

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 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)	

COMMENTS OF CANTOR TELECOM SERVICES, L.P.

July 14, 2014

Andrew D. Lipman
Timothy L. Bransford
Denise S. Wood
Bingham McCutchen LLP
2020 K Street, N.W.
Washington, DC 20006
(202) 373-6000
(202) 373-6001 (Fax)
andrew.lipman@bingham.com
timothy.bransford@bingham.com
denise.wood@bingham.com

Counsel to Cantor Telecom Services, L.P.

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EXECUTIVE SUMMARY

Cantor Telecom Services, L.P. (“Cantor Telecom”) applauds the Commission’s efforts to address wireless coverage and capacity issues in the 3550-3650 MHz band. Cantor Telecom generally supports the Commission’s proposals with respect to authorization of Priority Access License (“PAL”) rights, license term limits and aggregation of licenses as an initial step toward promoting flexibility, fungibility and liquidity in the secondary market but encourages the Commission to adopt rules that permit flexibility to accommodate market demand over time if a higher value could be achieved with a modified construct.

Cantor Telecom believes the FCC should incorporate innovative and forward-looking spectrum sharing models into the new rules to ensure the most open access to spectrum in the 3550-3650 MHz band. Cantor Telecom envisions a spectrum exchange managed by an independent and disinterested third party who can compile and make available the necessary information to facilitate these diverse uses in the most efficient manner. Above all, the spectrum exchange would serve as a tool under the United States Government’s control to manage resource availability, maximize information transparency and preserve classified information in order to maximize public utility and revenues.

As further discussed herein, Cantor Telecom proposes a spectrum exchange design modeled on platforms which exist for the trading of other U.S. Government securities. Cantor Telecom believes that a spectrum exchange can be implemented expeditiously and maintained at a reasonable cost to the end user, thus allowing the Commission and NTIA to unlock this band for commercial use in the near term.

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Cantor Telecom Services, L.P. (“Cantor Telecom”) hereby submits these comments in response to the Federal Communications Commission (“FCC” or “Commission”) Further Notice of Proposed Rulemaking proposing shared commercial and government use of the 3550-3650 MHz band (“3.5 GHz”) band.¹

I. BACKGROUND

Cantor Telecom is a subsidiary of Cantor Fitzgerald, L.P. (“Cantor Fitzgerald”), which is the holding company for a financial services organization, including investment banking, securities brokerage and real estate services, which has been in operation since 1945. As one of the last private partnerships operating on Wall Street, Cantor Fitzgerald has utilized its extensive experience and innovation as a computer-based bond brokerage to become a global premier financial services firm. For decades, Cantor Fitzgerald has been a market leader in the most efficient and cost-effective trading methods and provides expertise in a variety of areas, including the equity and fixed income capital markets, commercial real estate brokerage and finance, prime brokerage, gaming technology, insurance products and others. Cantor’s main broker-dealer is one of 22

¹ *In the Matter of Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Further Notice of Proposed Rulemaking, FCC 14-49 (rel. April 23, 2014) (“3.5 GHz FNPRM”).

primary dealers authorized to trade U.S. government securities with the Federal Reserve Bank of New York. Cantor Fitzgerald and its affiliates have approximately 8,000 employees in 20 countries.

Cantor Fitzgerald's work on behalf of the United States Federal Government ("USG") concerning spectrum monetization began in the 1990's as the FCC prepared to launch the PCS auctions. Cantor Telecom has participated in rule making procedures pertaining to spectrum issues (*e.g.*, basis for spectrum leasing), and pursued the creation of an exchange for radio frequency spectrum which enables trading of primary license and secondary lease rights for any authorized band.

Cantor Fitzgerald also has a long history of leadership in the development and operation of innovative electronic exchanges. Cantor Fitzgerald's electronic trading platforms enable participants to transact business online instantaneously and can be rapidly customized. Cantor Fitzgerald's electronic platform has auction and reverse auction capabilities, inquiry based functions, real-time distribution and transaction capabilities and can operate on a secure, high-speed private network or over the public Internet. Cantor Fitzgerald has long been at the forefront of electronic exchange innovation and recently divested one such platform facilitating trading in several forward U.S. Treasury security markets to NASDAQ.

