

**PROPOSAL FOR LICENSING RURAL WIRELESS BROADBAND SYSTEMS
IN THE 3650 MHZ BAND**

Airspan Networks, Inc. (“Airspan”) submits the proposal herein for operations in rural areas in the 3650 MHz Band.

A. Introduction and Background

In its Report and Order and Memorandum Opinion and Order authorizing broadband operations in the 3650 MHz band,¹ the Federal Communications Commission (the “Commission”) adopted a streamlined licensing mechanism with minimal regulatory entry requirements in order to stimulate the rapid expansion of wireless broadband services, particularly in rural America. The centerpiece of the Commission’s rules for the 3650 MHz band are requirements relating to a national blanket license and registration of individual base stations in a common database, cooperation among operators to minimize interference among systems operating in the same geographic area, and the requirement that systems incorporate contention-based protocol technologies. Key among the Commission’s goals was the provision of low-cost, expeditious access to the 3650 MHz band for rural broadband providers, thereby stimulating the rapid expansion of broadband services in rural America, as well as promoting efficient use of the 3650 MHz band.

Eight parties filed petitions for reconsideration of the *3650 MHz Band Order* on a variety of grounds, most notably questioning the efficacy of and lack of technical specifications in the rules for a 3650 MHz band contention-based protocol, as well as purported deficiencies in the Commission’s blanket licensing/local registration scheme for the band. In light of the questions raised by the petitions for reconsideration, the Wireless Telecommunications Bureau has yet to release a public notice establishing a filing date for wireless licenses in the band, or adopt rules for reporting and filing database information.² In addition, the Office of Engineering and Technology has indicated that applications for equipment authorizations will be delayed pending resolution of technical issues raised in the reconsideration petitions associated with the incorporation of contention-based technologies in 3650 MHz systems.³ As a result, access to the spectrum for rural broadband deployments has been delayed for well over a year since release of

¹ In the Matter of Wireless Operations in the 3650-3700 MHz Band; Rules for Wireless Broadband Services in the 3650-3700 MHz Band; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band; and Amendment of the Commission’s Rules With Regard to the 3650-3700 MHz Government Transfer Band, *Report and Order and Memorandum Opinion and Order*, 20 FCC Rcd 6502 (2005) (“*3650 MHz Band Order*”).

² See *3650 MHz Band Order*, ¶ 32.

³ See OET Knowledge Database, Publication No. 476264, Feb. 14, 2004, available at <http://gullfoss2.fcc.gov/prod/oet/cf/kdb/forms/FTSSearchResultPage.cfm?id=25701&switch=P> (noting that the technical rules do not reference any specific technologies or protocols for the use of contention-based protocols, and that applications for equipment authorization will be delayed until the issue is resolved).

the *3650 MHz Band Order*, and will continue to be delayed until the Commission resolves the issues on reconsideration.

In response to discussions with Commission staff, Airspan submits the proposal herein for operations in rural areas that if adopted, will meet the key objectives laid out by the Commission in the *3650 MHz Band Order*. Specifically, Airspan recommends that rural areas, which would be subject to the streamlined licensing approach set forth herein, be defined as those communities eligible for U.S. Department of Agriculture, Rural Utilities Service (“RUS”) financing under Section 1738 of the RUS’ rules, 7 C.F.R. § 1738. Airspan also proposes a refinement to the national license/local registration scheme adopted in the *3650 MHz Band Order* that, while still using a national license/local registration database, would provide for mandatory coordination and negotiated operating agreements among potentially conflicting operations. Finally, Airspan proposes that the rules require that authorized 3650 MHz equipment include a carrier-sensing “*Detect and Protect*” mechanism, centrally controlled at the base station, which could be activated as circumstances warrant in particular market scenarios. This would be in place of an unspecified “contention-based protocol” currently included in the technical rules for the band.⁴

Overall, such an approach will allow the Commission to establish expeditiously a technology-neutral licensing regime for the operation of IEEE 802.16 WiMAX systems and other similar devices, including the operation of standard WiMAX-compliant customer premises equipment (“CPE”) in the band. The proposal addresses avoidance of interference to an existing operator at the base station by means of a *centrally controlled*, carrier-sensing technique, which operates “over the top” of any existing transmission standard, whether for WiMAX or other technologies.

Such an approach avoids cost and delay, by allowing for immediate deployment while the industry addresses the adoption of more advanced contention-based techniques for incorporation directly into the WiMAX standard. Any other approach would necessarily lead to years of delay in use of the band, as the industry seeks to coalesce around a common contention-based protocol. In addition, the carrier-sensing technique described herein can be easily implemented on other non-WiMAX based technologies.

