

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of:)	
)	
Use of Spectrum Bands Above 24 GHz For Mobile Radio Services)	GN Docket No. 14-177
)	
Amendment of the Commission’s Rules Regarding the 37.0-38.6 GHz and 38.6-40.0 GHz Bands)	ET Docket No. 95-183 (Terminated)
)	
Implementation of Section 309(j) of the Communications Act—Competitive Bidding, 37.0-38.6 GHz and 38.6-40.0 GHz Bands)	PP Docket No. 93-253 (Terminated)
)	
Petition for Rulemaking of the Fixed Wireless Communications Coalition to Create Service Rules for the 42-43.5 GHz Band)	RM-11664

To the Commission:

COMMENTS OF JAMES EDWIN WHEDBEE ON NOTICE OF INQUIRY

COMES NOW the undersigned, JAMES EDWIN WHEDBEE, who pursuant to Sections 1.415 and 1.419 of the Commission’s rules and regulations (47 C.F.R. §§ 1.415, 1.419) and the Commission’s invitation in the above-captioned proceedings, offers his following comments. Where appropriate to so infer from the comments which follow, pursuant to Section 1.41 of the Commission’s rules and regulations (47 C.F.R. § 1.41), the undersigned informally requests any Commission actions subsequent to these proceedings be, at least in part, governed by those of these comments from which broader consensus develops.

Part One – Responses to the Commission's General Questions

1. In its Notice of Inquiry, FCC 14-154 (Page 8-Question 1), the Commission asks: “*Will it be feasible to provide mobile services above 24 GHz?*” My response is simply “Yes.”

2. In its Notice of Inquiry, FCC 14-154 (Page 8-Question 2), the Commission asks: *“To what extent will the viability of mobile service above 24 GHz be dependent on having complementary access to mobile services in lower frequency bands?”* My response is “That depends, as addressed in the comments which follow.” Initial deployment of broadband over 24 GHz may require a UHF or SHF complement. However, as later discussed in these comments, I believe >24 GHz bands should be secondarily authorized for non-interference use on an auxiliary basis by existing wireless broadband licensees. For these same reasons, however, broadband over 24 GHz in its initial stages shall provide an extremely important back-up to existing wireless broadband, so there are worthwhile synergies to explore in doing this in the initial buildout. Likewise, where >24GHz is providing backhaul, it is a complement to UHF/SHF broadband. Those issues aside, while some may raise propagation concerns which seem to contradict me on this point, there is no reason inherent in the >24GHz band which poses an immediate obstacle to use of the >24GHz band independent and apart from those wireless broadband services at lower frequencies. In communities where wireless broadband frequencies are saturated, introduction of >24GHz broadband may alleviate network congestion, reduce interference, and create a more robust electronic economy with improved employment, a more dependable stream of commerce, and improved throughput for transactions for any given user.

3. In its Notice of Inquiry, FCC 14-154 (Page 8-Questions 3 and 4), the Commission asks: *“What characteristics of the anticipated technology will be relevant to the choices of frequency bands above 24 GHz such as required bandwidth, propagation, availability of electronic components, antenna designs and costs of deployment?”* The Commission further asks: *“What characteristics of the anticipated technology are likely to inform the agency’s determination of what regulatory framework (or frameworks) for mobile services in the mmW bands will best serve the public interest?”* My response to both questions is that such technology already exists, and is conducive to adaptation to future changes in technology; accordingly, there is no general response I can give which portends

limitations upon these technologies. It is, therefore, both economically as well as technologically reasonable to allow this question to be determined in the future by market forces. The 57-64 GHz band generally provides an excellent example for unlicensed use, whereas an excellent example of licensed use may be found in the 71-95 GHz band.