As discussed in its prior filings, Cantor Telecom believes the FCC should incorporate innovative and forward-looking spectrum sharing models into the new rules to ensure the most open access to this spectrum.² Cantor Telecom envisions a spectrum

² See *In the Matter of Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Ex Parte Comments of Cantor Fitzgerald Telecom Services, LLC, FCC 12-148 (filed July 31, 2013); *In the Matter of Amendment of the Commission's Rules with Regard to*

exchange as a tool under the government’s control that can be used to balance resource availability, transparency while preserving classified information to maximize public utility and government revenues. As discussed in greater detail below, Cantor Telecom urges the Commission to explore the development of a spectrum exchange system for this band and to ensure that any rules ultimately adopted are sufficiently flexible to accommodate innovative spectrum exchange approaches.

II. PRIORITY ACCESS LICENSES

The FCC proposes to authorize Priority Access License (“PAL”) rights at the census tract level and to permit geographic aggregation across license areas.³ Cantor Telecom agrees that census tracts may offer certain benefits such as geographic sizes varying by population densities which would allow PAL applicants to target specific areas that they intend to serve.⁴ The FCC might further consider permitting dynamic disaggregation and partitioning of the licenses as this could improve demand and value of the spectrum in the secondary market.

The Commission seeks comment on its proposal to limit license terms to one year with no renewal, and to allow entities to aggregate up to five consecutive years of licenses through competitive bidding procedures.⁵ Cantor Telecom supports this proposal as an initial step toward promoting flexibility, fungibility and liquidity in the secondary market and would expect this proposal to achieve a substantial value for use rights. Cantor Telecom notes that practically speaking, these rules may need to be amended to accommodate market demand over time if a higher value could be achieved with a

Commercial Operations in the 3550-3650 MHz Band, Ex Parte Comments of Cantor Fitzgerald Telecom Services, LLC, FCC 12-148 (filed Mar. 13, 2014) (collectively, “*Cantor Telecom Comments*”).

³ 3.5 GHz FNPRM at ¶ 44.

⁴ *Id.*

⁵ *Id.* at ¶ 49.

modified construct and therefore encourages the Commission to adopt rules that permit such flexibility.

In addition, the Commission proposes allowing PAL users to hold up to three licenses in one census tract at one time.⁶ While this policy promotes competitive access to the band, Cantor Telecom suggests that the Commission consider a flexible approach that might allow for a waiver process to permit a party to exceed this limitation in the event that spectrum is lying fallow. In a similar vein, Cantor Telecom supports a “use it or lose it” scheme whereby PAL users would be prohibited from warehousing licenses without any beneficial use and inoperative licenses would be relinquished to other participants through the spectrum exchange after a reasonable period of time.

Finally, Cantor Telecom envisions that either the Spectrum Access System (“SAS”) or spectrum exchange administrator would arbitrate any disputes among PAL users and that the government would only intervene in the event that the dispute resolution procedures break down.

III. SPECTRUM EXCHANGE DESIGN

The Commission seeks comment on development one or more spectrum exchanges to facilitate a robust secondary market for PAL rights.⁷ Cantor Telecom believes the adoption and use of a spectrum exchange through which future PAL users in this band could trade and exchange spectrum based upon their needs at any given time would improve access. This type of exchange would significantly increase the liquidity of the spectrum, benefitting carriers as well as consumers and the USG by reducing costs and increasing the flexibility of use. Such an exchange would also support the

⁶ *Id.* at ¶ 55.

⁷ *Id.* at ¶ 135.

Commission’s goal of “promoting efficient and widespread use of the 3.5 GHz band for a variety of potential users.”⁸

Cantor Telecom believes that this type of spectrum exchange would best be managed by an independent and disinterested third party who can compile and make available the necessary information to facilitate these diverse uses in the most efficient manner. If the rules allow for such an exchange, then an experienced broker and exchange operator would be able to utilize its expertise to provide an electronic marketplace through which operators can come together to share this limited and valuable resource. Such an exchange could provide the necessary interference predictions to protect operators, and the exchange operator could actively work with operators to resolve any claims of interference as well as provide dynamic usage reporting. Moreover, a spectrum exchange would be compatible with geolocation database technology, which would serve as the underlying mechanism to assign frequencies and authorize spectrum users to transmit.

