

BEFORE THE  
**Federal Communications Commission**

WASHINGTON, DC 20554

In the Matter of	)	
	)	
Amendment of the Commission's Rules with	)	GN Docket No. 12-354
Regard to Commercial Operations in the 3550-	)	
3650 MHz Band	)	
	)	
	)	

To: The Commission

**COMMENTS OF XCHANGE TELECOM, INC.**

Xchange Telecom, Inc. (“Xchange”), pursuant to Section 1.405(a) of the Commission’s Rules, 47 C.F.R. § 1.405(a), hereby comments on the above-referenced Notice of Proposed Rulemaking and Order (“3.5 GHz NPRM”) released on December 12, 2012.<sup>1</sup> In the 3.5 GHz NPRM, the Federal Communications Commission (“FCC” or “Commission”) seeks comment on the creation of a “new Citizens Broadband Service in the 3550-3650 MHz band (‘3.5 GHz Band’) currently utilized for military and satellite operations, which will promote two major advances that enable more efficient use of radio spectrum: *small cells and spectrum sharing*.”<sup>2</sup> In addition, the Commission seeks comment “on whether to include under these proposed new, flexible rules the neighboring 3650-3700 MHz band, which is already used for commercial broadband services.”<sup>3</sup>

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<sup>1</sup> See Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band , GN Docket No. 12-354, released December 12, 2012 (“3.5 GHz NPRM”).

<sup>2</sup> 3.5 GHz NPRM at 2.

<sup>3</sup> *Id.*

At the outset, Xchange unequivocally affirms its support for the Commission's goal of expanding wireless broadband services and the collaborative effort between the FCC and the National Telecommunications and Information Administration ("NTIA") to make federal spectrum used by government agencies available for commercial use on a shared basis.<sup>4</sup> Xchange agrees that the 3.5 GHz band is an ideal band to demonstrate the merits of spectrum sharing between federal incumbents and commercial spectrum users. The known position of stationary incumbents in the 3.5 GHz band makes them identifiable and protectable through the implementation of a geolocation database. The propagation characteristics of the band make it well suited for small cell sites, cellular network off-load and intra-city fixed wireless broadband deployment, as well as other broadband applications.

Certain aspects of the Commission's proposed rules for the 3.5 GHz band, however, dramatically limit the commercial utility of the band and do little or nothing to alleviate the pending spectrum crunch in the most densely populated and spectrally congested areas of our nation. Specifically, the proposed exclusion zones around coastal radar facilities in the 3.5 GHz band, which rigidly prohibit any shared use in coastal regions over 100 miles inland, are overly restrictive. As a pioneer in the coordinated deployment of 3650-3700 MHz ("3.65 GHz") networks in close proximity to grandfathered international earth stations, Xchange believes that interference avoidance mechanisms can be implemented to enable shared use of the 3.5 GHz band in certain large eastern seaboard and western seaboard cities (New York, Boston, Los Angeles, *etc.*) without creating harmful interference for incumbent radar installations. To the extent that safeguards can be implemented to allow the shared commercial use of the 3.5 GHz

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<sup>4</sup> See *Id.* at 3.

band in discrete coastal regions, Xchange urges the Commission to thoroughly explore such opportunities.

## **I. INTRODUCTION TO XCHANGE TELECOM'S 3.65 GHz NETWORK**

In an environment where consolidation has eliminated many competitive telecommunications service providers, Xchange is a “David versus Goliath” success story. Xchange, founded in 2002, is a regional Competitive Local Exchange Carrier (“CLEC”) serving the New York region and surrounding areas. Xchange has deployed state of the art facilities and interconnects to most major carriers and data providers. Thousands of small, medium and enterprise sized business customers rely on Xchange’s network for the highest quality, personalized service and exceptional value.

Xchange is one of only fourteen (14) companies selected nationwide to participate in the FCC’s pilot program to advance broadband adoption. As the only New York provider to be selected, Xchange will begin rolling out a discount plan for eligible low income customers in 2013 that provides significant savings to their broadband costs. The pilot will focus on specific neighborhoods in Brooklyn and gather data and provide analysis on a wide a range of geographic, technological, and programmatic variables.

In 2012, Xchange deployed the only 4G wireless network in New York City that utilizes the 3.65 GHz band to deliver 4G service to business, enterprise and residential customers utilizing microcells/small cells.<sup>5</sup> The deployment of 4G microcell service using 3.65 GHz capacity in New York City has enabled Xchange to deliver unprecedented broadband speeds to customers in underserved areas of the city that have access only to antiquated and/or poorly maintained copper infrastructure, or to customers that cannot afford to purchase service from

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<sup>5</sup> See FCC Call Sign WQOW965.