4. In its Notice of Inquiry, FCC 14-154 (Page 8-Questions 5 and 7), the Commission asks: *“What characteristics of the technology are relevant to the manner in which mobile services in the mmW bands might coexist without impact on incumbent services that occupy the relevant frequency bands?”* Then later, the Commission asks: *“What technical and operational characteristics as well as interference mitigation techniques of the anticipated technologies for these bands need to be considered in assessing sharing and compatibility with in-band and adjacent band incumbent services? Are there other technical considerations the Commission should examine in enabling deployment of mobile services in bands above 24 GHz?”* My response is that the directionality, polarity, and small size of transmission facilities will make it very difficult for unintentional interference to occur, as the technologies and regulations associated with them largely assume highly directional antennas are being used. With the very high gains such directional antennas achieve, mobile units may operate with much lower powers to attain the same degree of fidelity in communications as higher powered mobile units in the UHF and SHF bands. This in mind, it is vitally important to focus on how, where, and when these antennas are used, their polarity, and transmitter duty factor (for example, some links may prefer to use bursts to limit transmission times in sensitive areas). For these reasons, I foresee few risks to incumbent users within existing technologies and it is in the economic interests of future technologies to incorporate new features which reduce further the likelihood of inadvertent interference-however unlikely it may be. Were it my place to do so, I'd personally advise the Commission to focus on antennas in bands above 24 GHz because this is the most cost-effective means by which this technology can be adapted to wireless broadband use, backhaul, and future innovations with both the

fewest limitations while fostering a cooperative regulatory climate between new services and incumbents.

5. In its Notice of Inquiry, FCC 14-154 (Page 8-Question 6), the Commission asks: *“Are there frequency bands contemplated for mobile use that are being considered for alternative uses and, if so, what might those alternative uses be? To what extent are such uses compatible or incompatible with the kinds of mobile wireless technologies being explored in this NOI?”* To this, my response would only be speculative; accordingly, I'll respond simply by suggesting that I lack sufficient information to form a specific response to this question.

6. The foregoing general responses broadly apply to the specific frequency bands within the Commission's NOI (Pages 1-25). Inasmuch as those technologies the Commission has already discussed which tend to mitigate interference and/or demonstrate propagation paths other than line-of-sight, I concur with the Commission's presumptive conclusions. Therefore, rather than repeatedly duplicate a response already given above, further comments and responses will not address the Commission's questions within each set of frequency bands, but rather focus on the combination of Part 15 uses, licensed uses, and use as an adjunct to existing licenses (much like Part 74 operates with respect to licensed broadcasters). To this end, in broad and general terms, I agree with the Commission's selection of the frequency bands for this NOI and agree with the proposed uses suggested by the Commission, as well as the tentative conclusions reached in support thereof.

Part Two – Authorizing Use of >24 GHz for Wireless Broadband and Backhaul

7. Pages 26 through 29 of the Commission's NOI discusses schemes for authorizing use of the spectrum as contemplated in the NOI. This part of my comments will deal strictly with those questions and ideas presented by the Commission.

8. Spectrum auctions are repeatedly suggested by the Commission. Paragraph 92 refers to

spectrum auctioning in connection with applications filed by existing telecommunications service licensees. If the idea is to ensure competition, auctions are tolerable. Paragraph 93 rightly points out that spectrum could lie fallow. I agree. The Commission in subsequent related paragraphs explains the complexities of licensing certain sized geographic areas, verifying buildouts, and so forth. For reasons logically extending from the Commission's own concerns as well as the natural limitations of the EHF spectrum, I also don't buy the Commission's concerns regarding a 'land rush' mentality...as long as UHF and SHF spectrum exists and technological innovations continue at these lower frequencies, suggestions of a 'land rush' are pure speculation apparently aimed at hyping demand where little exists. My comments which follow are logical extensions of the Commission's own notions of the limitations of auctioning spectrum in the >24 GHz bands.

My 'gut reaction' to auctioning millimeter-wave (mmW) spectrum such as this is to remind the Commission that the quickest way for the telecommunications services to get that spectrum for free is simply to refuse to participate further in spectrum auctions. Hying spectrum's value or talking up the commercial advantages of this particular spectrum will be seen for what it is: false advertising. Anybody wanting to use this spectrum must appreciate that it is inherently difficult to use for want of off-the-shelf equipment and lack of development, it will require significant up-front investment before even one cent of revenue may be generated, and because of molecular absorption and attenuation, this spectrum will not be as reliable for direct use by customers because of the likelihood for weather phenomena to impair links. Likewise, artificially creating demand by refusing to license spectrum until one pays at auction could be construed as extortion to deprive access to a natural resource; therefore, if auctioning for economic gain is proposed, tread lightly-as mentioned above, the best payback the industry can give the Commission for natural resource extortion is to boycott the auction process.