Certain requirements must be met in order to obtain maximum value of use rights required for successful implementation of a spectrum exchange. First, information regarding the commercial utilization of the 3.5 GHz spectrum resource must be published. Second, holders of use rights must be able to easily and freely exchange such rights while complying with rules and regulations associated with use right ownership. Use rights should be divisible by geography, time and capacity in order to derive maximum value per unit. Once set, each use right must be free tradable on a liquid,

⁸ *Id.* at ¶ 8. See also *In the Matter of Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Notice of Proposed Rulemaking, FCC 12-148, ¶ 14 (rel. Dec. 12, 2012) (“The Commission recognizes the shortage of available spectrum for commercial broadband uses in this country and the urgent need to make additional spectrum available . . .”).

reliable exchange. Third, the USG must receive adequate recompense for allowing the 3.5 GHz spectrum resource available to non-Incumbent users. Spectrum, a finite public resource owned and administered by the USG, increasingly drives the United States economy and a virtual innovation economy globally. Just as use right holders must receive fair value for holdings they acquire in the aftermarket, the USG must receive value it attains for issuing initial spectrum use rights to ensure a properly functioning economy.

A. Spectrum Access Administration

The Commission seeks comment on SAS administration functions and proposes the possibility of multiple SAS administrators to ensure that consumers are provided with choices in the marketplace.⁹ The SAS would necessarily be integrated in the Spectrum Exchange design that Cantor Telecom proposes below. Cantor Telecom does not foresee any issue with integrating an SAS with multiple administrators into its technology. The SAS will be essential to provide secondary market participants with use right information and to resolve any interference issues that might arise. The Commission should, however, retain the flexibility to adapt SAS administrator functions as necessary to promote successful operation and maintenance of the secondary exchange.

B. Use Right Information

The Commission discusses the type of information that must be provided to the SAS at the time any Citizen's Broadband Radio Service Device ("CBSD") is registered and at regular intervals thereafter, including (1) geographic location (within ± 50 meters horizontal and ± 3 meters vertical); (2) antenna height above ground level (meters); (3) requested authorization status (Priority Access or General Authorized Access); (4) unique

⁹ 3.5 GHz FNPRM at ¶¶ 91, 95.

FCC identification number; (5) user contact information; and (6) unique serial number.¹⁰ Cantor Telecom supports the publication of technical and user information and notes that if additional information regarding usage is or becomes important to the successful operation of services utilizing the 3.5 GHz spectrum, the Commission should build in flexibility, to the extent permissible, to require additional reporting requirements as necessary as usage information may be vital to the valuation of licenses in the secondary markets and to the monetization of 3.5 GHz licenses overall.

In response to the FCC's request for comment regarding whether a separate database should be established for federal information and operations,¹¹ Cantor Telecom acknowledges that certain information regarding the utilization of the 3.5 GHz spectrum resource will necessarily be classified and not available to the public. Such classified information is expected to include particular uses by 3.5 GHz Incumbents. The USG should authorize an agency to filter all classified information regarding 3.5 GHz utilization by Incumbent users and make available to the public only such information as is necessary to attain maximum value for non-Incumbent use rights. Cantor Telecom proposes that the appropriate agency responsible for this task would ideally be either a USG agency or a trusted contractor with a history of successfully handling classified information on behalf of the USG. The dissemination of filtered/macro information regarding Incumbents' use of 3.5 GHz spectrum resource utilization will enable parties holding (or interested in potentially holding) non-Incumbent use rights to 3.5 GHz spectrum resources to more accurately appraise the value of such use rights.

¹⁰ *Id.* at ¶ 62.

¹¹ *Id.* at ¶ 95.

Cantor Telecom proposes that non-Incumbent use right holders should not be able to restrict any information regarding their use of 3.5 GHz spectrum resources. Unrestricted dissemination of information where possible is essential to the valuation of non-Incumbent 3.5 GHz use rights. While some information regarding Incumbents' utilization will necessarily be restricted, accurate use right valuation will be derived so long as: 1) the rules pertaining to such information classification are clear and 2) non-Incumbent holders of use rights do not restrict the publication of information pertaining to their use.