Xchange's more established competitors that have historically served New York City. In fact, the configurability and flexibility of this 4G network enabled Xchange to restore phone and broadband access to large swaths of Brooklyn that suffered catastrophic infrastructure failure as a result of Hurricane Sandy in October 2012.<sup>6</sup>

Xchange's deployment of 4G microcell service in the 3.65 GHz band remains unprecedented because New York City falls within the protective contour of five (5) grandfathered international earth stations that continue to use the 3.65 GHz band. Xchange coordinates with these earth stations every time it deploys a new base station in the 3.65 GHz band, and has been able to carefully avoid creating interference into these sites by shaping its base station beams, adjusting antenna downtilt and varying the effective isotropic radiated power ("EIRP") from its transmitters as needed based on careful modeling to determining how much protection the potentially affected earth station requires. To date, Xchange's 4G network has operated successfully in close proximity to the aforementioned earth stations without any incidents of interference.

## **II. XCHANGE SUPPORTS SHARED USE OF 3.5 GHz FREQUENCIES**

Xchange agrees with the Commission's assessment that the 3.5 GHz frequency range is an "ideal band in which to propose small cell deployments and shared spectrum use."<sup>7</sup> Xchange's deployment of microcells in the immediately adjacent 3.65 GHz band makes Xchange intimately qualified to endorse the attributes of the 3.5 GHz band for microcell or small cell deployment. In particular, the 3.5 GHz band has propagation characteristics suitable for microcell deployment in densely populated areas that demand frequency reuse. The implementation of relatively modest antenna heights and output power will also enable the same

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<sup>6</sup> See FCC Call Sign WQQE423.

<sup>7</sup> 3.5 GHz NPRM at 4.

frequencies to be reused multiple times in close proximity. While the 3.5 GHz band accommodates heavy frequency reuse, signals in the 3.5 GHz band will still penetrate atmospheric anomalies and rain adequately to enable carrier-grade applications that require 99.9% reliability or better. Moreover, the rapid deployment of new 3.5 GHz equipment should require only a modest research and development effort given that there is a robust, existing ecosystem for 3.65 GHz hardware that can likely be retuned and recertified expeditiously.

Xchange agrees that geolocation database technology developed for the television broadcast white spaces (“TVWS”) can be remapped to protect incumbents in the 3.5 GHz band.<sup>8</sup> Given that there are no itinerant, portable incumbent spectrum users in the 3.5 GHz band, the implementation of a TVWS-based geolocation database should actually be more streamlined than the deployment in the broadcast bands where many different classes of user require varying degrees of protection.

### **III. PROPOSED 3.5 GHz RULES REQUIRE REVISION TO ENSURE VIABILITY OF THE BAND**

Certain proposals within the Commission’s 3.5 GHz NPRM will severely hinder the utility of the band. Xchange urges revision of these rules before they are adopted. Specifically:

*Overly Conservative Exclusion Zones:* The Commission contemplates exclusion zones that are overly conservative (potentially extending well over 100 miles inland) and which will likely cripple the prospects for the 3.5 GHz band.<sup>9</sup> Exchange notes that these expansive exclusion zones are not being given consideration to protect incumbent radar sites. Instead, the Commission is looking at implementing these exclusion zones in an effort to “address the

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<sup>8</sup> See 3.5 GHz NPRM at 32.

<sup>9</sup> See 3.5 GHz NPRM at 40.

potential interference from high-power radar systems to the [proposed] wireless broadband systems.”<sup>10</sup>

Xchange urges the Commission to focus solely on interference avoidance into the protected incumbent services when formulating exclusion zones.<sup>11</sup> The new entrant spectrum users fully understand that they must accept any and all interference from radar sites. There is no reason for the Commission to unnecessarily stifle development of shared 3.5 GHz spectrum throughout the entirety of the eastern and western seaboard in an effort to protect new entrants that have no expectation of interference protection from incumbent services. To the extent the new entrants can use the 3.5 GHz while ensuring that incumbent signal-to-noise ratios are protected, the Commission should avoid further involvement in the engineering of commercial 3.5 GHz networks.

Xchange also recommends that the Commission allow 3.5 GHz spectrum users to coordinate with radar sites directly or through NTIA if the spectrum user can demonstrate that it can safely operate wireless broadband facilities within the relevant exclusion zone without meaningfully degrading the incumbent’s clean signal-to-noise ratio. The current rules for the 3.65 GHz band allow such coordination with incumbent fixed satellite ground stations, and although Xchange’s current New York City 3.65 GHz microcells fall within the protected contour of five (5) protected fixed satellite sites, careful engineering has enabled the coordination of numerous microcell sites throughout Brooklyn.<sup>12</sup> Among others, Xchange has employed the following techniques to avoid creating interference into fixed satellite sites in the 3.65 GHz band.

