users which are estimated to be somewhere in the range of 65,000,000 people, far outweighs what Wilson believes would be very rare instances of interference, if appropriate standards are incorporated.

I believe that carriers' motivation for withholding approval of signal boosters lies within their understandable desire to protect their network. This is also fueled by the broadband issue referred to in Section VI regarding concerns for liability.

The carriers are large bureaucratic organizations that often make decisions not to proceed with something new. In this case, the fear is based upon legitimate concerns of interference by signal boosters that is internally based on historic precedent of actual problems and perhaps also fear of liability for approving signal boosters that might interfere with another's frequency. The problem is that the internal perception of the carriers do not keep their eye on their fundamental duty to serve the public. Verizon's responses to Wilson, which have ignored scientific inquiry into the protections indicate this. What we are asking the FCC to weigh here is the massive problem of dropped calls to the public versus the reality that occasional system interference now can be stopped by the effects of recent innovation, if standards are put in place.

Wilson has sold over 500,000 signal boosting devices which are relied upon all over the U.S. (including 500 government agencies) to overcome the massive problem of dropped calls. It is clear that these devices are in high public demand because they work. When designed properly, they also do not interfere with cell systems.

If cellular carriers are given approval rights, it is predictable that some will not approve them no matter what science says otherwise. Uniform standards scientifically established and independently administered by the FCC are the answer.

Wilson agrees that standards do need to be adopted because interference is possible from time to time without the appropriate built-in protections. The question therefore becomes who should administer these. If the individual licensed carriers are given this right, the standards will be chaotic. Also, Wilson's own attempts to work with Verizon and other carriers, shows how

that process can go if a carrier, for whatever reasons it employs, decides that it does not wish to allow boosters to be used on their system, which is adverse to the interests of the public.

WILSON'S CANADIAN EXPERIENCE

Wilson's experience in Canada with the carrier Telus is an example of cooperation that can exist, but also shows the real world difference between carrier approaches. Wilson has sold over 150,000 signal boosting devices in Canada, which Telus actively markets in the best interest of the citizens of Canada. By contrast Telus cooperated with Wilson on the design and testing of the Wilson 801201 dual-band wireless booster, to insure its use on its system would not cause interference. In Canada most of the country is rural and cell towers are understandably sparse. Wilson's signal boosters have worked well to provide service where it was not previously possible, or reliable, without any significant system interference. In those circumstances, Telus cooperated with Wilson in order to better serve its customers. Telus' engineers worked closely with Wilson engineers to design and build a product that would not interfere with their CDMA system (the same technology as Verizon). In addition, Telus developed their own standards for mobile boosters and had Wilson products tested against these standards by independent laboratories. The variance in attitude between Verizon and Telus is illustrative of the variance in carrier attitudes to approve signal boosters, which is likely to occur if approval is left to each carrier.

In Verizon's case, approval of the same booster, on the same type of system, was not even considered on a technical basis, and was summarily dismissed, without any significant technical dialogue or scientific testing regarding interference.

PUBLIC SAFETY

When considering the needs of the public, it is demonstrable that signal-boosting devices are critical to providing necessary cell service to the public. This is especially critical in the case of emergency responders such as police, fire, and EMT operations. For example, in the public comments that have already been filed on this matter, numerous public agencies, especially those in rural areas, have made this point that they have been able to greatly enhance their cell service by utilizing signal boosting devices. Wilson has sold signal boosters for cell phones to over 500 government agencies. For example, *see* the video of Corry Pulsipher of the St. George, Utah Police Department indicating the importance of these boosters to his department which operates in a rural area near St. George, Utah, previously submitted to the FCC.

In rural areas, the inability to communicate in certain areas is a given. In these same areas when Wilson boosters have been utilized by these departments, they have clear and uninterrupted services in most cases. In the Mexican Hat incident, which is referred to in Wilson Electronic's initial filing, lives were at stake because cell phone reception would not work where a significant bus accident had occurred. The person reporting the accident literally had to drive 36 miles before reception could be had when, with an appropriate booster, the bus could have called in its own report or anyone else with a booster. In the report on the incident issued by the NTSB, which is attached to Wilson's petition, it was recommended that buses traveling in rural areas be equipped with Wilson signal boosters.