The following table illustrates a proposed classification hierarchy with respect to published information regarding 3.5 GHz spectrum resource utilization required for successful implementation of a spectrum exchange.

	Incumbent Information	Non-Incumbent Information
Geography of 3.5 GHz use right	Non-classified ¹²	Non-classified
Specific bands within 3.5 GHz used	Non-classified	Non-classified
Measure of historical use (measured as % of theoretical capacity over time)	Quasi-classified (indicative/filtered so as not to indicate specific time/volume of use)	Non-classified (specific information regarding use, both in terms of time and volume)
Real time capacity utilization	Classified	Non-classified (real-time reporting)
Identity of use right holder	Classified	Non-classified

C. Electronic Spectrum Exchange

The USG should establish an electronic exchange modeled on platforms which exist for the trading of other USG securities. Cantor Telecom envisions that 3.5 GHz spectrum resource use rights, as well as other spectrum resources issued by the USG, will

¹² Incumbent information concerning geographic use rights would be limited to data deemed appropriate for public dissemination.

be securities held and transferred in much the same way as other USG securities. The following table illustrates comparable security features:

	USG Bond	Spectrum Use Right
Value	Right to receive fixed-rate of interest each period prior to maturity, at which point face value returned to investor	Right to utilize up to maximum amount of capacity each period prior to maturity at which point spectrum returned to USG
Maturity	3 years, at which point exchangeable for face value in cash	3 years, at which point use rights expire
Security	Full faith and credit of the USG	USG use right guarantee

Key aspects of the USG spectrum resource exchange (SRE) include (1) universal access to information; (2) dynamic transactional access by and among authorized market participants; (3) real-time reporting of 3.5 GHz spectrum resource use right utilization; and (4) market maintenance.

1. Universal Information Access

Authorized market participants should have access to historical and real-time information pertaining to 3.5 GHz spectrum resource use right trade values and capacity utilized by use right holders. Cantor Telecom proposes that exchange information be published in an electronic format which enables the broadest possible dissemination of historical and real-time market information.

2. Authorized Market Participants

Authorized market participants should have dynamic transactional access to the SRE. Authorized market participants include USG, USG’s contractor responsible for filtering Incumbent 3.5 GHz resource utilization information for publication on USG SRE, the designated operator of USG SRE, qualifying SAS providers publishing use right information on USG SRE, and buyers and sellers of 3.5 GHz spectrum resource use

rights who qualify under the USG's rules and regulations regarding spectrum use rights ownership.

3. Real-Time Reporting

Real-time reporting of 3.5 GHz spectrum resource use right utilization is essential to successful implementation of the SRE. Non-Incumbent use right holders should be required to report 3.5 GHz spectrum capacity utilization to the USG SRE in real-time. Upon receipt of the information, the exchange operator would automatically upload and publish capacity utilization to the USG SRE.

4. Market Maintenance

Cantor Telecom envisions that market maintenance for the SRE would be accomplished by designating an operator responsible for (1) publishing unclassified USG SRE exchange data; (2) qualifying dynamic market participants; (3) arranging custody for use rights held and purchased by qualified market participants; and (4) assisting the USG and dynamic market participants in settling disputes related to 3.5 GHz spectrum resource use rights.

D. USG Recompense

The value of the 3.5 GHz spectrum resource use right market, and other potential USG spectrum resource use right markets, is significant. It is currently not possible to accurately appraise the value of the 3.5 GHz spectrum. Once launched, the USG SRE will be the USG's primary tool to determine appraised value for its 3.5 GHz spectrum resource.

Initially, Cantor Telecom proposes that the USG utilize the USG SRE to determine 3.5 GHz spectrum resource use rights: (1) in a finite geographic area, (2) for a

limited time frame and (3) which represent a subset of the aggregate 3.5 GHz spectrum expected to ultimately be made available to non-Incumbent users in order to test and refine the SRE model as necessary prior to roll-out on a national scale.