Finally, the proposal furthers joint efforts by the Wireless Telecommunications Bureau and the RUS to provide essential information on programs, financial and other assistance regarding telecommunications opportunities for rural communities. The objective of the joint federal rural outreach initiative is to encourage greater access and deployment of wireless services to enhance economic development throughout rural America. The goal of this outreach initiative is to harmonize rules and regulations, harmonize outreach, and develop a joint Model Wireless Broadband Community Project.

⁴ Airspan also proposes additional refinements to the technical rules, which are discussed below.

B. Licensing and Registration Scheme

Airspan's proposal begins with the national license/local registration process adopted in the *3650 MHz Band Order*, refined to include a mandatory process for resolving conflicts during an initial registration period.⁵ Airspan proposes that the Commission or third party designee would create an online database that holds the registration requests of operators.

After obtaining a national license, operators would submit "request to build" registrations for specific base station sites by an initial filing date specified by the Commission in a Public Notice, such as 45 days from the date of Public Notice. The request to build registrations will include for each base station, provisional GPS site coordinates, radio tower height, EiRP, frequency channels,⁶ certification of a current lease agreement or other authorization for an existing base station antenna site, a description of equipment to operate at such site that is either currently approved or for which approval is pending, and such other criteria as the Commission deems appropriate, which would serve to demonstrate an intent to construct, and minimize the potential for squatters. The 45-day period following Public Notice is intended to give applicants sufficient time to put in place preliminary plans, particularly taking account of the fact that operators will likely have differing entry strategies, including exclusively local strategies, versus multi-market and multi-state rollouts.

The GPS coordinates, radio tower height, and EiRPs for each registered base station, define a "transmission zone" based on a pre-defined field strength threshold. Fifteen days following the initial registration, registrants will be required to certify whether or not, for each of their registered base stations, there are "Interfering Base Stations," *i.e.*, registered base stations with "transmission zones" that overlap with the transmission zones of other registrants' base stations.

Fifteen days following the date of such certifications, operators may object to each certification of no Interfering Base Stations. For each certification of no Interfering Base Station that has not been objected to, an authorization to build such approved infrastructure shall be deemed granted on the 31st day following initial registration. For each base station that is subject to an objection from an Interfering Base Station, the operators will have a 90-day period from the objection deadline to conclude a mutually agreed "Operating Agreement", *i.e.*, operating procedures for the Interfering Base Stations that will avoid interference among operators and facilitate QoS.⁷

⁵ As discussed below, base station operations registered through this process would then be protected to a threshold quality of service ("Threshold QoS"). This addresses concerns with the current rules that the ability of operators to enter markets at any time regardless of congestion, would create disincentives for deployment, since, under the current rules, an operator's QoS could be degraded by later entrants.

⁶ Airspan recommends that each base station be limited to no more than three channels.

⁷ For example, a local Operating Agreement might result in operators relocating facilities in a geographic area to avoid interference and agree on otherwise-conflicting operators using different channels. On the other hand, in certain circumstances operators may find it more efficient to share channels, in which case the detect and protect technique can be included as part of the Operating Agreement.

If within the 90-day period, an Operating Agreement is reached among the registered operators, the operators will file a certification with the Commission or third party designee of the existence of the Operating Agreement, and the following day, an authorization to build each base station covered by the Operating Agreement will be deemed granted. If at the end of the 90-day period no Operating Agreement is reached, the matter shall be presented to the Commission, or its designate, for a 90-day mandatory mediated coordination. If at the end of the 90-day mandatory mediated coordination, the operators of Interfering Base Stations are unable to agree to an operating agreement, the coordinator shall submit a recommended operating plan to the Commission for approval.

Operators shall be granted provisional authorizations to build in accordance with the recommended plan, pending Commission approval, but will ultimately be required to modify their operations in accordance with any Commission amendment to the recommended plan. If at any point in the process prior to final Commission action, the parties reach agreement on an operating plan, they may file certification of the existence of the resulting Operating Agreement, and will be deemed granted authorization to build the stations covered by the Operating Agreement the following day.

Once an operator has constructed its system and commenced commercial service, the operator is required to update its registration through a “System Activation” registration, submitting the following final base station information to the database:

- Frequency channel (a maximum of 3 per base station site)
- Channel bandwidth (max of 5 MHz)
- Total EIRP
- GPS site coordinates
- Antenna Gain
- Antenna Radiation Pattern
- Antenna Azimuth Bearing
- Antenna mechanical downtilt
- Base Station Receiver Threshold

All active systems must be able to implement the “detect and protect” capability, if necessary as part of an Operating Agreement, or in connection with a recommended or approved operating plan. If an operator does not file a system activation registration and commence commercial operation of a registered base station within three year period from the date the base station is authorized, the build grant and registration for the base station will be rescinded and deleted from the database.