BROADBAND ISSUES

If boosters are limited to the frequency of the cell carrier, the public will not be served because of the flexability required to have adequate cell service. For example, many customers, especially in rural areas, carry multiple cells with different carriers. Also, roaming would not be possible to be boosted without broadband capacity. Indeed, individual carriers jump from one frequency to another, depending on the area.

Accordingly, any solution that seeks to limit signal boosters to a single frequency would not adequately serve the public.

Also, I understand the cellular carrier's dilemma of approving a signal booster that could arguably create legal liabilities to another carrier if interference occurs. The FCC needs to deal with this problem, and approval of uniform standards can solve this as well because the carriers would have no liability for standards approved by the FCC.

CONCLUSION

Booster technology has advanced significantly in the last few years. Some of the Wilson protection devices that are not built into its products were only recently developed. It is undoubtedly the case that most of the interference that Verizon has experienced was caused by devices without adequate protection. It makes ultimate sense that the FCC, through the use of independent and fair scientifically based standards would adopt standards for the manufacturing and distribution of these devices that would insure that interference is kept to an absolute minimum, while significantly enhancing the service to the public.

In summary, I believe that there is potential for interference to wireless networks by devices that do not have the latest protections built into them. Devices that do have the latest protections known built into them very rarely cause interference, which would probably be more associated with an equipment failure, not with a design issue. The solution to the problem are uniform standards promulgated and administered by the FCC or by some industry trade group, which standards would be set with respect to the actual science involved and the public needs, and not based upon the variable concerns of the carriers. Also, if all 10 carriers can approve with their own standards, the approval process alone will drive up costs, and result in varying results, including the probable elimination of new boosters on carriers' systems that will not approve booster.

The truth is that signal boosters work to enhance the signal. Even Verizon agrees that this occurs. For most rural users, dropped and/or degraded calls or data is a daily occurrence, especially for mobile users. I know of no interference issue that has not been dealt with by Wilson innovations. The protections currently available, if made mandatory by FCC rule, will eliminate the interference problems to the carriers. I am also confident that with the cooperation of the carriers, any problem that future experience brings, will be solvable with an eye toward protection of the carriers' networks.

There is a legitimate regulatory need here, and Wilson is willing to cooperate in every

way in making sure that its products meet reasonable standards to eliminate interference wherever reasonably possible. The same principles that we have focused on in these comments with respect to rural mobile devices, should also be applied to stationary building devices or so-called repeaters because these can be manufactured at reasonable cost, utilizing the same new technology to boost signals without interference.

I respectfully urge the Commission to begin a rulemaking with the aim of adopting new rules consistent with those proposed by Wilson Electronics, including two additional proposed rules (*see* attached Addendum No. 1).

Very truly yours,

James Wilson

cc: Thomas Derenge
Erin McGrath
Paul Garnett
Alan S. Tilles
Michael D. Saperstein, Jr.
John T. Scott, III
Robert H. Schwaninger

ADDENDUM NO. 1

REQUESTED ADDITION OF PROTECTIONS TO PROPOSED RULE MAKING RE: SIGNAL BOOSTERS

We respectfully request that the Commission include the following additional topics in the proposed Rule Making that was previously submitted:

Reverse Link Shutdown Controlled by Forward Link Detection

When a base station receives a strong cellular signal, it will instruct the transmitting device (cell phone, booster, etc.) to reduce its power to a level that is compatible with the cellular network. In some instances, booster amplifier gain will not enable the power to be sufficiently reduced in order to comply with the needed power reduction thereby causing the base station receiver to be overloaded. Upon receiving a base station's Forward Link signal, a booster can determine if base station receiver overload is possible. Whenever such a possibility exists, a booster should be required to reduce its Reverse Link transmitted power by either shutting off completely or by reducing its transmitted power to a level that would not be harmful to base stations.

Limiting CDMA Output to 30 dBm

Boosters should be transparent to cellular networks and must not transmit with more power than is permissible for cell phones. The accepted industry standard for CDMA cell phones specifies a maximum power limit of 30 dBm.[1] While transmitting CDMA, boosters should be required to limit their power output to 30 dBm.

[1] *Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations – Addendum, TIA-98-F-1,* Telecommunications Industry Association, June 2006, Table 4.4.5.3-1.