In order to initiate participation on the USG SRE by dynamic market participants, it is expected that the USG will set reserve prices for initial issuances of 3.5 GHz spectrum resource use rights. In setting future reserve prices, the USG will be informed by the performance of previous initial offerings of 3.5 GHz spectrum resource use rights. The expansion of 3.5 GHz spectrum resource use rights initial offerings will be contingent on the USG's confidence that the USG SRE and other tools it employs are appropriate indicators of fair value for such spectrum use rights.

The USG might consider benefits other than monetary proceeds in setting the reserve price for initial offerings of 3.5 GHz spectrum resource use rights. Such benefits may include (1) inducing broad dynamic market participation (especially in the early phases of the 3.5 GHz spectrum resource use right offering); (2) augmenting the amount and quality of use right value and utilization data to enable market participants to better appraise value of 3.5 GHz spectrum resource use rights; and (3) addressing concerns among qualified market participants regarding the availability and reliability of wireless services by offering discounted access to 3.5 GHz spectrum resource use rights.

While the Commission proposes to initially implement the NTIA-recommended exclusion zones to prevent interference to radar systems along the U.S. coasts,¹³ Cantor Telecom maintains that existing spectrum exchange and geolocation database technology has matured sufficiently to deliver on the Commission's vision for the 3.5 GHz band. Cantor Telecom's exchange and geolocation database technology operates in near real-

¹³ *Id.* at ¶ 135.

time, and can dynamically disaggregate and partition spectrum. Moreover, in the unlikely event of harmful interference, Cantor Telecom's exchange and geolocation database technology has the ability to incorporate third party solutions able to mute potential sources of interference to higher priority incumbent spectrum users. However, there is limited risk of interference to incumbent spectrum users in the 3.5 GHz band so long as the exclusion zones in coastal regions are appropriately implemented. New licenses can also be incrementally added to the SRE as the exclusion zones are reduced through greater interference analysis of small cell operations and interference mitigation techniques.

IV. SPECTRUM EXCHANGE IMPLEMENTATION

As previously discussed, Cantor Telecom believes that the SRE can be implemented expeditiously and maintained at a reasonable cost to the end user, thus allowing the FCC and NTIA to unlock this band for commercial use in the near term.¹⁴ Cantor Telecom anticipates the implementation of an exchange/database can be accomplished in less than six (6) months for the purpose of beta testing and trials once exclusion zones have been determined, theoretically making the 3.5 GHz band available for commercial use as early as late 2014 or early 2015, and helping to facilitate the en masse development of hardware and applications for the 3.5 GHz band before the end of the decade. The cost of maintaining the database can be passed through to end users through spectrum access charges, or, alternatively, through to the hardware manufacturers who can opt to prepay spectrum access fees for their customers in advance and recover the costs at the point of sale.

¹⁴ See July 31, 2013 Cantor Telecom Comments at 4-5.

Cantor Telecom believes that the SRE and underlying SAS can be appropriately designed to adequately protect USG incumbent spectrum user data. The user interface of the SRE does not need to provide information concerning incumbent uses of spectrum to new commercial entrants seeking access to specific frequencies. In response to a request for a frequency assignment the SRE only needs to provide the requesting party with a minimal amount of information. Specifically, requesting parties only need a frequency assignment and other complementary operating parameters (e.g., maximum output). Commercial parties do not need to be informed as to the specific location of government incumbent spectrum users or as to why they may have been given an alternative frequency assignment or power limitation. With respect to the information provided by the USG and/or military, only sufficient information to calculate an adequate protection zone around the incumbent is required. Such information might include basic operating parameters and antenna gain, but would not include sensitive information concerning the underlying application. Cantor Telecom also supports the implementation of rigorous security protocols and certification to ensure a secure spectrum environment.

* * *

V. CONCLUSION

For the foregoing reasons, Cantor Telecom urges the Commission to explore the use of a spectrum exchange of 3.5 GHz spectrum to increase liquidity and efficient use of this finite resource.

Respectfully submitted,

/s/

Andrew D. Lipman
Timothy L. Bransford
Denise S. Wood
Bingham McCutchen LLP
2020 K Street, N.W.
Washington, DC 20006
(202) 373-6000
(202) 373-6001 (Fax)
andrew.lipman@bingham.com
timothy.bransford@bingham.com
denise.wood@bingham.com

Counsel to Cantor Telecom Services, L.P.

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