After the conclusion of the initial registration phase described above, operators may register additional base stations, subject to the certification/objection process described above. Where an objection is received from an incumbent registrant, the new operator shall be under an obligation to protect the operations of incumbents to a threshold quality of service (“Threshold

QoS”).⁸ New operators can use the on-line database to plan and model deployments before installation and can in almost all circumstances use propagation modeling techniques to determine if the activation of a system would cause incumbents’ performance to fall below the Threshold QoS.

If an operator believes that the new base station is reducing its performance below the Threshold QoS, the incumbent can immediately refer the matter to mandatory coordination. In cases where it cannot be resolved between operators through mandatory coordination, including the use of the carrier sense capability (if not already employed as part of an existing Operating Agreement), the matter can be brought before the Commission. In cases where it is determined that a new operator has reduced incumbent operations below the Threshold QoS, the new operator’s site registration will be revoked and deleted from the database.

C. System Parameters

Carrier sensing will be designed such that a base station (and consequently, subscriber stations) will be prevented from transmitting if a defined carrier sensing threshold is exceeded.⁹ This protects existing operators from interference from a new base station deployments operating on non-registered channels or in the event that adequate interference planning was not undertaken prior to registration. This carrier sensing algorithm will still require operators to plan using normal deployment considerations for non-synchronized Time Division Duplex (“TDD”), mixed-operator networks.

Airspan notes that certain of the petitions and commenters suggest that carrier sensing techniques are only suitable for low-power, short range applications like WiFi. While this may be the case with systems that do not have centrally-controlled uplink transmissions from the base station (WiFi is an example of such a system without central coordination), with TDD centrally coordinated systems, any transmissions from adjacent base stations will be detected at the base station. Transmissions from subscriber stations (or terminal stations) may not be directly detected, but they are under strict control of the base station so will not occur if the base station has detected another system. Thus criticisms of “listen and protect” systems raised by certain parties, are inapposite to the carrier sensing technique Airspan proposes, which would be centrally controlled by the base station.

⁸ It is envisioned that new operators may commence operations prior to construction by incumbent registrants, and only need to protect operations of the incumbent registrant upon the incumbent’s commencement of operations. In such circumstances, the new operator enters the market and builds at its own risk, and may be required to discontinue operations when the registered incumbent turns on service.

⁹ This protect and detect, carrier-sense technique is currently being used in WiMAX-based equipment supplied by Airspan to an operator in Japan for a Tokyo-wide network deployment operating in the 4.9 GHz band. This technique has been accepted by the Japanese regulator for equipment operating in the 4.9 GHz band, and the Tokyo deployment is the world’s largest rollout of WiMAX to date.

The following system parameters will require the definition of performance limits within the Commission's regulations for this band:¹⁰

- EiRP – Airspan proposes a maximum EiRP of +52dBm for rural deployments.¹¹
- Channel Bandwidth and Guardbands – Airspan recommends a maximum channel bandwidth of 5 MHz and that the rules provide for 5 MHz guard bands around active channels.
- Tx Signal Peak to mean ratio
- Rx Maximum Operating level
- Carrier to Interference Thresholds
- In-band and out-of-band emissions
- Carrier Sensing Thresholds and masks
- QoS Threshold (to define level at which incumbent operations will be protected from interference from later entrants)
- Field Strength Threshold (to define base station transmission zones)

D. Conclusion

A simple on-line database that registers and tracks deployments, combined with a carrier sensing mechanism that minimizes harmful interference, will facilitate efficient and rapid deployment of rural broadband services using 3650 MHz technologies. This two-part solution will also ensure that, over the long run, the spectrum is utilized to the maximum extent, while newly-deployed commercial services are not disturbed. For all these reasons, the proposal set forth herein meets the key objectives of the *3650 MHz Band Order* and should be adopted on reconsideration.

¹⁰ After meeting with Commission staff on the instant proposal, Airspan will be in a position to provide recommendations for those parameters which are not specified herein.

¹¹ The rules currently allow for a maximum EiRP of +36dBm. We believe that the use of a carrier-sense technique with 5 MHz guard bands around active channels, will allow for a higher EiRP limit than would normally be applied to license exempt bands.