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<sup>10</sup> *Id.*

<sup>11</sup> Based on the Fast Track Report prepared by NTIA the interference-to-noise (I/N) protection criteria for interference from wireless broadband transmitters to radar sites in the 3.5 GHz band is -6 dB. *See 3.5 GHz NPRM* at 38.

<sup>12</sup> Xchange has presently coordinated in excess of fifteen (15) 3.65 GHz base station sites in New York City.

- Beam Shaping: Xchange employs highly directional antennas in the 3.65 GHz band with narrow beamwidth that avoid radiating energy off-axis. Using highly directional antennas and orienting the main beam away from the potentially affected incumbent site dramatically reduces the amount of co-channel energy received by the incumbent.
- Downtilt: Given that microcells only need to cover a relatively small geographic area, Xchange employs significant mechanical and electrical downtilt to limit the propagation of 3.65 GHz signals.
- Variable EIRP: To the extent necessary, Xchange adjusts the spectral density of its signals to remote grandfathered earth stations.

The above interference mitigation techniques can be applied to the 3.5 GHz band as well, and the Commission should avoid rigidly prohibiting shared use of the 3.5 GHz band within exclusion zones if coordination with the incumbent spectrum user can be accomplished.

The spectrum crunch will likely occur in New York, Los Angeles, San Francisco and other major coastal cities. If commercial use of the 3.5 GHz band is rigidly prohibited in vast exclusion zones that stretch inland from the coasts, even when commercial use is carefully coordinated with the incumbent spectrum user, the Commission's efforts to open the band for shared use will not meaningfully impact the potentially looming crunch.

*Lite-Licensing Necessary for Shared Users of 3.5 GHz Spectrum*: The Commission seeks comments on whether to license shared 3.5 GHz commercial spectrum users by rule, or to implement a lite-licensed framework similar to the 3.65 GHz band.<sup>13</sup> Xchange urges the Commission to adopt a lite-licensed framework for shared use of the 3.5 GHz band. Licensing 3.5 GHz transmitters by rule will not lend itself to the deployment of small cells/microcells that will be expected to provide a higher quality-of-service and reliability relative to Wi-Fi and other traditional Part 15 radiators. The lite-licensed framework implemented already in the 3.65 GHz band enables coordination with incumbent spectrum users, and better allows incumbents and new entrants to understand the parameters of transmitters in close proximity.

Licensing by rule would actually discourage investment in the 3.5 GHz band. In particular, licensing by rule would create a strong disincentive for small carriers to invest in 3.5 GHz infrastructure and networks because it will be difficult if not impossible under such a scheme to predict the RF environment with any degree of certainty. Further, licensing 3.5 GHz systems by rule would likely prevent carriers from coordinating with radar sites and international earth stations. Coordination with radar sites and earth stations will require some form of registration so that the incumbent spectrum user and FCC understand and understand what new entrants have been approved to operate within the relevant exclusion zone or protected contour. Given that small carriers, including Xchange, are traditionally much more aggressive in pricing their services and deploying infrastructure in underserved communities, a lite-licensed approach strikes the appropriate balance between facilitating access to the spectrum with minimal restrictions while still maintaining regulatory oversight of microcell/small cell base stations that would need to register with the FCC directly or the proposed spectrum access manager.

Finally, Xchange urges the Commission not to integrate the 3.5 GHz and 3.65 GHz bands unless a lite-licensed approach is adopted. The 4G microcells that Xchange has coordinated in New York City in the 3.65 GHz band cannot be operated pursuant to a “license by rule” framework given that these sites are located within the protected contour of five (5) grandfathered international earth stations for which a painstaking coordination and engineering analysis has been undertaken for each microcell. This type of operation, which is being used to deliver uncapped, unlimited 4G service to residents of New York, simply cannot be accomplished under a licensed by rule framework.

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<sup>13</sup> See 3.5 GHz NPRM

#### **IV. CONCLUSION**

For the foregoing reasons, Xchange applauds the Commission's Notice and urges it to revisit the calculation of exclusion zone contours to ensure that coordinated commercial spectrum users are permitted to deploy networks and maximize the utility of the 3.5 GHz band, and to adopt a lite-licensed regulatory framework similar to successful rules implemented in the 3.65 GHz band.

Respectfully submitted,

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February 20, 2013