Moreover, in addition to the inequities of speculative auctioning, the spectrum being suggested for use by the Commission in this NOI already has incumbents who obtained their licenses without

auctioning. I'd question the equity of permitting incumbents to make unearned gains simply for being incumbents. Finally, inasmuch as this NOI is conceptual rather than demonstrative, there is a question as to just how much value one might attribute to EHF spectrum? ("Not much" I suspect is the answer at this time.) Aside from authorizing telecommunications services to continue spectrum warehousing and speculative investment in spectrum with dead links, this NOI does not satisfy the question, "How much need really exists for EHF spectrum?" If that question cannot be resolved with the word "overwhelming," then auctions are not a tool to develop innovative solutions within these bands, or for increasing competition, or for creating enhanced employment opportunities...especially since special equipment is needed just to get the signals in a building. Having paved this road with a cautionary tale, I do see spectrum auctions as useful tools in two (2) present-tense scenarios: [1] in metropolitan areas where spectrum might be crowded, auctions can resolve that overcrowding (when it occurs); and, [2] in cases where the Commission receives mutually exclusive applications for the same spectrum within the same geographic area using incompatible links. I also see spectrum auctions as beneficial when and if a great demand for spectrum >24 GHz exists in the distant future. Spectrum auctions in these three situations is useful. Pending some major development to establish an overwhelming critical demand for this spectrum, auctions are of limited benefit in the subject spectrum. Given the limited utility of spectrum auctions for this subject spectrum at this time, I recommend greater examination of the Commission's remaining options.

9. I strongly favor the Commission's nonexclusive licensing proposal in Paragraphs 97 through 99, if combined with the other two options the Commission proposes. Backbone licensees are afforded tremendous flexibility within this authorization scheme. Moreover, the dynamic spectrum coordination system permits proof of buildout, allows for interference mitigation, and provides for public disclosure of the network's present status and remaining potential for development. The limitations of this approach is the continued tendency of this industry to ignore rural communities

whose citizens are already at manifest disadvantage in obtaining broadband services. Accordingly, it will be necessary for nonexclusive licensing to be combined with secondary licensing and Part 15 use in a hybrid system.

10. Again, I strongly favor the Commission's Part 15 proposal in Paragraph 100 to keep 57 to 64 GHz within Part 15. I also suggest the Commission adopt a lower power level use within Part 15 for each of the spectrum bands which are the subject of this NOI. Why? So that rural communities aren't left out of these innovations while not making the costs so onerous that a typical rural community can't invest in 5G wireless broadband. All that said, to determine the status of any given network, I strongly recommend that 57-64 GHz operators voluntarily enter their links within the same dynamic spectrum coordination system envisioned by the Commission within its discussion of nonexclusive licensing. Existing Commission rules and regulations regarding 911 and emergency broadcast communications require an appreciation of the status within a given communications system, and for this reason, to the extent 57-64 GHz forms part of any network (even though its use is authorized under Part 15), it is essential to have its current operational status registered into the spectrum coordination system.

11. Finally, as an adjunct to the hybrid nonexclusive licensing and Part 15 operations above, I also like the Commission's idea of secondary authorizations in Paragraph 101 of the NOI. A proof of concept already exists for this idea: Part 74 already allows Part 73 licensees to operate broadcast auxiliary transmitters without further license on a secondary basis. In the same manner, those who have a license either within the existing UHF and SHF spectrum for wireless broadband or those new entrants who obtain a nonexclusive license, would have secondary authorization to operate on a non-interference basis to serve underserved (i.e., rural) areas or establish secondary backhaul links. Given the tendency for molecular attenuation of signals in these subject bands, and further given the prevalence for weather phenomenon to degrade or impair links, I see these secondary authorizations as

a matter of necessity to ensure end-users' experiences of 5G wireless doesn't prove to be its demise.

WHEREFORE, the undersigned respectfully submits for Commission consideration the foregoing comments and suggestions. Inasmuch as any consensus later develops herefrom, or inasmuch as any comments and suggestions hereinabove are concordant with an existing consensus, I request informally, pursuant to Section 1.41 of the Commission's rules, that such consensus be deemed the Commission's own decision and adopted at once.

Respectfully Submitted:

October 20, 2014

A handwritten signature in black ink, appearing to read 'James Whedbee', with a stylized flourish at the end.

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